# ds3 fusarium oxysporum limpieza de datos

February 1, 2021

Limpieza de datos

```
[1]: import pandas as pd
  import seaborn as sns
  import numpy as np
  import os
  import matplotlib.pyplot as plt
  import warnings
  warnings.filterwarnings("ignore")
  %matplotlib inline
  from mlxtend.preprocessing import standardize
  from scipy import stats
```

### 1 Declaración de variables

```
[2]: organismo ="fusarium oxysporum"
    dataset = 3
    nombre = ("ds" + str(dataset) + "_" + str(organismo))
    nombre2 = (str(organismo)+ " dataset " + str(dataset))
    r2 = ("Datos/resultados/"+ str(organismo) + "/" + str(nombre) + "/
     →transformaciones/sin_filtrar")
    r3 = ("Datos/resultados/"+ str(organismo) + "/" + str(nombre) + "/
     nom1 = ("/ds" + str(dataset) + "_AAC_efectores_" + str(organismo) + ".txt")
    nom2 = ("/ds" + str(dataset) + "_ACC_hidro_mass_efectores_" + str(organismo) +__
    nom3 = ("/ds" + str(dataset) + "_ACC_mass_efectores_" + str(organismo) + ".txt")
    nom4 = ("/ds" + str(dataset) + "_ACC_hidro_efectores_" + str(organismo) + ".
     →txt")
    nom5 = ("/ds" + str(dataset) + "_PseAAC_hidro_mass_efectores_" + str(organismo)__
     \hookrightarrow+ ".txt")
    nom6 = ("/ds" + str(dataset) + " PseAAC mass efectores " + str(organismo) + ".
    nom7 = ("/ds" + str(dataset) + " PseAAC hidro efectores " + str(organismo) + ".
     →txt")
```

```
nom8 = ("/ds" + str(dataset) + "_AAC_no_efectores_" + str(organismo) + ".txt")
nom9 = ("/ds" + str(dataset) + "_ACC_hidro_mass_no_efectores_" + str(organismo)__

→+ ".txt")

nom10 = ("/ds" + str(dataset) + " ACC mass no efectores " + str(organismo) + ".
nom11 = ("/ds" + str(dataset) + "_ACC_hidro_no_efectores_" + str(organismo) + ".
→txt")
nom12 = ("/ds" + str(dataset) + " PseAAC hidro mass no efectores " + 11

→str(organismo) + ".txt")
nom13 = ("/ds" + str(dataset) + "_PseAAC_mass_no_efectores_" + str(organismo) +__
nom14 = ("/ds" + str(dataset) + "_PseAAC_hidro_no_efectores_" + str(organismo)__

→+ ".txt")

#Efectores
AAC_efec= pd.read_csv(str(r2) + str(nom1), header=None,prefix='X',sep=',')
ACC_hidro_mass_efec = pd.read_csv(str(r2) + str(nom2),__
→header=None,prefix='X',sep=',')
ACC_mass_efec = pd.read_csv(str(r2) + str(nom3), header=None,prefix='X',sep=',')
ACC_hidro_efec = pd.read_csv(str(r2) + str(nom4),__
→header=None,prefix='X',sep=',')
PseAAC_hidro_mass_efec = pd.read_csv(str(r2) +str(nom5),__
→header=None, prefix='X', sep=',')
PseAAC_mass_efec = pd.read_csv(str(r2) + str(nom6),__
→header=None,prefix='X',sep=',')
PseAAC_hidro_efec = pd.read_csv(str(r2) + str(nom7),__
→header=None,prefix='X',sep=',')
#No efectores
AAC no efec= pd.read csv(str(r2) + str(nom8), header=None, prefix='X', sep=',')
ACC_hidro_mass_no_efec =pd.read_csv(str(r2) + str(nom9),__
→header=None,prefix='X',sep=',')
ACC_mass_no_efec =pd.read_csv(str(r2) + str(nom10),__
→header=None,prefix='X',sep=',')
ACC_hidro_no_efec =pd.read_csv(str(r2) + str(nom11),__
→header=None,prefix='X',sep=',')
PseAAC_hidro_mass_no_efec =pd.read_csv(str(r2) + str(nom12),__
→header=None,prefix='X',sep=',')
PseAAC_mass_no_efec =pd.read_csv(str(r2) + str(nom13),__
→header=None,prefix='X',sep=',')
PseAAC_hidro_no_efec =pd.read_csv(str(r2) + str(nom14),__
 →header=None,prefix='X',sep=',')
```

# 2 Composición de aminoácidos (AAC)

```
[3]: transf = "Composición de aminoácidos (AAC) "
     etiq="efectores "
     estado = "con valores atípicos.\n"
     df=""
     for etiq in "efectores", "no_efectores":
         titulo = (str(transf) + str(etiq) + " " + str(nombre2) + ", " +str(estado))
         print (str(etiq))
         if etiq == "efectores":
             df=AAC_efec
         if etiq == "no_efectores":
             df=AAC_no_efec
         #del df['X20']
         print (str(titulo) + "Valores del documento csv.\n")
         print (df)
         print ("\n\n" + str(titulo) + "Estadísticas.\n")
         print(df.describe())
         print ("\n\n")
         #Gráfica de caja y bigotes
         sns.set(style="whitegrid")
         fig , ax = plt.subplots(figsize=(14,7))
         ax = sns.boxplot(data=df)
         ax.set_title(organismo +' '+str(etiq) +" dataset "+ str(dataset)+"u
      →"+str(transf)+" "+str(estado))
```

#### efectores

Composición de aminoácidos (AAC) efectores fusarium\_oxysporum dataset 3, con valores atípicos.

```
XΟ
               X1
                     Х2
                           ХЗ
                                 Х4
                                        Х5
                                              Х6
                                                      Х7
                                                            Х8
                                                                  X9 \
0
    10.204
            5.102 2.721 5.782 1.361
                                      6.463 2.381 10.544 3.061 4.082
1
     8.304
           4.152 4.498 6.228 0.865 8.304
                                            3.633 5.363 2.941 3.806
2
    9.179
           7.729 1.932 8.213 0.483
                                     7.246
                                            3.865
                                                   5.314 2.899 2.899
    10.526
            3.204 5.034 4.119 1.373
                                                   7.323 2.975 4.805
3
                                      3.204 4.348
4
    5.545
            8.688 5.176 5.915 1.664
                                      7.948 4.806
                                                   5.176 2.588 4.991
. .
      ...
                         ...
                                        •••
                                             •••
            3.797 1.266 7.595 1.582
                                      6.962
                                                   7.595 3.165 6.962
995
   10.127
                                            4.114
996
    6.535
           5.847 3.955 5.503 0.860
                                      7.395 5.589
                                                   5.159 2.150 6.019
997
    8.937 10.894 3.327 7.502 0.587 11.220 4.044
                                                   5.023 3.653 2.609
998
    6.977 6.566 3.967 5.198 1.778
                                    6.566 4.651
                                                   5.198 2.462 4.514
999
    9.846
            3.089 3.282 3.089 1.544
                                      3.282 1.544
                                                   7.915 1.737 7.722
```

```
X11
                X12
                       X13
                             X14
                                    X15
                                           X16
                                                 X17
                                                        X18
                                                              X19 \
        5.102 2.381 3.741
                           3.061
                                 7.483 5.782 2.041 1.361
                                                            9.524
0
1
       10.035
              2.422 4.498
                            5.190 5.536
                                         4.325
                                               1.211
                                                      3.287
                                                            6.920
2
                                              0.966 2.899 7.729
        5.314
              4.348 2.415
                            2.899 6.763
                                         6.280
3
        6.865
               1.144 5.263
                            3.890 6.865
                                         7.323
                                               3.204 5.034
                                                            6.407
              2.033 3.142
                            5.176 8.503
                                         6.470 1.664 1.479
4
        6.839
                                                           3.512
. .
                        •••
                            •••
995 ...
        5.063
              1.899 1.899
                            5.063 6.013
                                         6.013 2.215 1.899
                                                            7.278
996
        6.793
              2.923 3.869
                            5.073 6.793
                                         5.331 0.860 3.611
                                                            5.159
997
        8.806
              1.044 1.044
                            6.001 9.132 3.979 0.652 1.566 3.327
998
        3.283
              1.915 4.378
                           5.198 9.986 7.387 2.052 2.462 4.651
999
        2.124
              3.089 7.143 3.861 6.564 8.880 2.703 3.475 7.722
           X20
0
     efectores
1
     efectores
2
     efectores
3
     efectores
4
     efectores
```

[1000 rows x 21 columns]

efectores

efectores

efectores

efectores

efectores

Composición de aminoácidos (AAC) efectores fusarium\_oxysporum dataset 3, con valores atípicos.

Estadísticas.

.. 995

996

997

998

999

	XO	X1	X2	ХЗ	X4	\
count	1000.000000	1000.000000	1000.000000	1000.000000	1000.000000	
mean	8.155106	5.825163	3.873596	5.663506	1.504349	
std	2.384638	2.216708	1.507853	1.795504	1.193571	
min	0.000000	0.000000	0.000000	0.000000	0.000000	
25%	6.703000	4.446500	2.964500	4.585250	0.755750	
50%	7.993500	5.653000	3.722500	5.714000	1.289500	
75%	9.357000	7.042000	4.587750	6.667000	1.954250	
max	23.158000	17.143000	16.981000	12.791000	10.526000	
	Х5	Х6	Х7	Х8	Х9	\
count	1000.000000	1000.000000	1000.000000	1000.000000	1000.000000	
mean	6.201953	4.068910	6.616051	2.484965	5.225028	
std	2.330782	1.830632	2.293229	1.190881	1.713239	

min	0.000000	0.000000	0.000000	0.000000	0.833000	
25%	4.823750	2.982000	5.085000	1.741750	4.224500	
50%	6.077000	3.857500	6.446000	2.392000	5.097000	
75%	7.401000	4.771250	7.874000	3.137250	6.189250	
max	25.676000	21.667000	24.363000	8.654000	13.793000	
	X10	X11	X12	X13	X14	\
count	1000.000000	1000.000000	1000.000000	1000.000000	1000.000000	
mean	8.871221	5.050389	2.362169	3.802543	5.788848	
std	2.489582	2.202072	1.142870	1.596464	2.254008	
min	0.000000	0.000000	0.238000	0.000000	0.000000	
25%	7.343000	3.533000	1.652250	2.781000	4.385000	
50%	8.840000	4.796500	2.180500	3.682500	5.526000	
75%	10.344500	6.263250	2.894500	4.673750	6.835750	
max	19.921000	16.438000	16.129000	12.000000	16.667000	
	X15	X16	X17	X18	X19	
count	1000.000000	1000.000000	1000.000000	1000.000000	1000.000000	
mean	8.000149	6.066231	1.610260	2.876146	5.953405	
std	2.516416	2.097649	0.970564	1.344996	1.856549	
min	0.000000	0.000000	0.000000	0.000000	0.000000	
25%	6.393750	4.911500	0.955000	2.049250	4.842250	
50%	7.746000	5.913000	1.518000	2.753500	5.843000	
75%	9.337500	6.878750	2.181250	3.641750	7.026500	
max	24.719000	21.839000	9.091000	13.514000	12.931000	

### no\_efectores

Composición de aminoácidos (AAC) no\_efectores fusarium\_oxysporum dataset 3, con valores atípicos.

	XO	X1	X2	ХЗ	Х4	Х5	Х6	Х7	Х8	Х9	\
0	9.315	7.671	3.014	4.932	0.000	10.959	3.836	3.836	1.644	8.767	
1	10.963	3.654	3.987	3.987	0.332	5.648	2.326	7.973	0.997	5.648	
2	5.417	2.917	1.667	5.417	1.667	7.083	5.417	5.417	2.500	7.917	
3	7.427	3.714	4.775	2.387	1.061	2.122	2.653	8.223	1.061	9.019	
4	2.721	10.204	4.082	6.122	1.361	3.401	2.041	6.122	3.401	3.401	
995	10.919	7.279	5.199	7.452	1.386	6.066	2.946	4.853	3.640	5.893	
996	9.958	5.085	4.661	4.873	1.271	6.780	2.754	6.568	2.331	6.144	
997	8.668	5.708	4.228	4.651	1.903	6.554	3.805	7.188	2.537	6.554	
998	8.976	7.854	2.665	5.750	2.945	5.750	5.610	6.592	2.104	3.787	
999	6.119	5.402	2.103	4.159	3.107	8.748	2.390	4.637	5.354	7.553	
	X1	1 X12	X13	X14	X15	X1	6 X1	7 X1	8 X1	9 \	
0	9.31	5 2.466	1.918	6.849	5.479	3.56	2 0.27	4 3.01	4 4.93	2	

```
1
       8.638 1.993 3.654 2.326
                                   6.977
                                           8.306 0.997
                                                        3.322 6.977
2
       4.583 4.167
                     2.917
                           3.333
                                   9.583
                                           4.167
                                                  2.083
                                                        5.000 6.250
3
       4.775 1.857
                    9.284 5.040
                                   5.305
                                           5.570
                                                         4.509 7.162
                                                  2.387
4
       3.401 0.680 4.762 9.524
                                  13.605 10.204 1.361
                                                         1.361 5.442
                        •••
                             •••
                                             ...
                                                  •••
. .
                   •••
995
       4.506
             1.560
                     2.600
                           3.293
                                   9.705
                                           5.546 1.213
                                                        1.906
                                                               3.466
996
    ... 4.661 1.907
                     4.873
                           5.085
                                   7.627
                                           6.144 1.271
                                                         2.966
                                                               8.475
997
       5.285 3.171
                    3.171 4.863
                                   7.400
                                           5.074 0.846
                                                        2.326
                                                               6.131
998
       2.525 2.525
                    4.067
                           5.330
                                   7.714
                                           5.610 1.823
                                                        2.384
                                                               6.031
999
    ... 6.931 1.530
                    3.920 1.195
                                   6.788
                                           7.505 1.912 3.537
                                                               6.501
```

X20

- 0 no\_efectores
- 1 no\_efectores
- 2 no\_efectores
- 3 no\_efectores
- 4 no\_efectores

. .

- 995 no\_efectores
- 996 no\_efectores
- 997 no\_efectores
- 998 no efectores
- 999 no\_efectores

[1000 rows x 21 columns]

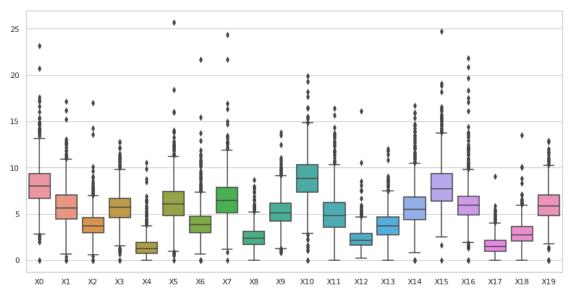
Composición de aminoácidos (AAC) no\_efectores fusarium\_oxysporum dataset 3, con valores atípicos.

Estadísticas.

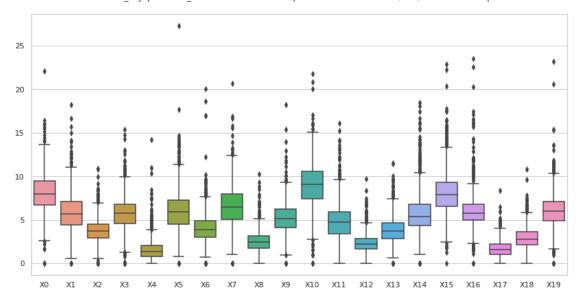
ХО	X1	X2	Х3	X4	\
1000.000000	1000.000000	1000.000000	1000.000000	1000.000000	
8.138903	5.839727	3.801352	5.674745	1.584666	
2.270966	2.265445	1.464776	2.011903	1.355950	
0.000000	0.000000	0.000000	0.000000	0.000000	
6.716000	4.396000	2.897750	4.580750	0.785750	
7.993000	5.701000	3.704000	5.748500	1.365000	
9.484500	7.092250	4.525750	6.774000	2.014750	
22.078000	18.182000	10.914000	15.363000	14.156000	
X5	Х6	Х7	Х8	Х9	\
1000.000000	1000.00000	1000.000000	1000.000000	1000.000000	
5.975062	4.02935	6.640659	2.498192	5.223348	
2.525931	1.79665	2.328634	1.235208	1.866947	
0.000000	0.00000	0.000000	0.000000	0.000000	
4.492250	2.97775	5.058000	1.702500	4.093750	
5.882000	3.86650	6.488500	2.422000	5.135000	
	1000.000000 8.138903 2.270966 0.000000 6.716000 7.993000 9.484500 22.078000 X5 1000.000000 5.975062 2.525931 0.000000 4.492250	1000.000000       1000.000000         8.138903       5.839727         2.270966       2.265445         0.000000       0.000000         6.716000       4.396000         7.993000       5.701000         9.484500       7.092250         22.078000       18.182000         X5       X6         1000.00000       1000.00000         5.975062       4.02935         2.525931       1.79665         0.000000       0.00000         4.492250       2.97775	1000.000000         1000.000000         1000.000000           8.138903         5.839727         3.801352           2.270966         2.265445         1.464776           0.000000         0.000000         0.000000           6.716000         4.396000         2.897750           7.993000         5.701000         3.704000           9.484500         7.092250         4.525750           22.078000         18.182000         10.914000           X5         X6         X7           1000.000000         1000.00000         1000.00000           5.975062         4.02935         6.640659           2.525931         1.79665         2.328634           0.000000         0.00000         0.000000           4.492250         2.97775         5.058000	1000.000000         1000.000000         1000.000000         1000.000000           8.138903         5.839727         3.801352         5.674745           2.270966         2.265445         1.464776         2.011903           0.000000         0.000000         0.000000         0.000000           6.716000         4.396000         2.897750         4.580750           7.993000         5.701000         3.704000         5.748500           9.484500         7.092250         4.525750         6.774000           22.078000         18.182000         10.914000         15.363000           X5         X6         X7         X8           1000.000000         1000.000000         1000.000000         1000.000000           5.975062         4.02935         6.640659         2.498192           2.525931         1.79665         2.328634         1.235208           0.000000         0.000000         0.000000         0.000000           4.492250         2.97775         5.058000         1.702500	1000.000000         1000.000000         1000.000000         1000.000000         1000.000000           8.138903         5.839727         3.801352         5.674745         1.584666           2.270966         2.265445         1.464776         2.011903         1.355950           0.000000         0.000000         0.000000         0.000000         0.000000           6.716000         4.396000         2.897750         4.580750         0.785750           7.993000         5.701000         3.704000         5.748500         1.365000           9.484500         7.092250         4.525750         6.774000         2.014750           22.078000         18.182000         10.914000         15.363000         14.156000           X5         X6         X7         X8         X9           1000.000000         1000.000000         1000.000000         1000.000000         1000.000000           5.975062         4.02935         6.640659         2.498192         5.223348           2.525931         1.79665         2.328634         1.235208         1.866947           0.000000         0.000000         0.000000         0.000000         0.000000         4.093750

75%	7.238250	4.85025	8.000000	3.125000	6.189500	
max	27.273000	20.05500	20.690000	10.280000	18.182000	
	X10	X11	X12	X13	X14	\
count	1000.000000	1000.000000	1000.000000	1000.000000	1000.000000	
mean	8.951983	4.868723	2.358161	3.861031	5.754984	
std	2.492257	2.180254	1.108679	1.594823	2.472857	
min	0.000000	0.000000	0.000000	0.000000	0.000000	
25%	7.413000	3.396000	1.625000	2.861750	4.304750	
50%	9.042000	4.723000	2.222000	3.741500	5.337500	
75%	10.545500	5.906000	2.865250	4.682750	6.759500	
max	21.739000	16.058000	9.677000	11.538000	18.447000	
	X15	X16	X17	X18	X19	
count	1000.000000	1000.000000	1000.000000	1000.000000	1000.000000	
mean	8.133277	6.006643	1.675747	2.903690	6.079772	
std	2.623650	2.163883	0.989689	1.332576	2.078128	
min	0.000000	0.000000	0.000000	0.000000	0.000000	
25%	6.550000	4.935500	1.026250	2.112250	4.906000	
50%	7.910000	5.784500	1.597500	2.769500	5.953000	
75%	9.324250	6.742250	2.238250	3.626750	7.101000	
max	22.857000	23.529000	8.333000	10.811000	23.171000	

fusarium\_oxysporum efectores dataset 3 Composición de aminoácidos (AAC) con valores atípicos.



fusarium\_oxysporum no\_efectores dataset 3 Composición de aminoácidos (AAC) con valores atípicos.



### 2.1 Composición de aminoácidos (AAC), sin valores atípicos

```
[4]: transf = "Composición de aminoácidos (AAC) "
     estado = "sin valores atípicos.\n"
     transf2="AAC"
     out = (str(r3) + '/ds' + str(dataset) + '_' + str(transf2) + '_' + __'
     ⇔str(organismo) + '.csv')
     os.makedirs(str(r3), exist_ok=True)
     df=""
     df_out = pd.DataFrame()
     for etiq in "efectores", "no_efectores":
         titulo = (str(transf) + str(etiq) + " " + str(nombre2) + ", " +str(estado))
         print (str(etiq))
         if etiq == "efectores":
             df=AAC_efec
         if etiq == "no_efectores":
             df=AAC_no_efec
         del df['X20']
         #Se eliminan todas las filas que tengan valores atípicos en al menos una de∟
      \rightarrow sus columnas.
         df = (df[(np.abs(stats.zscore(df)) < 3).all(axis=1)])</pre>
```

#### efectores

Composición de aminoácidos (AAC) efectores fusarium\_oxysporum dataset 3, sin valores atípicos.

```
XΟ
               X1
                      Х2
                            ХЗ
                                   Х4
                                          Х5
                                                 Х6
                                                        Х7
                                                               X8
                                                                     Х9
0
    10.204
            5.102 2.721 5.782 1.361
                                       6.463
                                              2.381 10.544
                                                           3.061
                                                                  4.082
     8.304
            4.152 4.498 6.228 0.865
                                       8.304
                                              3.633
                                                     5.363 2.941
                                                                  3.806
1
2
     9.179
            7.729 1.932 8.213 0.483
                                       7.246
                                              3.865
                                                     5.314 2.899 2.899
3
    10.526
            3.204 5.034 4.119 1.373
                                       3.204
                                              4.348
                                                     7.323 2.975 4.805
4
     5.545
            8.688 5.176 5.915 1.664
                                       7.948
                                              4.806
                                                     5.176 2.588 4.991
                          •••
       •••
                                          •••
   10.127
            3.797 1.266 7.595 1.582
                                       6.962
                                              4.114
                                                     7.595
                                                           3.165 6.962
995
                                                     5.159 2.150 6.019
996
     6.535
            5.847 3.955 5.503 0.860
                                       7.395
                                              5.589
997
     8.937 10.894 3.327 7.502 0.587
                                      11.220
                                              4.044
                                                     5.023 3.653 2.609
998
            6.566 3.967 5.198 1.778
                                       6.566 4.651
                                                     5.198 2.462 4.514
     6.977
999
     9.846
            3.089 3.282 3.089 1.544
                                       3.282 1.544
                                                     7.915 1.737 7.722
          X11
                X12
                       X13
                             X14
                                    X15
                                          X16
                                                 X17
                                                       X18
                                                              X19
0
        5.102 2.381 3.741
                           3.061 7.483 5.782 2.041 1.361 9.524
      10.035 2.422 4.498
                           5.190 5.536 4.325 1.211 3.287 6.920
1
2
        5.314 4.348 2.415
                           2.899 6.763
                                        6.280 0.966 2.899 7.729
3
        6.865 1.144 5.263 3.890 6.865 7.323 3.204 5.034 6.407
4
        6.839
              2.033 3.142
                           5.176 8.503 6.470 1.664 1.479 3.512
. .
                            •••
        5.063 1.899 1.899 5.063 6.013 6.013 2.215 1.899 7.278
995 ...
```

```
996 ...
        6.793 2.923 3.869 5.073 6.793 5.331 0.860 3.611 5.159
997 ...
        8.806 1.044 1.044 6.001 9.132 3.979 0.652 1.566 3.327
998 ...
        3.283 1.915 4.378 5.198 9.986 7.387 2.052 2.462 4.651
999 ...
        2.124 3.089 7.143 3.861 6.564 8.880 2.703 3.475 7.722
          X20
0
    efectores
    efectores
1
2
    efectores
3
    efectores
4
    efectores
995 efectores
996 efectores
997
    efectores
```

[850 rows x 21 columns]

998 efectores999 efectores

Composición de aminoácidos (AAC) efectores fusarium\_oxysporum dataset 3, sin valores atípicos. Estadísticas.

	XO	X1	X2	ХЗ	X4	Х5	\
count	850.000000	850.000000	850.000000	850.000000	850.000000	850.000000	
mean	8.093745	5.827448	3.850478	5.703171	1.457832	6.206824	
std	2.005597	1.888448	1.222740	1.570214	0.904769	1.936622	
min	2.000000	0.000000	0.000000	0.641000	0.000000	0.806000	
25%	6.812750	4.540500	3.062750	4.753000	0.827250	4.970000	
50%	8.000000	5.734000	3.747500	5.769000	1.312000	6.160000	
75%	9.244750	6.974500	4.558500	6.656500	1.907250	7.360000	
max	14.842000	11.864000	7.944000	10.932000	5.054000	12.346000	
	Х6	Х7	Х8	Х9	X10	X11	\
count	850.000000	850.000000	850.000000	850.000000	850.000000	850.000000	
mean	3.919240	6.640548	2.480524	5.330852	9.140553	4.988766	
std	1.346946	2.027162	1.003076	1.529310	2.108156	1.823871	
min	0.000000	1.460000	0.000000	1.031000	3.248000	0.000000	
25%	3.012000	5.161500	1.817000	4.388750	7.761000	3.618000	
50%	3.847000	6.477500	2.414500	5.193000	9.083000	4.806500	
75%	4.675250	7.910500	3.127250	6.245000	10.493000	6.164750	
max	9.440000	13.462000	5.769000	10.354000	15.528000	11.616000	
	X12	X13	X14	X15	X16	X17	\
count	850.000000	850.000000	850.000000	850.000000	850.000000	850.000000	
mean	2.325808	3.873460	5.688402	7.926239	5.957600	1.640894	

std min 25% 50% 75% max	0.914029 0.238000 1.695000 2.193500 2.888750 5.512000	1.394529 0.000000 3.009250 3.766000 4.700500 8.387000	1.837036 0.000000 4.525500 5.518000 6.688750 12.392000	2.153476 2.667000 6.472000 7.734500 9.163250 15.468000	1.568919 0.000000 4.993250 5.914000 6.823750 12.274000	0.851868 0.000000 1.011250 1.561000 2.217250 4.518000
	X18	X19				
count	850.000000	850.000000				
mean	2.885991	6.061618				
std	1.131027	1.648222				
min	0.000000	1.205000				
25%	2.140750	4.986250				
50%	2.775500	5.915000				
75%	3.643250	7.051000				
max	6.614000	11.079000				

# no\_efectores

Composición de aminoácidos (AAC) no\_efectores fusarium\_oxysporum dataset 3, sin valores atípicos.

		XO	X1	X2	ХЗ	X4	Х5	Х6	Х7	Х8	Х9	\
0	9	.315	7.671	3.014	4.932	0.000	10.959	3.836	3.836	1.644	8.767	
1	10	.963	3.654	3.987	3.987	0.332	5.648	2.326	7.973	0.997	5.648	
2	5	.417	2.917	1.667	5.417	1.667	7.083	5.417	5.417	2.500	7.917	
4	2	.721	10.204	4.082	6.122	1.361	3.401	2.041	6.122	3.401	3.401	
5	7	.303	3.933	3.933	5.056	1.966	5.337	3.371	8.146	2.809	6.180	
		•••			•••		•••					
995	10	.919	7.279	5.199	7.452	1.386	6.066	2.946	4.853	3.640	5.893	
996	9	.958	5.085	4.661	4.873	1.271	6.780	2.754	6.568	2.331	6.144	
997	8	.668	5.708	4.228	4.651	1.903	6.554	3.805	7.188	2.537	6.554	
998	8	.976	7.854	2.665	5.750	2.945	5.750	5.610	6.592	2.104	3.787	
999	6	.119	5.402	2.103	4.159	3.107	8.748	2.390	4.637	5.354	7.553	
	•••	X11	X12	X13	X14	X15	X1			8 X1	9 \	
0	•••	9.315	2.466	1.918	6.849	5.479	3.56	2 0.27	4 3.014	4 4.93	2	
1	•••	8.638	1.993	3.654	2.326	6.977	8.30	6 0.99	7 3.322	2 6.97	7	
2	•••	4.583	3 4.167	2.917	3.333	9.583	4.16	7 2.083	3 5.000	0 6.25	0	
4	•••	3.401	0.680	4.762	9.524	13.605	10.20	4 1.36	1 1.36	1 5.44	2	
5	•••	5.337	1.966	4.213	6.461	7.584	6.18	0 1.68	5 1.68	5 6.18	0	
	•••	•••			•••			•••				
995	•••	4.506	1.560	2.600	3.293	9.705	5.54	6 1.213	3 1.90	3.46	6	
996	•••	4.661	1.907	4.873	5.085	7.627	6.14	4 1.27	1 2.96	8.47	5	
997	•••	5.285	3.171	3.171	4.863	7.400	5.07	4 0.846	3 2.326	6.13	1	
998		2.525	2.525	4.067	5.330	7.714	5.61	0 1.823	3 2.384	4 6.03	1	

X20

- 0 no\_efectores
- 1 no\_efectores
- 2 no\_efectores
- 4 no\_efectores
- 5 no\_efectores

. ...

- 995 no\_efectores
- 996 no\_efectores
- 997 no\_efectores
- 998 no\_efectores
- 999 no\_efectores

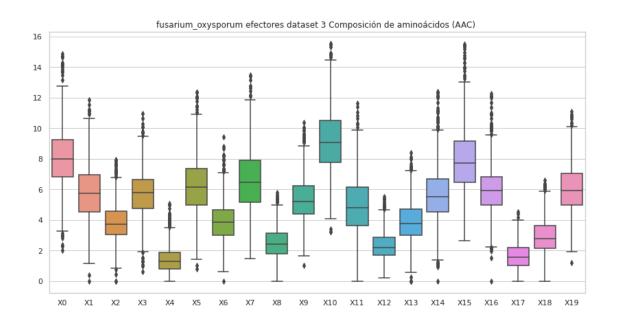
[838 rows x 21 columns]

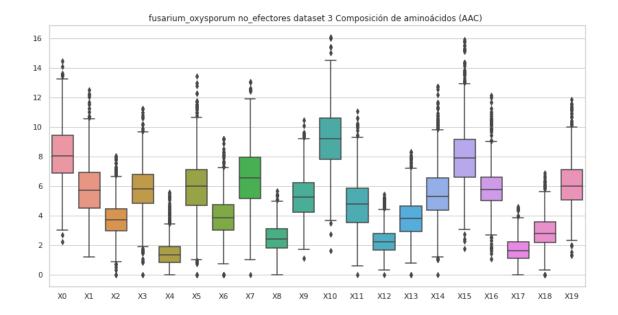
Composición de aminoácidos (AAC) no\_efectores fusarium\_oxysporum dataset 3, sin valores atípicos.

Estadísticas.

	XO	X1	Х2	ХЗ	Х4	Х5	\
count	838.000000	838.000000	838.000000	838.000000	838.000000	838.000000	
mean	8.172169	5.819342	3.806365	5.762327	1.491835	5.962805	
std	1.936518	1.923949	1.245379	1.705135	0.965456	2.087258	
min	2.247000	1.222000	0.000000	0.000000	0.000000	0.000000	
25%	6.864750	4.507000	2.989000	4.827000	0.847250	4.695000	
50%	8.031000	5.701500	3.715500	5.811500	1.366000	5.981500	
75%	9.427250	6.939000	4.471750	6.772500	1.906750	7.133500	
max	14.463000	12.500000	8.065000	11.243000	5.584000	13.462000	
	Х6	Х7	8X	Х9	X10	X11	\
count	838.000000	838.000000	838.000000	838.000000	838.000000	838.000000	
mean	3.961779	6.667852	2.497222	5.332249	9.219408	4.867294	
std	1.398324	2.044811	0.980129	1.541302	2.037519	1.772639	
min	0.000000	0.000000	0.000000	1.111000	1.613000	0.000000	
25%	3.042250	5.162500	1.818000	4.255000	7.832250	3.537750	
50%	3.850000	6.541000	2.439000	5.249500	9.219500	4.799500	
75%	4.751500	7.965250	3.120500	6.250000	10.606000	5.856250	
max	9.233000	13.084000	5.660000	10.458000	16.092000	11.087000	
	X12	X13	X14	X15	X16	X17	\
count	838.000000	838.000000	838.000000	838.000000	838.000000	838.000000	
mean	2.275977	3.891364	5.598016	8.011778	5.867004	1.708142	
std	0.901143	1.364920	1.916232	2.238143	1.472851	0.844929	
min	0.000000	0.000000	0.000000	1.754000	1.075000	0.000000	
25%	1.669500	2.950000	4.386750	6.595750	5.010500	1.128500	

50%	2.211000	3.802000	5.326000	7.900500	5.787500	1.644000
75%	2.778000	4.662500	6.569000	9.150500	6.610000	2.239000
max	5.444000	8.333000	12.766000	15.909000	12.150000	4.587000
	X18	X19				
count	838.000000	838.000000				
mean	2.924128	6.162936				
std	1.124133	1.716983				
min	0.000000	1.307000				
25%	2.199500	5.080500				
50%	2.794000	6.011000				
75%	3.597500	7.106250				
max	6.877000	11.852000				





# 3 Composición de pseudo aminoácidos (PseAAC) hidro\_mass

```
[5]: #hidro_mass
     transf = "Composición de pseudo aminoácidos (PseAAC) "
     transf2 = "PseAAC"
     estado = "con valores atípicos.\n"
     comp = "hidro_mass"
     df=""
     for etiq in "efectores", "no_efectores":
        titulo = (str(transf)+" "+ str(comp)+" "+ str(etiq) + " "+ str(nombre2) +",
     →" + str(estado))
         print (str(etiq))
         if etiq == "efectores":
             df=PseAAC_hidro_mass_efec
         if etiq == "no_efectores":
             df=PseAAC_hidro_mass_no_efec
         #del df['X83']
         print (str(titulo) + "Valores del documento csv.\n")
         print (df)
         print ("\n\n" + str(titulo) + "Estadísticas.\n")
         print(df.describe())
         print ("\n\n")
```

#### efectores

Composición de pseudo aminoácidos (PseAAC) hidro\_mass efectores fusarium\_oxysporum dataset 3, con valores atípicos. Valores del documento csv.

```
XΟ
                    X1
                              Х2
                                       ХЗ
                                                 Х4
                                                           Х5
                                                                    X6 \
0
    0.042668 0.005689
                        0.024179
                                 0.027023 0.015645
                                                     0.044090
                                                              0.012800
1
    0.034472 0.003591
                        0.025854 0.034472 0.018672 0.022263 0.012209
2
    0.040510 0.002132 0.036246
                                 0.031982 0.010661
                                                     0.023453 0.012793
3
    0.076976 0.010040
                        0.030121
                                 0.023428
                                           0.038488 0.053549
                                                              0.021754
4
    0.021000 0.006300
                        0.022400
                                 0.030100
                                           0.011900 0.019600
                                                              0.009800
995
    0.044521 0.006956
                        0.033390 0.030608 0.008348 0.033390 0.013913
996
    0.048412 \quad 0.006370 \quad 0.040768 \quad 0.054782 \quad 0.028665 \quad 0.038220 \quad 0.015925
    0.010560 0.000694 0.008864 0.013258
997
                                           0.001233 0.005935
                                                              0.004316
998
    0.036227 0.009234 0.026992 0.034096
                                           0.022730 0.026992 0.012786
999
    0.022141 0.003473 0.006946 0.007380
                                           0.016063 0.017800 0.003907
          Х7
                    X8
                              хэ ...
                                         X74
                                                   X75
                                                             X76 \
0
    0.017067
              0.021334 0.032712 ...
                                    0.006321 -0.004214 0.029241
1
    0.015800
              0.041654
                        0.035190 ...
                                    0.019440 0.024490 0.028272
2
    0.012793 0.023453
                        0.046906
                                 ... 0.014456 0.011120 0.030628
3
    0.035141
              0.050202
                        0.051875
                                 ... -0.024408 -0.042011 0.012833
4
    0.018900
              0.025900
                        0.032900
                                 ... -0.010903 0.016396 0.007286
                         ... ...
                                   •••
. .
                 •••
                                           •••
                                                   •••
995
    0.030608 0.022260
                        0.041738 ... -0.011039 0.016321 0.017154
996
    0.044590 \quad 0.050323 \quad 0.078352 \quad ... \quad -0.026484 \quad -0.014254 \quad 0.006328
997
    0.003083 0.010406 0.007862 ... 0.014114 0.022680 0.005533
998
    0.023441
              0.017048
                        0.056116
                                 ... -0.000121 0.000916 0.015536
999
    X77
                   X78
                             X79
                                      X80
                                                X81
                                                          X82
                                                                    X83
0
   -0.017139 -0.008381
                        0.040627
                                 0.013711 0.008792 0.016236
                                                              efectores
1
   -0.005404 0.015658
                        0.015887
                                 0.014641 0.014646
                                                     0.007376
                                                              efectores
2
    0.019014 0.025494 -0.011759 -0.002178
                                           0.008474
                                                     0.000648
                                                               efectores
3
   -0.004395 0.003368
                        0.023455 -0.005885
                                           0.006130
                                                     0.032685
                                                               efectores
4
    0.006686 0.010985
                        0.015335
                                 0.020213 0.030161 -0.003858
                                                              efectores
. .
995
    0.008615
              0.019753
                        0.025955 -0.008624 -0.009699
                                                     0.022561
                                                               efectores
996
    0.015040
              0.026196
                        0.018350 0.015661 0.025335 0.012971
                                                               efectores
```

997 0.013151 0.021507 0.003354 0.015794 0.024870 0.006370 efectores 998 -0.011307 -0.008477 0.006141 0.016402 0.012582 0.013580 efectores 999 0.018311 0.001907 0.008756 0.011769 0.004915 0.013155 efectores

[1000 rows x 84 columns]

Composición de pseudo aminoácidos (PseAAC) hidro\_mass efectores fusarium\_oxysporum dataset 3, con valores atípicos. Estadísticas.

	XO	X1	Х2	ХЗ	X4	\	
count	1000.000000	1000.000000	1000.000000	1000.000000	1000.000000		
mean	0.031097	0.010250	0.028397	0.029763	0.024093		
std	0.517731	0.095592	0.243464	0.219694	0.352315		
min	-14.212789	0.000000	-4.737596	-4.737596	-4.737596		
25%	0.027018	0.003001	0.017009	0.018290	0.010760		
50%	0.035158	0.005665	0.025085	0.026818	0.016814		
75%	0.044790	0.010046	0.034652	0.038607	0.023372		
max	8.062005	3.023252	6.046504	5.038753	10.077506		
	Х5	Х6	Х7	Х8	Х9	•••	\
count	1000.000000	1000.000000	1000.000000	1000.000000	1000.000000	•••	
mean	0.022279	0.009947	0.023766	0.015818	0.060673	•••	
std	0.302990	0.163423	0.394412	0.489314	0.541441	•••	
min	-9.475192	-4.737596	-9.475192	-14.212789	-0.489813	•••	
25%	0.021004	0.006306	0.016020	0.014328	0.027389	•••	
50%	0.028074	0.010497	0.023035	0.021361	0.039675	•••	
75%	0.038183	0.016266	0.031836	0.031092	0.054182	•••	
max	1.007751	2.015501	8.062005	6.046504	17.131761	•••	
	Х73	X74	X75	Х76	Х77	\	
count	1000.000000	1000.000000	1000.000000	1000.000000	1000.000000		
mean	0.040197	-0.011830	-0.007888	0.011637	0.013494		
std	0.750137	0.370846	0.357610	0.131190	0.630895		
min	-0.212762	-11.408293	-8.999686	-3.434205	-7.128048		
25%	0.005778	-0.006545	-0.001140	0.005871	-0.006124		
50%	0.015485	0.002626	0.006557	0.014491	0.003722		
75%	0.024053	0.011400	0.015843	0.023307	0.012353		
max	23.675281	0.589240	0.828264	1.945707	18.606521		
	770	W70	W00	77.04	W00		
	X78	X79	X80	X81	X82		
count	1000.000000	1000.000000	1000.000000	1000.000000	1000.000000		
mean	0.023330	0.022400	-0.040461	-0.012841	0.043507		
std	0.614457	0.372451	1.023720	0.451745	0.947068		
min	-2.187845	-2.469827	-30.507632	-12.875697	-0.200344		
25%	-0.002099	0.005826	-0.006450	-0.001736	0.004912		
50%	0.006325	0.014193	0.003200	0.006228	0.014623		

75%	0.015725	0.023974	0.011499	0.014834	0.023043
max	19.298124	11.491556	0.120112	0.590223	29.956152

[8 rows x 83 columns]

### ${\tt no\_efectores}$

Composición de pseudo aminoácidos (PseAAC) hidro\_mass no\_efectores fusarium\_oxysporum dataset 3, con valores atípicos. Valores del documento csv.

	X0	X1	Х2	Х3	Х4	Х5	X6 \
0	0.020136	0.000000	0.010660	0.023690	0.004146	0.008291	0.003553
1	0.042116	0.001276	0.015315	0.021696	0.014039	0.030630	0.003829
2	0.036852	0.011339	0.036852	0.048191	0.019844	0.036852	0.017009
3	0.026166	0.003738	0.008410	0.007476	0.032707	0.028969	0.003738
4	0.012712	0.006356	0.028603	0.015890	0.022247	0.028603	0.015890
			•••		•••	•••	
995	0.061986	0.007871	0.042308	0.034436	0.014758	0.027549	0.020662
996	0.049551	0.006326	0.024248	0.033737	0.024248	0.032683	0.011597
997	0.035654	0.007826	0.019131	0.026958	0.013044	0.029567	0.010435
998	0.042233	0.013858	0.027055	0.027055	0.019137	0.031015	0.009898
999	0.052667	0.026745	0.035797	0.075298	0.033740	0.039912	0.046084
	Х7	Х8	Х9	Х	.74 X	.75 X	76 \
0	0.018952	0.020136	0.017767	0.0076	50 0.0204	05 0.0063	394
1	0.021696	0.033183	0.043393		03 -0.0069		
2	0.053861	0.031183	0.085044			60 -0.0214	
3	0.031772	0.016821	0.041117		85 -0.0013		
4	0.015890	0.015890	0.031781	0.0323			
							.10
995	0.033453	0.025581	0.060018	0.0106			310
996	0.030574	0.023194	0.032683		07 -0.0002		
997	0.026958	0.020134	0.040871	0.0011 0.0047			
998	0.020330	0.021740	0.046852	0.0047 0.0164			
999	0.065011	0.011676	0.040032		93 -0.0177		
999	0.005011	0.059002	0.091343	0.0122	.93 -0.0177	00 0.0110	552
	X77	X78	Х79	X80	X81	X82	X83
0	0.005960	0.021479	0.009386	0.015071	0.027855	0.007733	no_efectores
1	0.003960	0.021479	0.009386				
					0.000368	0.032048	no_efectores
2	0.004257		-0.019083	0.079297	0.028508	0.031583	no_efectores
3	0.022137	0.009373	0.011527		-0.006661		no_efectores
4	0.022124	0.033193	0.007522	-0.007215	0.018399	0.002788	no_efectores
995	0.011503	0.009492		-0.004569		-0.009402	no_efectores
996		0.013742		-0.008408		0.022130	no_efectores
997	0.004889	0.002807	0.018981	-0.000699	-0.002860	0.041516	no_efectores

998 0.005025 0.013991 0.010827 -0.013707 -0.007703 0.004503 no\_efectores 999 0.015601 0.011593 0.017071 0.003722 0.022451 0.011907 no\_efectores

[1000 rows x 84 columns]

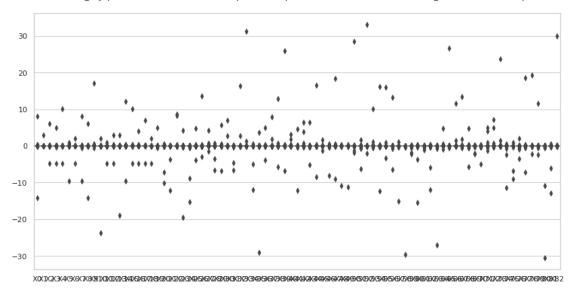
Composición de pseudo aminoácidos (PseAAC) hidro\_mass no\_efectores fusarium\_oxysporum dataset 3, con valores atípicos. Estadísticas.

	XO	X1	Х2	ХЗ	X4	\	
count	1000.000000	1000.000000	1000.000000	1000.000000	1000.000000		
mean	0.038007	0.007921	0.028252	0.028668	0.018626		
std	0.039917	0.009938	0.024178	0.054704	0.052354		
min	-0.983953	-0.157425	-0.472276	-1.475929	-1.475929		
25%	0.027927	0.003052	0.017515	0.017152	0.011457		
50%	0.036942	0.006213	0.026425	0.027431	0.017481		
75%	0.046492	0.010202	0.037224	0.038166	0.025060		
max	0.320751	0.084139	0.220725	0.577493	0.384995		
	Х5	Х6	Х7	Х8	Х9	•••	\
count	1000.000000	1000.000000	1000.000000	1000.000000	1000.000000	•••	
mean	0.030318	0.011653	0.025680	0.023589	0.044858	•••	
std	0.053068	0.048869	0.037537	0.037372	0.041142	•••	
min	-1.475929	-1.475929	-0.983953	-0.983953	-0.629701	•••	
25%	0.021458	0.006206	0.016386	0.013802	0.028536	•••	
50%	0.029027	0.011243	0.023702	0.021896	0.040943	•••	
75%	0.039909	0.016651	0.032214	0.031212	0.057321	•••	
max	0.384995	0.128301	0.288746	0.288746	0.278886	•••	
	Х73	X74	X75	X76	х77	\	
count	1000.000000	1000.000000	1000.000000	1000.000000	1000.000000	\	
count mean		1000.000000 -0.000096	1000.000000 0.003840		1000.000000 0.004339	\	
mean std	1000.000000 0.017467 0.068787	1000.000000 -0.000096 0.048982	1000.000000 0.003840 0.042680	1000.000000 0.015150 0.037857	1000.000000 0.004339 0.067618	\	
mean std min	1000.000000 0.017467 0.068787 -0.202653	1000.000000 -0.000096 0.048982 -0.826020	1000.000000 0.003840 0.042680 -0.978984	1000.000000 0.015150 0.037857 -0.536330	1000.000000 0.004339 0.067618 -0.383785	\	
mean std min 25%	1000.000000 0.017467 0.068787 -0.202653 0.005531	1000.000000 -0.000096 0.048982 -0.826020 -0.006335	1000.000000 0.003840 0.042680 -0.978984 -0.002092	1000.000000 0.015150 0.037857 -0.536330 0.006306	1000.000000 0.004339 0.067618 -0.383785 -0.006853	\	
mean std min 25% 50%	1000.000000 0.017467 0.068787 -0.202653 0.005531 0.014426	1000.000000 -0.000096 0.048982 -0.826020 -0.006335 0.002564	1000.000000 0.003840 0.042680 -0.978984	1000.000000 0.015150 0.037857 -0.536330	1000.000000 0.004339 0.067618 -0.383785	\	
mean std min 25%	1000.000000 0.017467 0.068787 -0.202653 0.005531	1000.000000 -0.000096 0.048982 -0.826020 -0.006335	1000.000000 0.003840 0.042680 -0.978984 -0.002092	1000.000000 0.015150 0.037857 -0.536330 0.006306	1000.000000 0.004339 0.067618 -0.383785 -0.006853	\	
mean std min 25% 50%	1000.000000 0.017467 0.068787 -0.202653 0.005531 0.014426	1000.000000 -0.000096 0.048982 -0.826020 -0.006335 0.002564	1000.000000 0.003840 0.042680 -0.978984 -0.002092 0.006040	1000.000000 0.015150 0.037857 -0.536330 0.006306 0.015833	1000.000000 0.004339 0.067618 -0.383785 -0.006853 0.002733	\	
mean std min 25% 50% 75%	1000.000000 0.017467 0.068787 -0.202653 0.005531 0.014426 0.024012 1.406025	1000.000000 -0.000096 0.048982 -0.826020 -0.006335 0.002564 0.010661 0.517978	1000.000000 0.003840 0.042680 -0.978984 -0.002092 0.006040 0.014299 0.306396	1000.000000 0.015150 0.037857 -0.536330 0.006306 0.015833 0.024418 0.513924	1000.000000 0.004339 0.067618 -0.383785 -0.006853 0.002733 0.011903 1.419353	\	
mean std min 25% 50% 75%	1000.000000 0.017467 0.068787 -0.202653 0.005531 0.014426 0.024012 1.406025	1000.000000 -0.000096 0.048982 -0.826020 -0.006335 0.002564 0.010661 0.517978	1000.000000 0.003840 0.042680 -0.978984 -0.002092 0.006040 0.014299 0.306396	1000.000000 0.015150 0.037857 -0.536330 0.006306 0.015833 0.024418 0.513924	1000.000000 0.004339 0.067618 -0.383785 -0.006853 0.002733 0.011903 1.419353	\	
mean std min 25% 50% 75%	1000.000000 0.017467 0.068787 -0.202653 0.005531 0.014426 0.024012 1.406025 X78 1000.000000	1000.000000 -0.000096 0.048982 -0.826020 -0.006335 0.002564 0.010661 0.517978 X79 1000.000000	1000.000000 0.003840 0.042680 -0.978984 -0.002092 0.006040 0.014299 0.306396 X80 1000.000000	1000.000000 0.015150 0.037857 -0.536330 0.006306 0.015833 0.024418 0.513924 X81 1000.000000	1000.000000 0.004339 0.067618 -0.383785 -0.006853 0.002733 0.011903 1.419353 X82 1000.000000	\	
mean std min 25% 50% 75% max	1000.000000 0.017467 0.068787 -0.202653 0.005531 0.014426 0.024012 1.406025 X78 1000.000000 0.006682	1000.000000 -0.000096 0.048982 -0.826020 -0.006335 0.002564 0.010661 0.517978 X79 1000.000000 0.017721	1000.000000 0.003840 0.042680 -0.978984 -0.002092 0.006040 0.014299 0.306396 X80 1000.000000 0.001502	1000.000000 0.015150 0.037857 -0.536330 0.006306 0.015833 0.024418 0.513924 X81 1000.000000 0.005846	1000.000000 0.004339 0.067618 -0.383785 -0.006853 0.002733 0.011903 1.419353 X82 1000.000000 0.014720	\	
mean std min 25% 50% 75% max	1000.000000 0.017467 0.068787 -0.202653 0.005531 0.014426 0.024012 1.406025 X78 1000.000000 0.006682 0.043761	1000.000000 -0.000096 0.048982 -0.826020 -0.006335 0.002564 0.010661 0.517978 X79 1000.000000 0.017721 0.098984	1000.000000 0.003840 0.042680 -0.978984 -0.002092 0.006040 0.014299 0.306396 X80 1000.000000 0.001502 0.053540	1000.000000 0.015150 0.037857 -0.536330 0.006306 0.015833 0.024418 0.513924 X81 1000.000000 0.005846 0.043607	1000.000000 0.004339 0.067618 -0.383785 -0.006853 0.002733 0.011903 1.419353 X82 1000.000000 0.014720 0.032781	\	
mean std min 25% 50% 75% max  count mean std min	1000.000000 0.017467 0.068787 -0.202653 0.005531 0.014426 0.024012 1.406025 X78 1000.000000 0.006682 0.043761 -0.735519	1000.000000 -0.000096 0.048982 -0.826020 -0.006335 0.002564 0.010661 0.517978 X79 1000.000000 0.017721 0.098984 -0.652277	1000.000000 0.003840 0.042680 -0.978984 -0.002092 0.006040 0.014299 0.306396 X80 1000.000000 0.001502 0.053540 -1.159645	1000.000000 0.015150 0.037857 -0.536330 0.006306 0.015833 0.024418 0.513924 X81 1000.000000 0.005846 0.043607 -0.870393	1000.000000 0.004339 0.067618 -0.383785 -0.006853 0.002733 0.011903 1.419353 X82 1000.000000 0.014720 0.032781 -0.586594	\	
mean std min 25% 50% 75% max  count mean std min 25%	1000.000000 0.017467 0.068787 -0.202653 0.005531 0.014426 0.024012 1.406025 X78 1000.000000 0.006682 0.043761 -0.735519 -0.002880	1000.000000 -0.000096 0.048982 -0.826020 -0.006335 0.002564 0.010661 0.517978  X79 1000.000000 0.017721 0.098984 -0.652277 0.006119	1000.000000 0.003840 0.042680 -0.978984 -0.002092 0.006040 0.014299 0.306396 X80 1000.000000 0.001502 0.053540 -1.159645 -0.007208	1000.000000 0.015150 0.037857 -0.536330 0.006306 0.015833 0.024418 0.513924 X81 1000.000000 0.005846 0.043607 -0.870393 -0.002638	1000.000000 0.004339 0.067618 -0.383785 -0.006853 0.002733 0.011903 1.419353 X82 1000.000000 0.014720 0.032781 -0.586594 0.006496		
mean std min 25% 50% 75% max  count mean std min	1000.000000 0.017467 0.068787 -0.202653 0.005531 0.014426 0.024012 1.406025 X78 1000.000000 0.006682 0.043761 -0.735519	1000.000000 -0.000096 0.048982 -0.826020 -0.006335 0.002564 0.010661 0.517978 X79 1000.000000 0.017721 0.098984 -0.652277	1000.000000 0.003840 0.042680 -0.978984 -0.002092 0.006040 0.014299 0.306396 X80 1000.000000 0.001502 0.053540 -1.159645	1000.000000 0.015150 0.037857 -0.536330 0.006306 0.015833 0.024418 0.513924 X81 1000.000000 0.005846 0.043607 -0.870393	1000.000000 0.004339 0.067618 -0.383785 -0.006853 0.002733 0.011903 1.419353 X82 1000.000000 0.014720 0.032781 -0.586594		

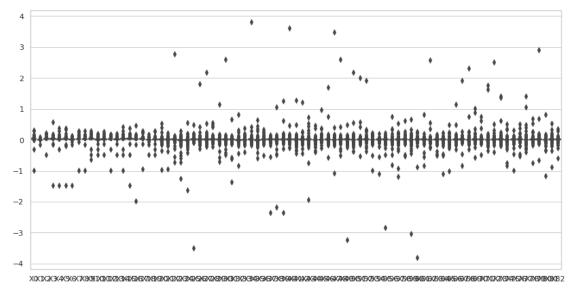
max 0.675102 2.914833 0.806128 0.538359 0.364653

[8 rows x 83 columns]

fusarium\_oxysporum efectores dataset 3 Composición de pseudo aminoácidos (PseAAC) hidro\_mass con valores atípicos.



fusarium\_oxysporum no\_efectores dataset 3 Composición de pseudo aminoácidos (PseAAC) hidro\_mass con valores atípicos.



3.1 Composición de pseudo aminoácidos (PseAAC) hidro\_mass, sin valores atípicos

```
[6]: #hidro_mass
    transf = "Composición de pseudo aminoácidos (PseAAC) "
    transf2 = "PseAAC"
    estado = "sin valores atípicos.\n"
    comp = "hidro_mass"
    df=""
    out = (str(r3) + '/ds' + str(dataset) + '_' + str(transf2) + '_' + str(comp) +_{\square}
     os.makedirs(str(r3), exist_ok=True)
    df_out = pd.DataFrame()
    for etiq in "efectores", "no_efectores":
        titulo = (str(transf)+" "+ str(comp)+" "+ str(etiq) + " "+ str(nombre2) +",
     →" + str(estado))
        print (str(etiq))
        if etiq == "efectores":
            df=PseAAC_hidro_mass_efec
        if etiq == "no_efectores":
            df=PseAAC_hidro_mass_no_efec
        del df['X83']
         #Se eliminan todas las filas que tengan valores atípicos en al menos una de∟
     ⇒sus columnas.
        df = (df[(np.abs(stats.zscore(df)) < 3).all(axis=1)])</pre>
        df['X83'] = etiq
        df_out = pd.concat([df_out,df])
        #Guarda la lista csv sin valores atípicos.
        df_out.to_csv(str(out), index=False, header=False)
        print (str(titulo) + "Valores del documento csv.\n")
        print (df)
        print ("\n\n" + str(titulo) + "Estadísticas.\n")
        print(df.describe())
        print ("\n\n")
        #Gráfica de caja y bigotes
        sns.set(style="whitegrid")
        fig , ax = plt.subplots(figsize=(14,7))
```

### efectores

Composición de pseudo aminoácidos (PseAAC) hidro\_mass efectores fusarium\_oxysporum dataset 3, sin valores atípicos. Valores del documento csv.

	ХО	X1	Х2	ХЗ	Х4	Х5	Х6	\
0	0.042668	0.005689	0.024179	0.027023	0.015645	0.044090	0.012800	`
1	0.034472	0.003591	0.025854	0.027023	0.013672	0.022263	0.012000	
2	0.040510	0.002132	0.036246	0.031982	0.010661	0.023453	0.012793	
3	0.076976	0.010040	0.030121	0.023428	0.038488	0.053549	0.021754	
4	0.021000	0.006300	0.022400	0.030100	0.011900	0.019600	0.009800	
							0.00000	
995	0.044521	0.006956	0.033390	0.030608	0.008348	0.033390	0.013913	
996	0.048412	0.006370	0.040768	0.054782	0.028665	0.038220	0.015925	
997	0.010560	0.000694	0.008864	0.013258	0.001233	0.005935	0.004316	
998	0.036227	0.009234	0.026992	0.034096	0.022730	0.026992	0.012786	
999	0.022141	0.003473	0.006946	0.007380	0.016063	0.017800	0.003907	
	Х7	Х8	Х9	>	(74 )	(75 X	76 \	
0	0.017067	0.021334	0.032712	0.0063	321 -0.0042	214 0.0292	241	
1	0.015800	0.041654	0.035190	0.0194	40 0.0244	190 0.0282	272	
2	0.012793	0.023453	0.046906	0.0144	156 0.0111	120 0.0306	328	
3	0.035141	0.050202	0.051875	0.0244	108 -0.0420	0.0128	333	
4	0.018900	0.025900	0.032900	0.0109	0.0163	396 0.0072	286	
	•••	•••			•••	<b></b>		
995	0.030608	0.022260	0.041738	0.0110	0.0163	321 0.0171	.54	
996	0.044590	0.050323	0.078352	0.0264	84 -0.0142	254 0.0063	328	
997	0.003083	0.010406	0.007862	0.0141	14 0.0226	880 0.0055	33	
998	0.023441	0.017048	0.056116	0.0001	21 0.0009	916 0.0155	36	
999	0.017366	0.004776	0.025615	0.0142	248 0.0059	994 0.0135	519	
	X77	Х78	Х79	X80	X81	X82	X83	
0	-0.017139	-0.008381	0.040627	0.013711	0.008792	0.016236	efectores	
1	-0.005404	0.015658	0.015887	0.014641	0.014646	0.007376	efectores	
2	0.019014	0.025494	-0.011759	-0.002178	0.008474	0.000648	efectores	
3	-0.004395	0.003368	0.023455	-0.005885	0.006130	0.032685	efectores	
4	0.006686	0.010985	0.015335	0.020213	0.030161	-0.003858	efectores	
		•••			•••	•••		
995	0.008615	0.019753	0.025955	-0.008624	-0.009699	0.022561	efectores	
996	0.015040	0.026196	0.018350	0.015661	0.025335	0.012971	efectores	
997	0.013151	0.021507	0.003354	0.015794	0.024870	0.006370	efectores	
998	-0.011307	-0.008477	0.006141	0.016402	0.012582	0.013580	efectores	
999	0.018311	0.001907	0.008756	0.011769	0.004915	0.013155	efectores	

[995 rows x 84 columns]

Composición de pseudo aminoácidos (PseAAC) hidro\_mass efectores fusarium\_oxysporum dataset 3, sin valores atípicos. Estadísticas.

	XO	X1	Х2	ХЗ	X4	Х5	\
count	995.000000	995.000000	995.000000	995.000000	995.000000	995.000000	
mean	0.037125	0.007199	0.027288	0.029645	0.018882	0.030551	
std	0.015628	0.006189	0.015173	0.016412	0.014637	0.014571	
min	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	
25%	0.027048	0.003049	0.017091	0.018328	0.010786	0.021029	
50%	0.035144	0.005682	0.025056	0.026796	0.016837	0.028073	
75%	0.044756	0.010043	0.034612	0.038420	0.023340	0.038140	
max	0.164447	0.046305	0.163129	0.106851	0.212988	0.133118	
	Х6	Х7	Х8	Х9	X	73 \	
count	995.000000	995.000000	995.000000	995.000000	995.0000	00	
mean	0.012606	0.025528	0.024031	0.043515	0.0147	26	
std	0.009942	0.016179	0.014754	0.025172	0.0198	21	
min	0.000000	0.001487	0.000000	0.000000	0.1717	51	
25%	0.006313	0.016081	0.014354	0.027461	0.0057	48	
50%	0.010510	0.023035	0.021334	0.039658	0.0154	66	
75%	0.016214	0.031719	0.030994	0.054127	0.0238	66	
max	0.114381	0.208858	0.156644	0.277783	0.2751	89	
	X74	Х75	X76	X77	Х78	X79	\
count	X74 995.000000	X75 995.000000	X76 995.000000	X77 995.000000	X78 995.000000	X79 995.000000	\
count mean							\
	995.000000 0.002306 0.020327	995.000000 0.007224 0.018635	995.000000 0.014724 0.019023	995.000000 0.001956 0.026359	995.000000 0.006167 0.020672	995.000000 0.014310 0.019391	\
mean std min	995.000000 0.002306	995.000000 0.007224 0.018635 -0.113813	995.000000 0.014724 0.019023 -0.123846	995.000000 0.001956 0.026359 -0.462898	995.000000 0.006167	995.000000 0.014310 0.019391 -0.148374	\
mean std min 25%	995.000000 0.002306 0.020327	995.000000 0.007224 0.018635	995.000000 0.014724 0.019023	995.000000 0.001956 0.026359	995.000000 0.006167 0.020672	995.000000 0.014310 0.019391	\
mean std min	995.000000 0.002306 0.020327 -0.204623	995.000000 0.007224 0.018635 -0.113813	995.000000 0.014724 0.019023 -0.123846	995.000000 0.001956 0.026359 -0.462898	995.000000 0.006167 0.020672 -0.255896	995.000000 0.014310 0.019391 -0.148374	\
mean std min 25%	995.000000 0.002306 0.020327 -0.204623 -0.006396 0.002644 0.011427	995.000000 0.007224 0.018635 -0.113813 -0.001077	995.000000 0.014724 0.019023 -0.123846 0.006007	995.000000 0.001956 0.026359 -0.462898 -0.006030	995.000000 0.006167 0.020672 -0.255896 -0.002088	995.000000 0.014310 0.019391 -0.148374 0.006026 0.014385 0.023985	\
mean std min 25% 50%	995.000000 0.002306 0.020327 -0.204623 -0.006396 0.002644	995.000000 0.007224 0.018635 -0.113813 -0.001077 0.006560	995.000000 0.014724 0.019023 -0.123846 0.006007 0.014682	995.000000 0.001956 0.026359 -0.462898 -0.006030 0.003747	995.000000 0.006167 0.020672 -0.255896 -0.002088 0.006316	995.000000 0.014310 0.019391 -0.148374 0.006026 0.014385	\
mean std min 25% 50% 75%	995.000000 0.002306 0.020327 -0.204623 -0.006396 0.002644 0.011427 0.104147	995.000000 0.007224 0.018635 -0.113813 -0.001077 0.006560 0.015839 0.126048	995.000000 0.014724 0.019023 -0.123846 0.006007 0.014682 0.023323	995.000000 0.001956 0.026359 -0.462898 -0.006030 0.003747 0.012289	995.000000 0.006167 0.020672 -0.255896 -0.002088 0.006316 0.015592	995.000000 0.014310 0.019391 -0.148374 0.006026 0.014385 0.023985	\
mean std min 25% 50% 75%	995.000000 0.002306 0.020327 -0.204623 -0.006396 0.002644 0.011427 0.104147	995.000000 0.007224 0.018635 -0.113813 -0.001077 0.006560 0.015839 0.126048	995.000000 0.014724 0.019023 -0.123846 0.006007 0.014682 0.023323 0.155204	995.000000 0.001956 0.026359 -0.462898 -0.006030 0.003747 0.012289	995.000000 0.006167 0.020672 -0.255896 -0.002088 0.006316 0.015592	995.000000 0.014310 0.019391 -0.148374 0.006026 0.014385 0.023985	\
mean std min 25% 50% 75%	995.000000 0.002306 0.020327 -0.204623 -0.006396 0.002644 0.011427 0.104147 X80 995.000000	995.000000 0.007224 0.018635 -0.113813 -0.001077 0.006560 0.015839 0.126048 X81 995.000000	995.000000 0.014724 0.019023 -0.123846 0.006007 0.014682 0.023323 0.155204	995.000000 0.001956 0.026359 -0.462898 -0.006030 0.003747 0.012289	995.000000 0.006167 0.020672 -0.255896 -0.002088 0.006316 0.015592	995.000000 0.014310 0.019391 -0.148374 0.006026 0.014385 0.023985	\
mean std min 25% 50% 75% max	995.000000 0.002306 0.020327 -0.204623 -0.006396 0.002644 0.011427 0.104147	995.000000 0.007224 0.018635 -0.113813 -0.001077 0.006560 0.015839 0.126048	995.000000 0.014724 0.019023 -0.123846 0.006007 0.014682 0.023323 0.155204	995.000000 0.001956 0.026359 -0.462898 -0.006030 0.003747 0.012289	995.000000 0.006167 0.020672 -0.255896 -0.002088 0.006316 0.015592	995.000000 0.014310 0.019391 -0.148374 0.006026 0.014385 0.023985	\
mean std min 25% 50% 75% max	995.000000 0.002306 0.020327 -0.204623 -0.006396 0.002644 0.011427 0.104147 X80 995.000000	995.000000 0.007224 0.018635 -0.113813 -0.001077 0.006560 0.015839 0.126048 X81 995.000000	995.000000 0.014724 0.019023 -0.123846 0.006007 0.014682 0.023323 0.155204 X82 995.000000	995.000000 0.001956 0.026359 -0.462898 -0.006030 0.003747 0.012289	995.000000 0.006167 0.020672 -0.255896 -0.002088 0.006316 0.015592	995.000000 0.014310 0.019391 -0.148374 0.006026 0.014385 0.023985	\
mean std min 25% 50% 75% max  count mean std min	995.000000 0.002306 0.020327 -0.204623 -0.006396 0.002644 0.011427 0.104147 X80 995.000000 0.001376	995.000000 0.007224 0.018635 -0.113813 -0.001077 0.006560 0.015839 0.126048 X81 995.000000 0.006038 0.019606 -0.231772	995.000000 0.014724 0.019023 -0.123846 0.006007 0.014682 0.023323 0.155204 X82 995.000000 0.013806	995.000000 0.001956 0.026359 -0.462898 -0.006030 0.003747 0.012289	995.000000 0.006167 0.020672 -0.255896 -0.002088 0.006316 0.015592	995.000000 0.014310 0.019391 -0.148374 0.006026 0.014385 0.023985	
mean std min 25% 50% 75% max  count mean std min 25%	995.000000 0.002306 0.020327 -0.204623 -0.006396 0.002644 0.011427 0.104147 X80 995.000000 0.001376 0.023323	995.000000 0.007224 0.018635 -0.113813 -0.001077 0.006560 0.015839 0.126048 X81 995.000000 0.006038 0.019606 -0.231772 -0.001658	995.000000 0.014724 0.019023 -0.123846 0.006007 0.014682 0.023323 0.155204  X82 995.000000 0.013806 0.017525	995.000000 0.001956 0.026359 -0.462898 -0.006030 0.003747 0.012289	995.000000 0.006167 0.020672 -0.255896 -0.002088 0.006316 0.015592	995.000000 0.014310 0.019391 -0.148374 0.006026 0.014385 0.023985	
mean std min 25% 50% 75% max  count mean std min 25% 50%	995.000000 0.002306 0.020327 -0.204623 -0.006396 0.002644 0.011427 0.104147 X80 995.000000 0.001376 0.023323 -0.281737 -0.006335 0.003241	995.000000 0.007224 0.018635 -0.113813 -0.001077 0.006560 0.015839 0.126048 X81 995.000000 0.006038 0.019606 -0.231772	995.000000 0.014724 0.019023 -0.123846 0.006007 0.014682 0.023323 0.155204 X82 995.000000 0.013806 0.017525 -0.101374	995.000000 0.001956 0.026359 -0.462898 -0.006030 0.003747 0.012289	995.000000 0.006167 0.020672 -0.255896 -0.002088 0.006316 0.015592	995.000000 0.014310 0.019391 -0.148374 0.006026 0.014385 0.023985	\
mean std min 25% 50% 75% max  count mean std min 25%	995.000000 0.002306 0.020327 -0.204623 -0.006396 0.002644 0.011427 0.104147  X80 995.000000 0.001376 0.023323 -0.281737 -0.006335	995.000000 0.007224 0.018635 -0.113813 -0.001077 0.006560 0.015839 0.126048 X81 995.000000 0.006038 0.019606 -0.231772 -0.001658	995.000000 0.014724 0.019023 -0.123846 0.006007 0.014682 0.023323 0.155204  X82 995.000000 0.013806 0.017525 -0.101374 0.004970	995.000000 0.001956 0.026359 -0.462898 -0.006030 0.003747 0.012289	995.000000 0.006167 0.020672 -0.255896 -0.002088 0.006316 0.015592	995.000000 0.014310 0.019391 -0.148374 0.006026 0.014385 0.023985	
mean std min 25% 50% 75% max  count mean std min 25% 50%	995.000000 0.002306 0.020327 -0.204623 -0.006396 0.002644 0.011427 0.104147 X80 995.000000 0.001376 0.023323 -0.281737 -0.006335 0.003241	995.000000 0.007224 0.018635 -0.113813 -0.001077 0.006560 0.015839 0.126048  X81 995.000000 0.006038 0.019606 -0.231772 -0.001658 0.006294	995.000000 0.014724 0.019023 -0.123846 0.006007 0.014682 0.023323 0.155204  X82 995.000000 0.013806 0.017525 -0.101374 0.004970 0.014631	995.000000 0.001956 0.026359 -0.462898 -0.006030 0.003747 0.012289	995.000000 0.006167 0.020672 -0.255896 -0.002088 0.006316 0.015592	995.000000 0.014310 0.019391 -0.148374 0.006026 0.014385 0.023985	

[8 rows x 83 columns]

no\_efectores Composición de pseudo aminoácidos (PseAAC) hidro\_mass no\_efectores fusarium\_oxysporum dataset 3, sin valores atípicos. Valores del documento csv.

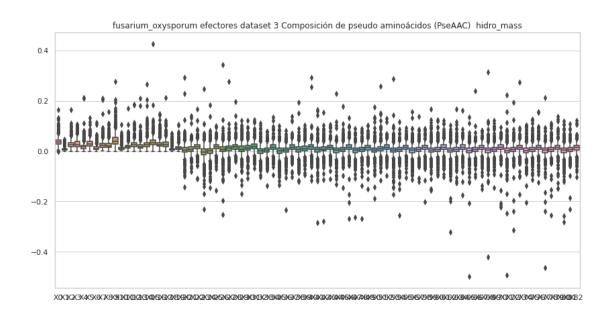
	V۸	V 4	VO	٧n	<b>V</b> /	VE	vc \
0	X0 0.020136	X1 0.000000	X2 0.010660	X3 0.023690	X4 0.004146	X5 0.008291	X6 \ 0.003553
1	0.020136	0.000000	0.010000	0.023696	0.004140	0.000291	0.003829
2	0.042110	0.001270	0.015313	0.021090	0.014039	0.036852	0.017009
3	0.036032	0.0011339	0.008410	0.043131	0.013044	0.030032	0.003738
4	0.020100	0.003736	0.000410	0.007470	0.032707	0.028603	0.015890
							0.010000
 995	0.061986	 0.007871	 0.042308	0.034436	 0.014758	 0.027549	0.020662
996	0.049551	0.006326	0.024248	0.033737	0.024248	0.032683	0.011597
997	0.035654	0.007826	0.019131	0.026958	0.013044	0.029567	0.010435
998	0.042233	0.013858	0.027055	0.027055	0.019137	0.031015	0.009898
999	0.052667	0.026745	0.035797	0.075298	0.033740	0.039912	0.046084
	Х7	Х8	Х9	X	.74 X	.75 X	76 \
0	0.018952	0.020136	0.017767	0.0076	50 0.0204	05 0.0063	394
1	0.021696	0.033183	0.043393	0.0100	03 -0.0069	96 0.0315	526
2	0.053861	0.031183	0.085044	0.0160	44 0.0304	60 -0.0214	58
3	0.031772	0.016821	0.041117	0.0122	85 -0.0013	69 0.0066	09
4	0.015890	0.015890	0.031781	0.0323	66 0.0093	29 0.0192	218
	•••	•••		•••		•	
995	0.033453	0.025581	0.060018	0.0106	90 0.0066	81 0.0416	310
996	0.030574	0.023194	0.032683	0.0014	07 -0.0002	36 0.0191	.00
997	0.026958	0.021740	0.040871	0.0047	84 0.0066	92 0.0244	:54
998	0.017817	0.011878	0.046852	0.0164	0.0026	26 0.0222	285
999	0.065011	0.059662	0.091345	0.0122	93 -0.0177	88 0.0118	332
	X77	X78	X79	X80	X81	X82	X83
0	0.005960	0.021479	0.009386	0.015071	0.027855	0.007733	no_efectores
1	0.001775	0.009281	0.020974	0.002019	0.000368	0.032048	no_efectores
2	0.004257		-0.019083	0.079297	0.028508	0.031583	no_efectores
3	0.022137	0.009373	0.011527			-0.001153	no_efectores
4	0.022124	0.033193	0.007522	-0.007215	0.018399	0.002788	no_efectores
• •	•••	•••					
995	0.011503	0.009492		-0.004569			no_efectores
	-0.009406	0.013742		-0.008408		0.022130	no_efectores
997	0.004889	0.002807		-0.000699		0.041516	no_efectores
998	0.005025	0.013991		-0.013707		0.004503	no_efectores
999	0.015601	0.011593	0.017071	0.003722	0.022451	0.011907	no_efectores

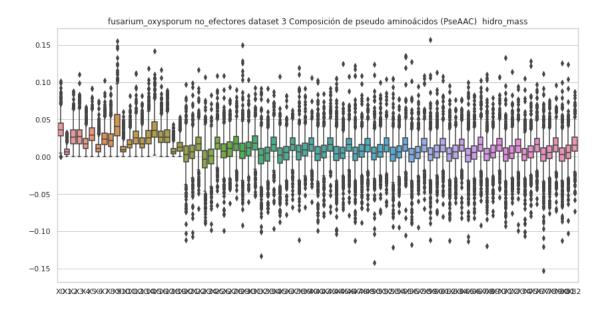
[956 rows x 84 columns]

Composición de pseudo aminoácidos (PseAAC) hidro\_mass no\_efectores fusarium\_oxysporum dataset 3, sin valores atípicos. Estadísticas.

	V.O.	V 4	VO	٧n	<b>V</b> //	VE	,
t	X0 956.000000	X1 956.000000	X2 956.000000	X3 956.000000	X4 956.000000	X5 956.000000	\
count	0.037510	0.007306	0.027417	0.028514	0.018703	0.030477	
mean std	0.037310	0.007300	0.027417	0.026514	0.010703	0.030477	
	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	
min							
25%	0.027753	0.003078	0.017279	0.016977	0.011150	0.021385	
50%	0.036303	0.006064	0.026056	0.026985	0.016924	0.028615	
75%	0.045044	0.009921	0.036312	0.036457	0.024291	0.038444	
max	0.101297	0.032802	0.088211	0.110506	0.066594	0.091738	
	Х6	Х7	Х8	Х9	X	73 \	
count	956.000000	956.000000	956.000000	956.000000	956.0000		
mean	0.012307	0.025016	0.023121	0.043585	0.0145		
std	0.008713	0.012844	0.013003	0.022233	0.0173		
min	0.000000	0.000000	0.000000	0.000000	0.0987		
25%	0.006088	0.016373	0.013734	0.028355	0.0059		
50%	0.010962	0.023484	0.021580	0.040082	0.0144		
75%	0.015991	0.031584	0.030409	0.056377	0.0237		
max	0.074866	0.102197	0.092460	0.155183	0.0945		
	0.011000	0.10210.	0.002100	0.100100	0.0010		
	X74	X75	X76	X77	X78	X79	\
count	X74 956.000000	X75 956.000000	X76 956.000000	X77 956.000000	X78 956.000000	X79 956.000000	\
count mean							\
	956.000000	956.000000	956.000000	956.000000	956.000000	956.000000	\
mean	956.000000 0.001454	956.000000 0.006166	956.000000 0.015468	956.000000 0.001923	956.000000 0.005233	956.000000 0.014897	\
mean std	956.000000 0.001454 0.018839	956.000000 0.006166 0.017665	956.000000 0.015468 0.016702	956.000000 0.001923 0.020379	956.000000 0.005233 0.017573	956.000000 0.014897 0.016831	\
mean std min	956.000000 0.001454 0.018839 -0.106709	956.000000 0.006166 0.017665 -0.079061	956.000000 0.015468 0.016702 -0.063667	956.000000 0.001923 0.020379 -0.152850	956.000000 0.005233 0.017573 -0.076117	956.000000 0.014897 0.016831 -0.072511	\
mean std min 25%	956.000000 0.001454 0.018839 -0.106709 -0.005474	956.000000 0.006166 0.017665 -0.079061 -0.001432	956.000000 0.015468 0.016702 -0.063667 0.006583	956.000000 0.001923 0.020379 -0.152850 -0.006472	956.000000 0.005233 0.017573 -0.076117 -0.002764	956.000000 0.014897 0.016831 -0.072511 0.006822	\
mean std min 25% 50%	956.000000 0.001454 0.018839 -0.106709 -0.005474 0.002794	956.000000 0.006166 0.017665 -0.079061 -0.001432 0.006122	956.000000 0.015468 0.016702 -0.063667 0.006583 0.015894	956.000000 0.001923 0.020379 -0.152850 -0.006472 0.002753	956.000000 0.005233 0.017573 -0.076117 -0.002764 0.005563	956.000000 0.014897 0.016831 -0.072511 0.006822 0.015411	\
mean std min 25% 50% 75%	956.000000 0.001454 0.018839 -0.106709 -0.005474 0.002794 0.010567 0.105263	956.000000 0.006166 0.017665 -0.079061 -0.001432 0.006122 0.014147 0.128433	956.000000 0.015468 0.016702 -0.063667 0.006583 0.015894 0.024028 0.096830	956.000000 0.001923 0.020379 -0.152850 -0.006472 0.002753 0.011609	956.000000 0.005233 0.017573 -0.076117 -0.002764 0.005563 0.014347	956.000000 0.014897 0.016831 -0.072511 0.006822 0.015411 0.024969	\
mean std min 25% 50% 75% max	956.000000 0.001454 0.018839 -0.106709 -0.005474 0.002794 0.010567 0.105263	956.000000 0.006166 0.017665 -0.079061 -0.001432 0.006122 0.014147 0.128433	956.000000 0.015468 0.016702 -0.063667 0.006583 0.015894 0.024028 0.096830	956.000000 0.001923 0.020379 -0.152850 -0.006472 0.002753 0.011609	956.000000 0.005233 0.017573 -0.076117 -0.002764 0.005563 0.014347	956.000000 0.014897 0.016831 -0.072511 0.006822 0.015411 0.024969	\
mean std min 25% 50% 75%	956.000000 0.001454 0.018839 -0.106709 -0.005474 0.002794 0.010567 0.105263 X80 956.000000	956.000000 0.006166 0.017665 -0.079061 -0.001432 0.006122 0.014147 0.128433 X81 956.000000	956.000000 0.015468 0.016702 -0.063667 0.006583 0.015894 0.024028 0.096830 X82 956.000000	956.000000 0.001923 0.020379 -0.152850 -0.006472 0.002753 0.011609	956.000000 0.005233 0.017573 -0.076117 -0.002764 0.005563 0.014347	956.000000 0.014897 0.016831 -0.072511 0.006822 0.015411 0.024969	\
mean std min 25% 50% 75% max count mean	956.000000 0.001454 0.018839 -0.106709 -0.005474 0.002794 0.010567 0.105263 X80 956.000000 0.002570	956.000000 0.006166 0.017665 -0.079061 -0.001432 0.006122 0.014147 0.128433 X81 956.000000 0.006055	956.000000 0.015468 0.016702 -0.063667 0.006583 0.015894 0.024028 0.096830 X82 956.000000 0.015684	956.000000 0.001923 0.020379 -0.152850 -0.006472 0.002753 0.011609	956.000000 0.005233 0.017573 -0.076117 -0.002764 0.005563 0.014347	956.000000 0.014897 0.016831 -0.072511 0.006822 0.015411 0.024969	\
mean std min 25% 50% 75% max  count mean std	956.000000 0.001454 0.018839 -0.106709 -0.005474 0.002794 0.010567 0.105263 X80 956.000000 0.002570 0.020099	956.000000 0.006166 0.017665 -0.079061 -0.001432 0.006122 0.014147 0.128433 X81 956.000000 0.006055 0.017476	956.000000 0.015468 0.016702 -0.063667 0.006583 0.015894 0.024028 0.096830 X82 956.000000 0.015684 0.017043	956.000000 0.001923 0.020379 -0.152850 -0.006472 0.002753 0.011609	956.000000 0.005233 0.017573 -0.076117 -0.002764 0.005563 0.014347	956.000000 0.014897 0.016831 -0.072511 0.006822 0.015411 0.024969	\
mean std min 25% 50% 75% max  count mean std min	956.000000 0.001454 0.018839 -0.106709 -0.005474 0.002794 0.010567 0.105263 X80 956.000000 0.002570 0.020099 -0.112971	956.000000 0.006166 0.017665 -0.079061 -0.001432 0.006122 0.014147 0.128433 X81 956.000000 0.006055 0.017476 -0.102445	956.000000 0.015468 0.016702 -0.063667 0.006583 0.015894 0.024028 0.096830 X82 956.000000 0.015684 0.017043 -0.073034	956.000000 0.001923 0.020379 -0.152850 -0.006472 0.002753 0.011609	956.000000 0.005233 0.017573 -0.076117 -0.002764 0.005563 0.014347	956.000000 0.014897 0.016831 -0.072511 0.006822 0.015411 0.024969	\
mean std min 25% 50% 75% max  count mean std min 25%	956.000000 0.001454 0.018839 -0.106709 -0.005474 0.002794 0.010567 0.105263 X80 956.000000 0.002570 0.020099 -0.112971 -0.006478	956.000000 0.006166 0.017665 -0.079061 -0.001432 0.006122 0.014147 0.128433 X81 956.000000 0.006055 0.017476 -0.102445 -0.002494	956.000000 0.015468 0.016702 -0.063667 0.006583 0.015894 0.024028 0.096830 X82 956.000000 0.015684 0.017043 -0.073034 0.006991	956.000000 0.001923 0.020379 -0.152850 -0.006472 0.002753 0.011609	956.000000 0.005233 0.017573 -0.076117 -0.002764 0.005563 0.014347	956.000000 0.014897 0.016831 -0.072511 0.006822 0.015411 0.024969	\
mean std min 25% 50% 75% max  count mean std min 25% 50%	956.000000 0.001454 0.018839 -0.106709 -0.005474 0.002794 0.010567 0.105263 X80 956.000000 0.002570 0.020099 -0.112971 -0.006478 0.002988	956.000000 0.006166 0.017665 -0.079061 -0.001432 0.006122 0.014147 0.128433 X81 956.000000 0.006055 0.017476 -0.102445 -0.002494 0.005773	956.000000 0.015468 0.016702 -0.063667 0.006583 0.015894 0.024028 0.096830 X82 956.000000 0.015684 0.017043 -0.073034 0.006991 0.015557	956.000000 0.001923 0.020379 -0.152850 -0.006472 0.002753 0.011609	956.000000 0.005233 0.017573 -0.076117 -0.002764 0.005563 0.014347	956.000000 0.014897 0.016831 -0.072511 0.006822 0.015411 0.024969	\
mean std min 25% 50% 75% max  count mean std min 25%	956.000000 0.001454 0.018839 -0.106709 -0.005474 0.002794 0.010567 0.105263 X80 956.000000 0.002570 0.020099 -0.112971 -0.006478	956.000000 0.006166 0.017665 -0.079061 -0.001432 0.006122 0.014147 0.128433 X81 956.000000 0.006055 0.017476 -0.102445 -0.002494	956.000000 0.015468 0.016702 -0.063667 0.006583 0.015894 0.024028 0.096830 X82 956.000000 0.015684 0.017043 -0.073034 0.006991	956.000000 0.001923 0.020379 -0.152850 -0.006472 0.002753 0.011609	956.000000 0.005233 0.017573 -0.076117 -0.002764 0.005563 0.014347	956.000000 0.014897 0.016831 -0.072511 0.006822 0.015411 0.024969	

[8 rows x 83 columns]





# 4 Composición de pseudo aminoácidos (PseAAC) mass

```
[7]: #mass
transf = "Composición de pseudo aminoácidos (PseAAC) "
transf2 = "PseAAC"
```

```
estado = "con valores atípicos.\n"
comp = "mass"
df=""
for etiq in "efectores", "no_efectores":
    titulo = (str(transf)+" "+ str(comp)+" "+ str(etiq) + " "+ str(nombre2) +",
→" + str(estado))
    print (str(etiq))
    if etiq == "efectores":
        df=PseAAC_mass_efec
    if etiq == "no_efectores":
        df=PseAAC_mass_no_efec
    #del df['X41']
    print (str(titulo) + "Valores del documento csv.\n")
    print (df)
    print ("\n\n" + str(titulo) + "Estadísticas.\n")
    print(df.describe())
    print ("\n\n")
    #Gráfica de caja y bigotes
    sns.set(style="whitegrid")
    fig , ax = plt.subplots(figsize=(14,7))
    ax = sns.boxplot(data=df)
    ax.set_title(organismo +' '+str(etiq)+" dataset "+str(dataset)+"__
 →"+str(transf)+" "+str(comp)+" "+str(estado))
```

#### efectores

Composición de pseudo aminoácidos (PseAAC) mass efectores fusarium\_oxysporum dataset 3, con valores atípicos.

```
XΟ
                      Х1
                                  X2
                                             ХЗ
                                                        X4
                                                                   Х5
                                                                              X6 \
0
     0.043079 \quad 0.005744 \quad 0.024412 \quad 0.027284 \quad 0.015796 \quad 0.044515 \quad 0.012924
     0.058191 \quad 0.006062 \quad 0.043643 \quad 0.058191 \quad 0.031520 \quad 0.037582 \quad 0.020609
1
     0.050991 \quad 0.002684 \quad 0.045624 \quad 0.040256 \quad 0.013419 \quad 0.029521 \quad 0.016102
2
3
     0.065546 \quad 0.008549 \quad 0.025648 \quad 0.019949 \quad 0.032773 \quad 0.045597 \quad 0.018524
4
     0.045360 0.013608 0.048384 0.065016 0.025704 0.042336 0.021168
995 0.046003 0.007188 0.034502 0.031627 0.008626 0.034502 0.014376
996 0.053294 0.007012 0.044879 0.060307 0.031556 0.042074 0.017531
997 0.049883 0.003277 0.041872 0.062626 0.005826 0.028036 0.020390
998 0.045830 0.011682 0.034148 0.043134 0.028756 0.034148 0.016175
999 0.048838 0.007661 0.015322 0.016279 0.035431 0.039262 0.008618
            Х7
                       Х8
                                  хэ ...
                                               X32
                                                          X33
                                                                     X34 \
```

```
0
    0.017232 0.021540 0.033027 ... 0.030732 0.018096 0.046392
    0.026671 0.070314 0.059404 ... -0.012280 0.019624 0.018991
1
    0.016102 \quad 0.029521 \quad 0.059042 \quad ... \quad 0.018999 \quad 0.014254 \quad 0.038128
2
3
    0.029923 0.042747 0.044172 ... -0.002484 0.027664 0.015354
4
    0.040824 0.055944 0.071064 ... 0.008183 0.003207 0.035150
. .
995
    0.031627
             0.023002 \quad 0.043128 \quad ... \quad 0.021518 \quad 0.025650 \quad 0.029339
996
    0.049087 0.055398 0.086252
                               ... 0.015070 0.027758 0.016148
997
    0.014564 0.049154 0.037139 ... 0.012293 0.020327 0.018595
998
    999
    0.038304 0.010534 0.056498 ... 0.017858 0.014313 0.017853
        X35
                 X36
                          X37
                                   X38
                                            X39
                                                     X40
                                                               X41
    0.042328 \quad 0.028314 \quad 0.011836 \quad 0.029523 \quad 0.041018 \quad 0.016393
0
                                                          efectores
                      0.038390 0.047725
1
    0.018646 0.009855
                                        0.026817
                                                 0.012452
                                                          efectores
2
    3
   -0.006010 0.043995 0.032249
                               0.010928
                                        0.019972 0.027832
                                                         efectores
4
   -0.001300 -0.003257 0.008593 0.015737 0.033125 -0.008334 efectores
. .
                •••
995 0.034137 0.015995
                      996
    0.006054 0.003740 -0.000587 0.006967 0.020200 0.014279
                                                         efectores
997
    0.025743 0.014560 0.020689 0.026136 0.015843 0.030092 efectores
998
    0.018624 0.023877
                      0.008596 0.019654 0.007769 0.017179
                                                         efectores
999
    0.007510 0.035539 0.023932 0.029819 0.019314 0.029016 efectores
```

[1000 rows x 42 columns]

Composición de pseudo aminoácidos (PseAAC) mass efectores fusarium\_oxysporum dataset 3, con valores atípicos.
Estadísticas.

	XO	X1	X2	ХЗ	X4	\	
count	1000.000000	1000.000000	1000.000000	1000.000000	1000.000000		
mean	0.047342	0.009071	0.034945	0.039139	0.023584		
std	0.015214	0.007517	0.017246	0.022577	0.013596		
min	0.000000	0.000000	0.000000	0.000000	0.000000		
25%	0.037945	0.004078	0.023394	0.023445	0.014362		
50%	0.046314	0.007586	0.032794	0.035457	0.021067		
75%	0.054433	0.012487	0.043350	0.049602	0.029956		
max	0.213377	0.067324	0.149040	0.257330	0.101011		
	Х5	Х6	Х7	Х8	Х9	•••	\
count	1000.000000	1000.000000	1000.000000	1000.000000	1000.000000	•••	
mean	0.038268	0.015760	0.032299	0.031655	0.054871	•••	
std	0.013366	0.010477	0.015985	0.020382	0.024619	•••	
min	0.000000	0.000000	0.001574	0.000000	0.000000	•••	
25%	0.029624	0.008900	0.021623	0.018979	0.038235	•••	

50%	0.036919	0.013875	0.030106	0.027796	0.052729	
75%	0.044911	0.020409	0.040123	0.040115	0.068841	•••
max	0.142251	0.096502	0.148772	0.222196	0.192881	
	X31	Х32	Х33	Х34	Х35	\
count	1000.000000	1000.000000	1000.000000	1000.000000	1000.000000	
mean	0.018421	0.017606	0.017578	0.017968	0.016094	
std	0.020682	0.026364	0.021567	0.022257	0.023175	
min	-0.239927	-0.148242	-0.112234	-0.117624	-0.200263	
25%	0.010385	0.008634	0.009510	0.009570	0.008115	
50%	0.020873	0.019837	0.020238	0.020351	0.019660	
75%	0.029618	0.028558	0.029761	0.029964	0.028731	
max	0.196105	0.443239	0.085598	0.174734	0.096568	
	X36	Х37	X38	X39	X40	
count	1000.000000	1000.000000	1000.000000	1000.000000	1000.000000	
mean	0.017597	0.017403	0.017715	0.017637	0.016323	
std	0.023033	0.024926	0.023868	0.024691	0.025732	
min	-0.234045	-0.355437	-0.224041	-0.246503	-0.449732	
25%	0.008207	0.008386	0.008478	0.008685	0.006558	
50%	0.019875	0.020474	0.020171	0.019710	0.018558	
75%	0.029412	0.029513	0.029107	0.029060	0.029047	
max	0.126566	0.107946	0.155219	0.133540	0.147699	

[8 rows x 41 columns]

### no\_efectores

Composición de pseudo aminoácidos (PseAAC) mass no\_efectores fusarium\_oxysporum dataset 3, con valores atípicos.

	XO	X1	Х2	ХЗ	Х4	Х5	Х6	\
0	0.057061	0.000000	0.030209	0.067131	0.011748	0.023496	0.010070	
1	0.049288	0.001494	0.017923	0.025391	0.016429	0.035846	0.004481	
2	0.041434	0.012749	0.041434	0.054183	0.022311	0.041434	0.019123	
3	0.048512	0.006930	0.015593	0.013861	0.060640	0.053710	0.006930	
4	0.016138	0.008069	0.036310	0.020172	0.028241	0.036310	0.020172	
	•••	•••	•••		•••	•••		
995	0.070773	0.008987	0.048305	0.039318	0.016851	0.031455	0.023591	
996	0.052103	0.006652	0.025497	0.035475	0.025497	0.034366	0.012194	
997	0.042375	0.009302	0.022738	0.032040	0.015503	0.035140	0.012403	
998	0.053748	0.017636	0.034432	0.034432	0.024355	0.039471	0.012597	
999	0.048348	0.024552	0.032862	0.069123	0.030973	0.036639	0.042305	
	Х7	Х8	Х9	X	32 X	33 X	34 \	
0	0.053704	0.057061	0.050348	0.0189	30 0.0121	69 -0.0116	79	

```
1
    0.025391 0.038833 0.050782
                                ... 0.002951 0.024086 0.030914
2
    0.060557 \quad 0.035059 \quad 0.095617 \quad ... \quad -0.026331 \quad 0.019610 \quad 0.036739
3
    0.058907 0.031186 0.076233
                                   0.022984 0.006493 0.047290
4
    0.020172 0.020172 0.040344
                                   0.008998 0.011761 -0.002476
. .
         •••
                •••
                                                 •••
995
    0.038195 0.029208
                                ... -0.003346  0.005002  0.013303
                       0.068526
996
    0.032149 0.024389
                       0.034366 ... 0.017948 0.040826 0.026261
997
    0.032040 0.025839
                       0.048577
                                   0.034593 0.026675 0.036477
998
    0.022675 0.015117
                       0.059627 ... 0.033852 0.016624 -0.003917
999
    0.059680 0.054769 0.083854 ...
                                   0.002248 0.012326 0.017148
                  X36
                            X37
                                               X39
                                                        X40
                                                                     X41
         X35
                                     X38
    0.020818 0.011369 0.007916 0.018120
0
                                          0.026597
                                                   0.021912
                                                            no_efectores
    0.055448 0.013663
                       0.025123 0.036895
1
                                          0.024546
                                                   0.037505
                                                            no_efectores
2
    0.008252 0.044765
                       0.022613 -0.024125 -0.021455
                                                   0.035510
                                                             no_efectores
3
   -0.009578 0.011922 0.024690
                                0.012253
                                          0.021372 -0.002138
                                                            no_efectores
4
    0.046877
              0.045182 0.016788 0.024396
                                          0.009548
                                                   0.003539
                                                            no_efectores
. .
    no_efectores
995
996
    0.039064 0.031233 0.008573 0.020084 0.032357 0.023270
                                                            no efectores
                                                             no efectores
997 -0.004198 0.049528
                       0.012141 0.029064 0.022560 0.049343
    0.017654 0.014547
                       0.010209 0.028361
998
                                          0.013779
                                                   0.005731
                                                             no efectores
999
    0.014039 0.006326 0.002425 0.010861 0.015671 0.010931
                                                            no efectores
```

[1000 rows x 42 columns]

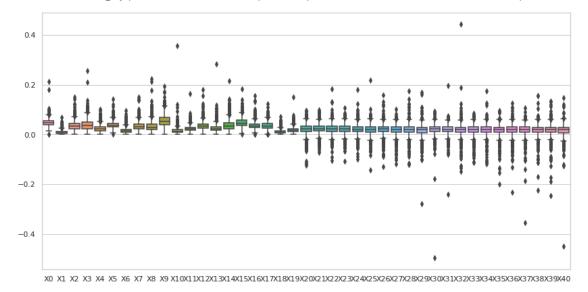
Composición de pseudo aminoácidos (PseAAC) mass no\_efectores fusarium\_oxysporum dataset 3, con valores atípicos.
Estadísticas.

	XO	X1	Х2	ХЗ	Х4	\	
count	1000.000000	1000.000000	1000.000000	1000.000000	1000.000000		
mean	0.047451	0.009680	0.035096	0.037910	0.024250		
std	0.015557	0.009308	0.018354	0.023267	0.015179		
min	0.000000	0.000000	0.000000	0.000000	0.000000		
25%	0.038506	0.004252	0.022260	0.022954	0.015159		
50%	0.045874	0.007758	0.033535	0.034210	0.021772		
75%	0.054669	0.012421	0.044468	0.048838	0.030479		
max	0.158133	0.115567	0.143055	0.220766	0.143771		
	Х5	Х6	Х7	Х8	Х9		\
count	1000.000000	1000.000000	1000.000000	1000.000000	1000.000000		
mean	0.038544	0.016063	0.031882	0.030808	0.055549		
std	0.015222	0.011910	0.016151	0.020512	0.025552		
min	0.000000	0.000000	0.000000	0.000000	0.000000		
25%	0.030279	0.008638	0.022139	0.017369	0.039229		
50%	0.037191	0.014056	0.030231	0.027049	0.052635		

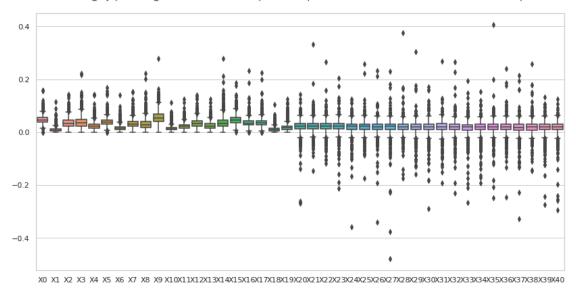
75%	0.045025	0.020162	0.039115	0.039119	0.068908	•••
max	0.167625	0.139253	0.151614	0.220766	0.279375	•••
	X31	X32	X33	X34	X35	\
count	1000.000000	1000.000000	1000.000000	1000.000000	1000.000000	
mean	0.017478	0.017560	0.016668	0.016829	0.018803	
std	0.026836	0.026787	0.027229	0.025319	0.029149	
min	-0.193700	-0.230970	-0.266710	-0.193238	-0.248260	
25%	0.008782	0.009263	0.008257	0.009145	0.009563	
50%	0.020231	0.019665	0.019404	0.019881	0.020947	
75%	0.031356	0.030009	0.028378	0.029361	0.030889	
max	0.267294	0.264413	0.193806	0.153511	0.405958	
	X36	Х37	Х38	X39	X40	
count	1000.000000	1000.000000	1000.000000	1000.000000	1000.000000	
mean	0.018618	0.016058	0.018606	0.016831	0.016808	
std	0.025035	0.029076	0.025550	0.026982	0.029036	
min	-0.247011	-0.328156	-0.146033	-0.275013	-0.294251	
25%	0.009555	0.007919	0.008295	0.008861	0.008908	
50%	0.019775	0.018194	0.020382	0.019657	0.020483	
75%	0.030460	0.028967	0.029591	0.030036	0.030421	
max	0.240185	0.213431	0.257798	0.133660	0.125956	

[8 rows x 41 columns]

fusarium\_oxysporum efectores dataset 3 Composición de pseudo aminoácidos (PseAAC) mass con valores atípicos.



fusarium\_oxysporum no\_efectores dataset 3 Composición de pseudo aminoácidos (PseAAC) mass con valores atípicos.



### 4.1 Composición de pseudo aminoácidos (PseAAC) mass, sin valores atípicos

```
[8]: #mass
    transf = "Composición de pseudo aminoácidos (PseAAC) "
    transf2 = "PseAAC"
    estado = "sin valores atípicos.\n"
    comp = "mass"
    df=""
    out = (str(r3) + '/ds' + str(dataset) + '_' + str(transf2) + '_' + str(comp) +__
     os.makedirs(str(r3), exist_ok=True)
    df_out = pd.DataFrame()
    for etiq in "efectores", "no_efectores":
        titulo = (str(transf)+" "+ str(comp)+" "+ str(etiq) + " "+ str(nombre2) +", __
     →" + str(estado))
        if etiq == "efectores":
            df=PseAAC_mass_efec
        if etiq == "no_efectores":
            df=PseAAC_mass_no_efec
        del df['X41']
        df = (df[(np.abs(stats.zscore(df)) < 3).all(axis=1)])</pre>
        df['X41'] = etiq
```

Composición de pseudo aminoácidos (PseAAC) mass efectores fusarium\_oxysporum dataset 3, sin valores atípicos.
Valores del documento csv.

```
XΟ
                    Х1
                             Х2
                                       ХЗ
                                                 Х4
                                                          Х5
                                                                    X6 \
0
    0.043079 \quad 0.005744 \quad 0.024412 \quad 0.027284 \quad 0.015796 \quad 0.044515 \quad 0.012924
1
    0.058191 0.006062 0.043643 0.058191 0.031520 0.037582 0.020609
2
    0.050991 \quad 0.002684 \quad 0.045624 \quad 0.040256 \quad 0.013419 \quad 0.029521 \quad 0.016102
3
    0.065546 0.008549 0.025648 0.019949 0.032773 0.045597 0.018524
4
    0.045360 0.013608 0.048384 0.065016 0.025704 0.042336 0.021168
    0.046003 \quad 0.007188 \quad 0.034502 \quad 0.031627 \quad 0.008626 \quad 0.034502 \quad 0.014376
995
996 0.053294 0.007012 0.044879 0.060307 0.031556 0.042074 0.017531
997
    0.049883 \quad 0.003277 \quad 0.041872 \quad 0.062626 \quad 0.005826 \quad 0.028036 \quad 0.020390
    0.045830 0.011682 0.034148 0.043134
998
                                           0.028756
                                                     0.034148
                                                              0.016175
999
    Χ7
                    Х8
                             хэ ...
                                         X32
                                                   X33
                                                             X34 \
0
    0.017232 \quad 0.021540 \quad 0.033027 \quad ... \quad 0.030732 \quad 0.018096 \quad 0.046392
    0.026671 0.070314 0.059404 ... -0.012280 0.019624 0.018991
1
2
    0.016102 0.029521 0.059042 ... 0.018999 0.014254 0.038128
3
    0.029923 \quad 0.042747 \quad 0.044172 \quad \dots \quad -0.002484 \quad 0.027664 \quad 0.015354
4
    0.040824 0.055944 0.071064 ... 0.008183 0.003207 0.035150
. .
                         ... ...
995 0.031627 0.023002 0.043128 ... 0.021518 0.025650 0.029339
996
    997
    0.014564 0.049154 0.037139 ... 0.012293 0.020327 0.018595
998
    0.038304 0.010534 0.056498 ... 0.017858 0.014313 0.017853
999
```

	X35	X36	Х37	X38	Х39	X40	X41
0	0.042328	0.028314	0.011836	0.029523	0.041018	0.016393	efectores
1	0.018646	0.009855	0.038390	0.047725	0.026817	0.012452	efectores
2	0.019618	0.017378	0.016695	0.038553	-0.014801	0.000816	efectores
3	-0.006010	0.043995	0.032249	0.010928	0.019972	0.027832	efectores
4	-0.001300	-0.003257	0.008593	0.015737	0.033125	-0.008334	efectores
	•••	•••	•••		***	•••	
 995	 0.034137	 0.015995	 0.025230	 0.017725	 0.026820	 0.023312	efectores
		0.015995					efectores efectores
995	0.034137	0.015995	0.025230	0.017725	0.026820	0.023312	010000100
995 996	0.034137 0.006054	0.015995 0.003740	0.025230 -0.000587	0.017725 0.006967	0.026820 0.020200	0.023312 0.014279	efectores

[865 rows x 42 columns]

Composición de pseudo aminoácidos (PseAAC) mass efectores fusarium\_oxysporum dataset 3, sin valores atípicos. Estadísticas.

XO	X1	Х2	ХЗ	Х4	Х5	\
865.000000	865.000000	865.000000	865.000000	865.000000	865.000000	
0.045854	0.008323	0.032587	0.035462	0.021983	0.036518	
0.011854	0.005837	0.013452	0.016831	0.010997	0.010559	
0.014482	0.000000	0.000000	0.001847	0.000000	0.006912	
0.037724	0.004102	0.023127	0.022873	0.014149	0.029317	
0.045670	0.007179	0.031427	0.033483	0.020612	0.036011	
0.053332	0.011468	0.041338	0.046084	0.028130	0.042792	
0.092500	0.029763	0.081470	0.102121	0.061833	0.074831	
Х6	Х7	Х8	Х9	Х	31 \	
	865.000000	865.000000	865.000000		•	
	0.029919	0.028629	0.051417	0.0204	88	
0.007740	0.012538	0.014489	0.020703			
0.000000	0.001574	0.000000	0.003611			
0.008563	0.020961	0.017822	0.037139	0.0118	12	
0.013336	0.029028	0.026323	0.049910	0.0219	31	
0.019239	0.038060	0.037795	0.064984	0.0298	53	
0.044584	0.074440	0.087432	0.125058	0.0681	13	
¥32	¥33	<b>X3</b> 4	X35	¥36	¥37	\
						`
0.021021	0.021000	0.021010	0.020000	0.020100	0.021201	
	865.000000 0.045854 0.011854 0.014482 0.037724 0.045670 0.053332 0.092500 X6 865.000000 0.014269 0.007740 0.000000 0.018563 0.013336 0.019239	865.000000       865.000000         0.045854       0.008323         0.011854       0.005837         0.014482       0.000000         0.037724       0.004102         0.045670       0.007179         0.053332       0.011468         0.092500       0.029763         X6       X7         865.000000       865.000000         0.014269       0.029919         0.007740       0.012538         0.000563       0.020961         0.013336       0.029028         0.019239       0.038060         0.044584       0.074440         X32       X33         865.000000       865.000000         0.019027       0.020436         0.015149       0.015826         -0.057649       -0.042489         0.010683       0.011791	865.000000       865.000000       865.000000         0.045854       0.008323       0.032587         0.011854       0.005837       0.013452         0.014482       0.000000       0.000000         0.037724       0.004102       0.023127         0.045670       0.007179       0.031427         0.053332       0.011468       0.041338         0.092500       0.029763       0.081470         X6       X7       X8         865.000000       865.000000       865.000000         0.014269       0.029919       0.028629         0.007740       0.012538       0.014489         0.008563       0.020961       0.017822         0.013336       0.029028       0.026323         0.019239       0.038060       0.037795         0.044584       0.074440       0.087432         X32       X33       X34         865.000000       865.000000       865.000000         0.019027       0.020436       0.020297         0.015149       0.015826       0.015032         -0.057649       -0.042489       -0.029830         0.010683       0.011791       0.011388	865.000000       865.000000       865.000000       865.000000         0.045854       0.008323       0.032587       0.035462         0.011854       0.005837       0.013452       0.016831         0.014482       0.000000       0.000000       0.001847         0.037724       0.004102       0.023127       0.022873         0.045670       0.007179       0.031427       0.033483         0.053332       0.011468       0.041338       0.046084         0.092500       0.029763       0.081470       0.102121         X6       X7       X8       X9         865.000000       865.000000       865.000000       865.000000         0.014269       0.029919       0.028629       0.051417         0.007740       0.012538       0.014489       0.020703         0.000000       0.001574       0.000000       0.003611         0.008563       0.020961       0.017822       0.037139         0.013336       0.029028       0.026323       0.049910         0.019239       0.038060       0.037795       0.064984         0.044584       0.074440       0.087432       0.125058         X32       X33       X34       X35	865.000000       865.000000       865.000000       865.000000       865.000000         0.045854       0.008323       0.032587       0.035462       0.021983         0.011854       0.005837       0.013452       0.016831       0.010997         0.014482       0.000000       0.000000       0.001847       0.000000         0.037724       0.004102       0.023127       0.022873       0.014149         0.045670       0.007179       0.031427       0.033483       0.020612         0.053332       0.011468       0.041338       0.046084       0.028130         0.092500       0.029763       0.081470       0.102121       0.061833         X6       X7       X8       X9        X         865.000000       865.000000       865.000000        865.00000        865.00000         0.014269       0.029919       0.028629       0.051417        0.0204         0.007740       0.012538       0.014489       0.020703        0.0146         0.008563       0.020961       0.017822       0.037139        0.0118         0.013336       0.029028       0.026323       0.049910 <t< td=""><td>865.000000         865.000000         865.000000         865.000000         865.000000         865.000000         865.000000         865.000000         865.000000         865.000000         0.036518         0.0145854         0.005837         0.013452         0.016831         0.010997         0.010559         0.014482         0.000000         0.000000         0.001847         0.000000         0.006912         0.037724         0.004102         0.023127         0.022873         0.014149         0.029317         0.045670         0.007179         0.031427         0.033483         0.020612         0.036011         0.053332         0.011468         0.041338         0.046084         0.028130         0.042792         0.092500         0.029763         0.081470         0.102121         0.061833         0.074831           X6         X7         X8         X9          X31         \         865.000000         865.000000         865.000000          865.000000          865.000000          865.000000          865.000000          865.000000          865.000000          865.000000          865.000000          865.000000          865.000000          865.000000         &lt;</td></t<>	865.000000         865.000000         865.000000         865.000000         865.000000         865.000000         865.000000         865.000000         865.000000         865.000000         0.036518         0.0145854         0.005837         0.013452         0.016831         0.010997         0.010559         0.014482         0.000000         0.000000         0.001847         0.000000         0.006912         0.037724         0.004102         0.023127         0.022873         0.014149         0.029317         0.045670         0.007179         0.031427         0.033483         0.020612         0.036011         0.053332         0.011468         0.041338         0.046084         0.028130         0.042792         0.092500         0.029763         0.081470         0.102121         0.061833         0.074831           X6         X7         X8         X9          X31         \         865.000000         865.000000         865.000000          865.000000          865.000000          865.000000          865.000000          865.000000          865.000000          865.000000          865.000000          865.000000          865.000000          865.000000         <

max	0.070754	0.077625	0.078221	0.066512	0.085669	0.075290
	Х38	Х39	X40			
count	865.000000	865.000000	865.000000			
mean	0.019556	0.019708	0.018911			
std	0.015292	0.015446	0.015708			
min	-0.040202	-0.041508	-0.046440			
25%	0.010800	0.011324	0.010199			
50%	0.020644	0.020489	0.020022			
75%	0.029001	0.029136	0.029326			
max	0.068168	0.070971	0.067894			

[8 rows x 41 columns]

 $\label{lem:composition} \mbox{Composición de pseudo aminoácidos (PseAAC)} \quad \mbox{mass no\_efectores fusarium\_oxysporum dataset 3, sin valores atípicos.}$ 

	XO	X1	X2	ХЗ	X4	X5	Х6	\
0	0.057061	0.000000	0.030209	0.067131	0.011748	0.023496	0.010070	
1	0.049288	0.001494	0.017923	0.025391	0.016429	0.035846	0.004481	
2	0.041434	0.012749	0.041434	0.054183	0.022311	0.041434	0.019123	
3	0.048512	0.006930	0.015593	0.013861	0.060640	0.053710	0.006930	
4	0.016138	0.008069	0.036310	0.020172	0.028241	0.036310	0.020172	
	•••	•••	•••		•••	•••		
995	0.070773	0.008987	0.048305	0.039318	0.016851	0.031455	0.023591	
996	0.052103	0.006652	0.025497	0.035475	0.025497	0.034366	0.012194	
997	0.042375	0.009302	0.022738	0.032040	0.015503	0.035140	0.012403	
998	0.053748	0.017636	0.034432	0.034432	0.024355	0.039471	0.012597	
999	0.048348	0.024552	0.032862	0.069123	0.030973	0.036639	0.042305	
	X7	Х8	Х9	X3	32 X	33 X	34 \	
0	0.053704	0.057061	0.050348	0.01893	30 0.0121	69 -0.0116	79	
1	0.025391	0.038833	0.050782	0.0029	51 0.0240	86 0.0309	14	
2	0.060557	0.035059	0.095617	0.02633	31 0.0196	10 0.0367	39	
3	0.058907	0.031186	0.076233	0.02298	84 0.0064	93 0.0472	90	
4	0.020172	0.020172	0.040344	0.00899	98 0.0117	61 -0.0024	76	
	•••	•••		•••				
995	0.038195	0.029208	0.068526	0.00334	46 0.0050	02 0.0133	03	
996	0.032149	0.024389	0.034366	0.01794	48 0.0408	26 0.0262	61	
997	0.032040	0.025839	0.048577	0.03459	93 0.0266	75 0.0364	77	
998	0.022675	0.015117	0.059627	0.0338	52 0.0166	24 -0.0039	17	
999	0.059680	0.054769	0.083854	0.00224	48 0.0123	26 0.0171	48	
	X35	X36	Х37	X38	X39	X40		X41
0	0.020818	0.011369	0.007916	0.018120	0.026597	0.021912	no_efecto	res

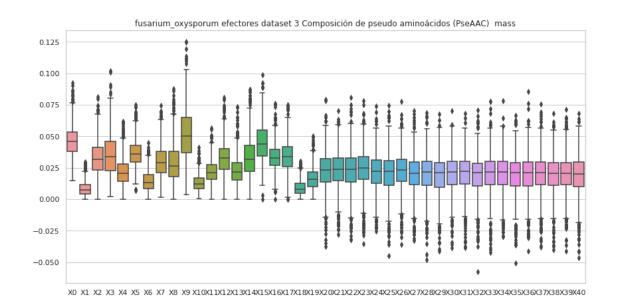
[874 rows x 42 columns]

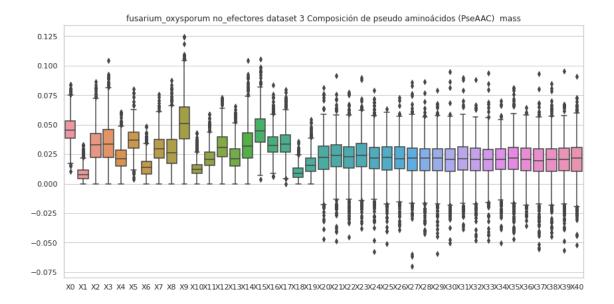
Composición de pseudo aminoácidos (PseAAC) mass no\_efectores fusarium\_oxysporum dataset 3, sin valores atípicos.
Estadísticas.

	XO	X1	Х2	ХЗ	X4	Х5	\
count	874.000000	874.000000	874.000000	874.000000	874.000000	874.000000	
mean	0.045910	0.008439	0.033397	0.035346	0.022168	0.037082	
std	0.011929	0.006004	0.014715	0.018060	0.010716	0.010592	
min	0.010532	0.000000	0.000000	0.000000	0.000000	0.003490	
25%	0.038364	0.004225	0.022271	0.022486	0.014854	0.030299	
50%	0.045052	0.007331	0.032920	0.033595	0.021191	0.036658	
75%	0.053119	0.011395	0.042635	0.046103	0.028504	0.043699	
max	0.084325	0.032952	0.086535	0.104289	0.060640	0.080344	
	Х6	Х7	Х8	Х9		.31 \	
count	874.000000	874.000000	874.000000	874.000000	874.0000		
mean	0.014376	0.029924	0.028141	0.051983	0.0203	85	
std	0.008061	0.012085	0.014512	0.020358	0.0162		
min	0.000000	0.000000	0.000000	0.000000	0.0382	270	
25%	0.008268	0.021684	0.017298	0.038201	0.0113	93	
50%	0.013574	0.029265	0.025998	0.050691	0.0209	79	
75%	0.018718	0.037640	0.037153	0.064734	0.0313	64	
max	0.048845	0.075795	0.087536	0.124530	0.0898	61	
	X32	Х33	X34	X35	Х36	Х37	\
count	874.000000	874.000000	874.000000	874.000000	874.000000	874.000000	
mean	0.019749	0.019605	0.019308	0.020665	0.019915	0.018939	
std	0.015497	0.015925	0.015483	0.017351	0.015084	0.016964	
min	-0.048092	-0.048138	-0.050307	-0.046775	-0.035535	-0.055221	
25%	0.011186	0.010883	0.011872	0.011848	0.010760	0.010379	
50%	0.020648	0.020271	0.020609	0.021498	0.020295	0.019190	
75%	0.030084	0.028883	0.029306	0.030862	0.030300	0.029352	
max	0.088287	0.093753	0.070174	0.081126	0.064549	0.092973	

	X38	X39	X40
count	874.000000	874.000000	874.000000
mean	0.019317	0.019420	0.020265
std	0.016744	0.016853	0.017154
min	-0.044715	-0.056478	-0.052147
25%	0.010231	0.011190	0.010561
50%	0.020734	0.020706	0.021422
75%	0.029383	0.030228	0.030748
max	0.084499	0.095106	0.090581

[8 rows x 41 columns]





## 5 Composición de pseudo aminoácidos (PseAAC) hidro

```
[9]: #hidro
     transf = "Composición de pseudo aminoácidos (PseAAC) "
     transf2 = "PseAAC"
     estado = "con valores atípicos.\n"
     comp = "hidro"
     df=""
     for etiq in "efectores", "no_efectores":
         titulo = (str(transf)+" "+ str(comp)+" "+ str(etiq) + " "+ str(nombre2) +",
      →" + str(estado))
        print (str(etiq))
         if etiq == "efectores":
             df=PseAAC_hidro_efec
         if etiq == "no_efectores":
             df=PseAAC_hidro_no_efec
         #del df['X62']
         print (str(titulo) + "Valores del documento csv.\n")
         print (df)
         print ("\n\n" + str(titulo) + "Estadísticas.\n")
         print(df.describe())
         print ("\n\n")
```

#### efectores

Composición de pseudo aminoácidos (PseAAC) hidro efectores fusarium\_oxysporum dataset 3, con valores atípicos.

```
XΟ
                     Х1
                                Х2
                                          ХЗ
                                                     Х4
                                                               Х5
                                                                          X6 \
     0.099764 0.013302 0.056533 0.063184 0.036580 0.103089 0.029929
0
     0.041901 \quad 0.004365 \quad 0.031426 \quad 0.041901 \quad 0.022696 \quad 0.027061 \quad 0.014840
1
2
     0.062622 \quad 0.003296 \quad 0.056031 \quad 0.049439 \quad 0.016480 \quad 0.036255 \quad 0.019775
3
     0.138226  0.018030  0.054089  0.042069  0.069113  0.096157
                                                                   0.039064
     0.022932 0.006880
4
                         0.024461 0.032869
                                              0.012995 0.021403 0.010702
. .
                  •••
                                                    •••
                                                            •••
     0.094350 \quad 0.014742 \quad 0.070762 \quad 0.064865 \quad 0.017691 \quad 0.070762 \quad 0.029484
995
996
     0.058157 \quad 0.007652 \quad 0.048975 \quad 0.065810 \quad 0.034435 \quad 0.045914 \quad 0.019131
997
     0.011650 \quad 0.000765 \quad 0.009779 \quad 0.014626 \quad 0.001361 \quad 0.006548 \quad 0.004762
                                    0.046784 0.031189
998
     0.049708 0.012671
                         0.037037
                                                         0.037037
                                                                   0.017544
999
     0.028698 \quad 0.004502 \quad 0.009003 \quad 0.009566 \quad 0.020820 \quad 0.023071 \quad 0.005064
           Х7
                     Х8
                                Х9
                                            X53
                                                       X54
                                                                 X55 \
0
     0.039905 0.049882 0.076486 ...
                                       0.051846 0.002622 -0.003148
1
     0.019205 0.050630 0.042774
                                       0.034389 0.000025 0.015360
2
     0.019775 0.036255 0.072510 ...
                                       0.023206 -0.039416 -0.035913
3
     0.063103 0.090148 0.093153
                                       0.022751 -0.046300 -0.046001
4
     0.020639 0.028283
                         0.035927
                                       0.020464 0.003115 0.010322
. .
995
     0.064865 0.047175
                         0.088453
                                       0.000547 -0.034817 -0.014870
996
     0.053566 0.060453
                         0.094123 ... 0.002931 -0.001052 0.026165
997
     0.003401 0.011479 0.008673 ...
                                       0.023830 0.016208 0.025722
998
     0.032164 0.023392 0.076999 ...
                                       0.004861 -0.000053 0.001569
999
     0.022509 0.006190 0.033200
                                       0.008486 0.008629 0.000074
                                                                          X62
          X56
                    X57
                               X58
                                         X59
                                                    X60
                                                              X61
0
     0.014780 -0.009853 -0.040073 -0.019595 0.032058 0.020557
                                                                    efectores
1
     0.023629
               0.029768 -0.006569
                                    0.019032 0.017797
                                                         0.017802
                                                                   efectores
2
     0.022347
               0.017189
                          0.029393 0.039410 -0.003367
                                                         0.013100
                                                                   efectores
3
    -0.043830 -0.075439 -0.007893
                                    0.006049 -0.010568 0.011008
                                                                   efectores
4
    -0.011907 0.017905
                          0.007301 0.011996 0.022072 0.032936
                                                                    efectores
995 -0.023394 0.034588
                          efectores
996 -0.031815 -0.017123
                          0.018068
                                    0.031470 0.018813 0.030435
                                                                    efectores
     0.015570 0.025020
                         0.014508
                                    0.023726 0.017424 0.027437
                                                                    efectores
```

998 -0.000166 0.001256 -0.015514 -0.011632 0.022506 0.017264 efectores 999 0.018467 0.007769 0.023734 0.002472 0.015254 0.006371 efectores

[1000 rows x 63 columns]

Composición de pseudo aminoácidos (PseAAC) hidro efectores fusarium\_oxysporum dataset 3, con valores atípicos.
Estadísticas.

	XO	X1	Х2	ХЗ	X4	\	
count	1000.000000	1000.000000	1000.000000	1000.000000	1000.000000		
mean	0.060274	0.011302	0.041480	0.043838	0.029382		
std	0.047125	0.011807	0.026029	0.028026	0.036036		
min	-0.146701	0.000000	-0.293402	-0.440104	-0.146701		
25%	0.038673	0.004371	0.026402	0.029220	0.016895		
50%	0.054545	0.008900	0.040063	0.043108	0.025843		
75%	0.075412	0.015053	0.053153	0.056396	0.035749		
max	1.099788	0.176543	0.353086	0.294239	0.684714		
	Х5	Х6	Х7	Х8	Х9		\
count	1000.000000	1000.000000	1000.000000	1000.000000	1000.000000		
mean	0.050288	0.018974	0.039317	0.037101	0.067111	•••	
std	0.056404	0.015986	0.043495	0.034606	0.070179		
min	-0.293402	0.000000	-0.733506	-0.293402	-0.733506	•••	
25%	0.029307	0.009949	0.024155	0.022023	0.041243	•••	
50%	0.043700	0.016627	0.036625	0.033424	0.063212	•••	
75%	0.064207	0.024387	0.048776	0.047901	0.082843	•••	
max	1.539704	0.272929	0.659873	0.659873	1.539704	•••	
	X52	X53	X54	X55	X56	\	
count	X52 1000.000000	X53 1000.000000	X54 1000.000000	X55 1000.000000	X56 1000.000000	\	
count mean						\	
	1000.000000	1000.000000	1000.000000	1000.000000	1000.000000	\	
mean	1000.000000 0.000674	1000.000000 0.010128	1000.000000 -0.000846	1000.000000 0.007743	1000.000000 -0.000627	\	
mean std	1000.000000 0.000674 0.078762	1000.000000 0.010128 0.041821	1000.000000 -0.000846 0.144064	1000.000000 0.007743 0.067465	1000.000000 -0.000627 0.088848	\	
mean std min	1000.000000 0.000674 0.078762 -1.571570	1000.000000 0.010128 0.041821 -0.471446	1000.000000 -0.000846 0.144064 -3.899028	1000.000000 0.007743 0.067465 -1.241590	1000.000000 -0.000627 0.088848 -2.499870	\	
mean std min 25%	1000.000000 0.000674 0.078762 -1.571570 -0.009411	1000.000000 0.010128 0.041821 -0.471446 -0.001949	1000.000000 -0.000846 0.144064 -3.899028 -0.009694	1000.000000 0.007743 0.067465 -1.241590 -0.002698	1000.000000 -0.000627 0.088848 -2.499870 -0.010692	\	
mean std min 25% 50%	1000.000000 0.000674 0.078762 -1.571570 -0.009411 0.005561	1000.000000 0.010128 0.041821 -0.471446 -0.001949 0.010441	1000.000000 -0.000846 0.144064 -3.899028 -0.009694 0.004164	1000.000000 0.007743 0.067465 -1.241590 -0.002698 0.010063	1000.000000 -0.000627 0.088848 -2.499870 -0.010692 0.004435	\	
mean std min 25% 50% 75%	1000.000000 0.000674 0.078762 -1.571570 -0.009411 0.005561 0.016855	1000.000000 0.010128 0.041821 -0.471446 -0.001949 0.010441 0.022551	1000.000000 -0.000846 0.144064 -3.899028 -0.009694 0.004164 0.016692	1000.000000 0.007743 0.067465 -1.241590 -0.002698 0.010063 0.021418	1000.000000 -0.000627 0.088848 -2.499870 -0.010692 0.004435 0.016726	\	
mean std min 25% 50% 75%	1000.000000 0.000674 0.078762 -1.571570 -0.009411 0.005561 0.016855	1000.000000 0.010128 0.041821 -0.471446 -0.001949 0.010441 0.022551	1000.000000 -0.000846 0.144064 -3.899028 -0.009694 0.004164 0.016692	1000.000000 0.007743 0.067465 -1.241590 -0.002698 0.010063 0.021418	1000.000000 -0.000627 0.088848 -2.499870 -0.010692 0.004435 0.016726		
mean std min 25% 50% 75%	1000.000000 0.000674 0.078762 -1.571570 -0.009411 0.005561 0.016855 0.818813	1000.000000 0.010128 0.041821 -0.471446 -0.001949 0.010441 0.022551 0.845139	1000.000000 -0.000846 0.144064 -3.899028 -0.009694 0.004164 0.016692 1.415994	1000.000000 0.007743 0.067465 -1.241590 -0.002698 0.010063 0.021418 1.024610	1000.000000 -0.000627 0.088848 -2.499870 -0.010692 0.004435 0.016726 0.445511		
mean std min 25% 50% 75% max	1000.000000 0.000674 0.078762 -1.571570 -0.009411 0.005561 0.016855 0.818813	1000.000000 0.010128 0.041821 -0.471446 -0.001949 0.010441 0.022551 0.845139	1000.000000 -0.000846 0.144064 -3.899028 -0.009694 0.004164 0.016692 1.415994	1000.000000 0.007743 0.067465 -1.241590 -0.002698 0.010063 0.021418 1.024610	1000.000000 -0.000627 0.088848 -2.499870 -0.010692 0.004435 0.016726 0.445511	\	
mean std min 25% 50% 75% max	1000.000000 0.000674 0.078762 -1.571570 -0.009411 0.005561 0.016855 0.818813 X57 1000.000000 0.008814 0.066284	1000.000000 0.010128 0.041821 -0.471446 -0.001949 0.010441 0.022551 0.845139 X58 1000.000000 0.001290 0.055835	1000.000000 -0.000846 0.144064 -3.899028 -0.009694 0.004164 0.016692 1.415994 X59 1000.000000 0.007342 0.039806	1000.000000 0.007743 0.067465 -1.241590 -0.002698 0.010063 0.021418 1.024610 X60 1000.000000 -0.001211 0.076001	1000.000000 -0.000627 0.088848 -2.499870 -0.010692 0.004435 0.016726 0.445511 X61 1000.000000 0.006926 0.059076	\	
mean std min 25% 50% 75% max  count mean std min	1000.000000 0.000674 0.078762 -1.571570 -0.009411 0.005561 0.016855 0.818813 X57 1000.000000 0.008814 0.066284 -1.338604	1000.000000 0.010128 0.041821 -0.471446 -0.001949 0.010441 0.022551 0.845139 X58 1000.000000 0.001290 0.055835 -1.209798	1000.000000 -0.000846 0.144064 -3.899028 -0.009694 0.004164 0.016692 1.415994 X59 1000.000000 0.007342 0.039806 -0.668793	1000.000000 0.007743 0.067465 -1.241590 -0.002698 0.010063 0.021418 1.024610 X60 1000.000000 -0.001211 0.076001 -1.791713	1000.000000 -0.000627 0.088848 -2.499870 -0.010692 0.004435 0.016726 0.445511 X61 1000.000000 0.006926 0.059076 -1.120997	\	
mean std min 25% 50% 75% max  count mean std min 25%	1000.000000 0.000674 0.078762 -1.571570 -0.009411 0.005561 0.016855 0.818813 X57 1000.000000 0.008814 0.066284	1000.000000 0.010128 0.041821 -0.471446 -0.001949 0.010441 0.022551 0.845139 X58 1000.000000 0.001290 0.055835 -1.209798 -0.010367	1000.000000 -0.000846 0.144064 -3.899028 -0.009694 0.004164 0.016692 1.415994 X59 1000.000000 0.007342 0.039806 -0.668793 -0.003310	1000.000000 0.007743 0.067465 -1.241590 -0.002698 0.010063 0.021418 1.024610 X60 1000.000000 -0.001211 0.076001	1000.000000 -0.000627 0.088848 -2.499870 -0.010692 0.004435 0.016726 0.445511  X61 1000.000000 0.006926 0.059076 -1.120997 -0.002881	\	
mean std min 25% 50% 75% max  count mean std min	1000.000000 0.000674 0.078762 -1.571570 -0.009411 0.005561 0.016855 0.818813 X57 1000.000000 0.008814 0.066284 -1.338604	1000.000000 0.010128 0.041821 -0.471446 -0.001949 0.010441 0.022551 0.845139 X58 1000.000000 0.001290 0.055835 -1.209798	1000.000000 -0.000846 0.144064 -3.899028 -0.009694 0.004164 0.016692 1.415994 X59 1000.000000 0.007342 0.039806 -0.668793	1000.000000 0.007743 0.067465 -1.241590 -0.002698 0.010063 0.021418 1.024610 X60 1000.000000 -0.001211 0.076001 -1.791713	1000.000000 -0.000627 0.088848 -2.499870 -0.010692 0.004435 0.016726 0.445511 X61 1000.000000 0.006926 0.059076 -1.120997	\	

max 1.240346 0.424960 0.266416 0.384922 0.883873

[8 rows x 62 columns]

## no\_efectores

Composición de pseudo aminoácidos (PseAAC) hidro no\_efectores fusarium\_oxysporum dataset 3, con valores atípicos. Valores del documento csv.

	ХО	X1	Х2	ХЗ	Х4	Х5	X6 \	
0	0.023325	0.000000	0.012349	0.027442	0.004802	0.009605	0.004116	`
1	0.079516	0.002410	0.028915	0.040963	0.026505	0.057829	0.007229	
2	0.046594	0.014337	0.046594	0.060930	0.025089	0.046594	0.021505	
3	0.032186	0.004598	0.010346	0.009196	0.040233	0.035635	0.004598	
4	0.018710	0.009355	0.042098	0.023388	0.032743	0.042098	0.023388	
							0.02000	
995	0.089591	0.011377		0.049773	0.021331	0.039818	0.029864	
996	0.090652	0.011573	0.044362	0.061721	0.044362	0.059792	0.021216	
997	0.062557	0.013732	0.033567	0.047299	0.022887	0.051876	0.018309	
998	0.061677	0.020238	0.039512	0.039512	0.027947	0.045294	0.014455	
999	0.068271	0.034669	0.046403	0.097606	0.043736	0.051737	0.059737	
	Х7	Х8	Х9	Х	.53 X		.55 \	
0	0.021953	0.023325	0.020581	0.0158	884 0.0166	0.0239	04	
1	0.040963	0.062649	0.081925	0.0111	92 0.0266	889 0.0317	06	
2	0.068099	0.039426	0.107524	0.0293	31 0.0143	373 -0.0064	.77	
3	0.039083	0.020691	0.050579	0.0026	94 -0.0122	271 -0.0209	46	
4	0.023388	0.023388	0.046776	0.0100	95 -0.0537	68 -0.0354	:60	
	•••			•••		•		
995	0.048351	0.036974	0.086747	0.0407	79 -0.0050	70 0.0326	94	
996	0.055934	0.042433	0.059792	0.0134	33 -0.0060	18 -0.0134	81	
997	0.047299	0.038144	0.071712	0.0215	97 0.0207	19 -0.0030	89	
998	0.026020	0.017347	0.068423	0.0003	0.0036	26 0.0037	37	
999	0.084272	0.077338	0.118407	0.0333	46 0.0188	375 0.0229	34	
	X56	X57	X58	X59	X60	X61	Xε	32
0	0.008862	0.023636	0.006904	0.024881	0.017457	0.032266	no_efectore	28
1	-0.018886	-0.013208	0.003351	0.017522	0.003811	0.000695	no_efectore	28
2	0.020286	0.038512	0.005383	0.001142	0.100258	0.036044	no_efectore	28
3	0.015112	-0.001684	0.027231	0.011529	0.008535	-0.008193	no_efectore	28
4	0.047636	0.013731	0.032562	0.048854	-0.010619	0.027081	no_efectore	28
	•••	•••	•••		•••	•••		
995	0.015451	0.009657	0.016625	0.013719	-0.006604	0.037432	no_efectore	28
996	-0.002574	-0.000432	-0.017208	0.025141	-0.015383	-0.013812	no_efectore	28
997	0.008393	0.011741	0.008578	0.004925	-0.001226	-0.005017	no_efectore	38
998	0.023961	0.003836	0.007339	0.020432	-0.020017	-0.011250	no_efectore	28

999 -0.015935 -0.023058 0.020224 0.015028 0.004825 0.029103 no\_efectores

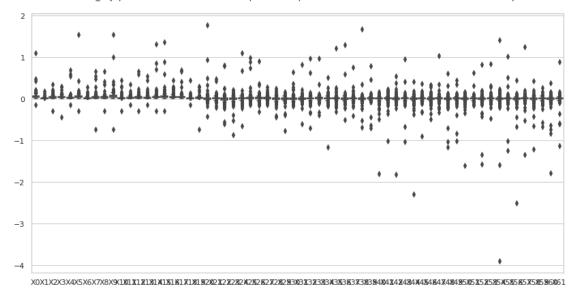
[1000 rows x 63 columns]

Composición de pseudo aminoácidos (PseAAC) hidro no\_efectores fusarium\_oxysporum dataset 3, con valores atípicos. Estadísticas.

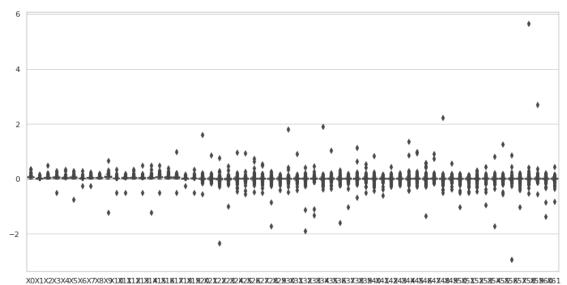
	XO	X1	Х2	ХЗ	X4	\	
count	1000.000000	1000.000000	1000.000000	1000.000000	1000.000000		
mean	0.062582	0.012735	0.044062	0.044161	0.030697		
std	0.031304	0.014115	0.027154	0.029634	0.022424		
min	0.000000	0.000000	0.000000	-0.492612	0.000000		
25%	0.042375	0.004670	0.028431	0.028723	0.017871		
50%	0.058926	0.009844	0.043282	0.042712	0.028321		
75%	0.077940	0.015809	0.055838	0.057985	0.038040		
max	0.379123	0.166095	0.498286	0.287800	0.332191		
	Х5	Х6	Х7	Х8	Х9	•••	\
count	1000.000000	1000.000000	1000.000000	1000.000000	1000.000000	•••	
mean	0.050901	0.019899	0.040446	0.037110	0.069219	•••	
std	0.038958	0.018834	0.024934	0.022167	0.057564	•••	
min	-0.738919	-0.246306	-0.246306	0.000000	-1.231531	•••	
25%	0.031466	0.010177	0.025580	0.021609	0.045221	•••	
50%	0.046392	0.017839	0.037981	0.034184	0.067656	•••	
75%	0.067079	0.025873	0.051746	0.048517	0.090238	•••	
max	0.287800	0.287800	0.246892	0.202199	0.664381	•••	
	X52	X53	X54	X55	X56	\	
count	1000.000000	1000.000000	1000.000000	1000.000000	1000.000000		
count mean	1000.000000 0.002552	1000.000000 0.006580	1000.000000 0.000550	1000.000000 0.007608	1000.000000 -0.000515		
mean	0.002552	0.006580	0.000550	0.007608	-0.000515		
mean std	0.002552 0.040633	0.006580 0.047904	0.000550 0.070632	0.007608 0.055009	-0.000515 0.103510		
mean std min	0.002552 0.040633 -0.450685	0.006580 0.047904 -0.951955	0.000550 0.070632 -1.715161	0.007608 0.055009 -0.541923	-0.000515 0.103510 -2.933474		
mean std min 25%	0.002552 0.040633 -0.450685 -0.008922	0.006580 0.047904 -0.951955 -0.003684	0.000550 0.070632 -1.715161 -0.010907	0.007608 0.055009 -0.541923 -0.005069	-0.000515 0.103510 -2.933474 -0.010086		
mean std min 25% 50%	0.002552 0.040633 -0.450685 -0.008922 0.005279	0.006580 0.047904 -0.951955 -0.003684 0.009120	0.000550 0.070632 -1.715161 -0.010907 0.004719	0.007608 0.055009 -0.541923 -0.005069 0.008256	-0.000515 0.103510 -2.933474 -0.010086 0.004358		
mean std min 25% 50% 75%	0.002552 0.040633 -0.450685 -0.008922 0.005279 0.017229	0.006580 0.047904 -0.951955 -0.003684 0.009120 0.022543	0.000550 0.070632 -1.715161 -0.010907 0.004719 0.017517	0.007608 0.055009 -0.541923 -0.005069 0.008256 0.022187	-0.000515 0.103510 -2.933474 -0.010086 0.004358 0.016637		
mean std min 25% 50% 75%	0.002552 0.040633 -0.450685 -0.008922 0.005279 0.017229	0.006580 0.047904 -0.951955 -0.003684 0.009120 0.022543	0.000550 0.070632 -1.715161 -0.010907 0.004719 0.017517	0.007608 0.055009 -0.541923 -0.005069 0.008256 0.022187	-0.000515 0.103510 -2.933474 -0.010086 0.004358 0.016637		
mean std min 25% 50% 75%	0.002552 0.040633 -0.450685 -0.008922 0.005279 0.017229 0.321961	0.006580 0.047904 -0.951955 -0.003684 0.009120 0.022543 0.430624	0.000550 0.070632 -1.715161 -0.010907 0.004719 0.017517 0.823125	0.007608 0.055009 -0.541923 -0.005069 0.008256 0.022187 1.250127	-0.000515 0.103510 -2.933474 -0.010086 0.004358 0.016637 0.871512		
mean std min 25% 50% 75% max	0.002552 0.040633 -0.450685 -0.008922 0.005279 0.017229 0.321961	0.006580 0.047904 -0.951955 -0.003684 0.009120 0.022543 0.430624	0.000550 0.070632 -1.715161 -0.010907 0.004719 0.017517 0.823125	0.007608 0.055009 -0.541923 -0.005069 0.008256 0.022187 1.250127	-0.000515 0.103510 -2.933474 -0.010086 0.004358 0.016637 0.871512		
mean std min 25% 50% 75% max	0.002552 0.040633 -0.450685 -0.008922 0.005279 0.017229 0.321961 X57	0.006580 0.047904 -0.951955 -0.003684 0.009120 0.022543 0.430624 X58 1000.000000	0.000550 0.070632 -1.715161 -0.010907 0.004719 0.017517 0.823125 X59 1000.000000	0.007608 0.055009 -0.541923 -0.005069 0.008256 0.022187 1.250127 X60 1000.000000	-0.000515 0.103510 -2.933474 -0.010086 0.004358 0.016637 0.871512 X61 1000.000000		
mean std min 25% 50% 75% max count	0.002552 0.040633 -0.450685 -0.008922 0.005279 0.017229 0.321961 X57 1000.000000 0.005232	0.006580 0.047904 -0.951955 -0.003684 0.009120 0.022543 0.430624 X58 1000.000000 0.008262	0.000550 0.070632 -1.715161 -0.010907 0.004719 0.017517 0.823125 X59 1000.000000 0.010259	0.007608 0.055009 -0.541923 -0.005069 0.008256 0.022187 1.250127 X60 1000.000000 0.001318	-0.000515 0.103510 -2.933474 -0.010086 0.004358 0.016637 0.871512 X61 1000.000000 0.007071		
mean std min 25% 50% 75% max  count mean std	0.002552 0.040633 -0.450685 -0.008922 0.005279 0.017229 0.321961 X57 1000.000000 0.005232 0.047926	0.006580 0.047904 -0.951955 -0.003684 0.009120 0.022543 0.430624 X58 1000.000000 0.008262 0.184283	0.000550 0.070632 -1.715161 -0.010907 0.004719 0.017517 0.823125 X59 1000.000000 0.010259 0.092736	0.007608 0.055009 -0.541923 -0.005069 0.008256 0.022187 1.250127 X60 1000.000000 0.001318 0.063373	-0.000515 0.103510 -2.933474 -0.010086 0.004358 0.016637 0.871512 X61 1000.000000 0.007071 0.045354		
mean std min 25% 50% 75% max  count mean std min	0.002552 0.040633 -0.450685 -0.008922 0.005279 0.017229 0.321961 X57 1000.000000 0.005232 0.047926 -1.015845	0.006580 0.047904 -0.951955 -0.003684 0.009120 0.022543 0.430624 X58 1000.000000 0.008262 0.184283 -0.516837	0.000550 0.070632 -1.715161 -0.010907 0.004719 0.017517 0.823125 X59 1000.000000 0.010259 0.092736 -0.560237	0.007608 0.055009 -0.541923 -0.005069 0.008256 0.022187 1.250127 X60 1000.000000 0.001318 0.063373 -1.363018	-0.000515 0.103510 -2.933474 -0.010086 0.004358 0.016637 0.871512 X61 1000.000000 0.007071 0.045354 -0.814904		
mean std min 25% 50% 75% max  count mean std min 25%	0.002552 0.040633 -0.450685 -0.008922 0.005279 0.017229 0.321961 X57 1000.000000 0.005232 0.047926 -1.015845 -0.003802	0.006580 0.047904 -0.951955 -0.003684 0.009120 0.022543 0.430624 X58 1000.000000 0.008262 0.184283 -0.516837 -0.010342	0.000550 0.070632 -1.715161 -0.010907 0.004719 0.017517 0.823125 X59 1000.000000 0.010259 0.092736 -0.560237 -0.004814	0.007608 0.055009 -0.541923 -0.005069 0.008256 0.022187 1.250127 X60 1000.000000 0.001318 0.063373 -1.363018 -0.010982	-0.000515 0.103510 -2.933474 -0.010086 0.004358 0.016637 0.871512 X61 1000.000000 0.007071 0.045354 -0.814904 -0.004695		

## [8 rows x 62 columns]

fusarium\_oxysporum efectores dataset 3 Composición de pseudo aminoácidos (PseAAC) hidro con valores atípicos.



fusarium\_oxysporum no\_efectores dataset 3 Composición de pseudo aminoácidos (PseAAC) hidro con valores atípicos.



### 5.1 Composición de pseudo aminoácidos (PseAAC) hidro, sin valores atípicos

```
[10]: #hidro
      transf = "Composición de pseudo aminoácidos (PseAAC) "
      transf2 = "PseAAC"
      estado = "sin valores atípicos.\n"
      comp = "hidro"
      df=""
      out = (str(r3) + '/ds' + str(dataset) + '_' + str(transf2) + '_' + str(comp) +_{\sqcup}
      os.makedirs(str(r3), exist_ok=True)
      df_out = pd.DataFrame()
      for etiq in "efectores", "no_efectores":
          titulo = (str(transf) +" "+ str(etiq) + " " + str(nombre2) + ", " +
       →str(estado))
          print (str(etiq))
          if etiq == "efectores":
              df=PseAAC_hidro_efec
          if etiq == "no_efectores":
              df=PseAAC_hidro_no_efec
          del df['X62']
          #Se eliminan todas las filas que tengan valores atípicos en al menos una de<sub>u</sub>
          df = (df[(np.abs(stats.zscore(df)) < 3).all(axis=1)])</pre>
          df['X62'] = etiq
          df_out = pd.concat([df_out,df])
          #Guarda la lista csv sin valores atípicos.
          df_out.to_csv(str(out), index=False, header=False)
          print (str(titulo) + "Valores del documento csv.\n")
          print (df)
          print ("\n\n" + str(titulo) + "Estadísticas.\n")
          print(df.describe())
          print ("\n\n")
          #Gráfica de caja y bigotes
          sns.set(style="whitegrid")
          fig , ax = plt.subplots(figsize=(14,7))
          ax = sns.boxplot(data=df)
```

### efectores

Composición de pseudo aminoácidos (PseAAC) efectores fusarium\_oxysporum dataset 3, sin valores atípicos.

Valores del documento csv.

```
XΟ
                     Х1
                              Х2
                                        ХЗ
                                                   Х4
                                                             Х5
                                                                       X6 \
0
    0.099764
              0.013302
                        0.056533
                                  0.063184
                                                                 0.029929
                                             0.036580
                                                       0.103089
1
    0.041901
              0.004365
                        0.031426
                                   0.041901
                                             0.022696
                                                       0.027061
                                                                 0.014840
2
    0.062622
              0.003296
                        0.056031
                                   0.049439
                                             0.016480
                                                       0.036255
                                                                 0.019775
3
    0.138226
              0.018030
                        0.054089
                                   0.042069
                                             0.069113
                                                       0.096157
                                                                 0.039064
4
    0.022932
              0.006880
                        0.024461
                                   0.032869
                                             0.012995
                                                       0.021403
                                                                0.010702
. .
    0.094350
                        0.070762
                                   0.064865
                                             0.017691
                                                       0.070762
995
              0.014742
                                                                0.029484
996
    0.058157
              0.007652
                        0.048975
                                  0.065810
                                            0.034435
                                                       0.045914
                                                                0.019131
997
    0.011650
              0.000765
                        0.009779
                                   0.014626
                                             0.001361
                                                       0.006548
                                                                 0.004762
998
    0.049708
              0.012671
                        0.037037
                                   0.046784
                                             0.031189
                                                       0.037037
                                                                 0.017544
    0.028698
                        0.009003
999
              0.004502
                                   0.009566
                                            0.020820
                                                       0.023071
                                                                0.005064
                                           X53
           Х7
                     Х8
                               Х9
                                                     X54
                                                               X55
    0.039905
0
              0.049882
                        0.076486
                                     0.051846
                                               0.002622 -0.003148
1
    0.019205
              0.050630
                        0.042774
                                      0.034389
                                               0.000025 0.015360
2
                        0.072510
    0.019775
              0.036255
                                      0.023206 -0.039416 -0.035913
3
    0.063103
              0.090148
                        0.093153
                                      0.022751 -0.046300 -0.046001
4
     0.020639
              0.028283
                        0.035927
                                      0.020464 0.003115 0.010322
. .
995
    0.064865
              0.047175
                        0.088453
                                      0.000547 -0.034817 -0.014870
996
    0.053566
              0.060453
                        0.094123
                                      0.002931 -0.001052 0.026165
997
    0.003401
                        0.008673
                                      0.023830
                                               0.016208 0.025722
              0.011479
998
    0.032164
              0.023392
                        0.076999
                                      0.004861 -0.000053 0.001569
    0.022509
                                      0.008486 0.008629 0.000074
999
              0.006190
                        0.033200
         X56
                   X57
                                                                       X62
                              X58
                                        X59
                                                  X60
                                                            X61
    0.014780 -0.009853 -0.040073 -0.019595
0
                                            0.032058
                                                       0.020557
                                                                 efectores
1
    0.023629
              0.029768 -0.006569
                                   0.019032
                                            0.017797
                                                       0.017802
                                                                 efectores
2
    0.022347
              0.017189
                        0.029393
                                  0.039410 -0.003367
                                                       0.013100
                                                                 efectores
3
    -0.043830 -0.075439 -0.007893
                                  0.006049 -0.010568
                                                       0.011008
                                                                 efectores
4
    -0.011907
              0.017905
                        0.007301
                                   0.011996
                                            0.022072
                                                       0.032936
                                                                 efectores
995 -0.023394
              0.034588
                        0.018256
                                  0.041861 -0.018276 -0.020555
                                                                 efectores
996 -0.031815 -0.017123
                        0.018068
                                   0.031470
                                            0.018813
                                                       0.030435
                                                                 efectores
              0.025020
                        0.014508
                                             0.017424
997
    0.015570
                                   0.023726
                                                       0.027437
                                                                 efectores
998 -0.000166
              0.001256 -0.015514 -0.011632
                                             0.022506
                                                       0.017264
                                                                 efectores
    0.018467
              0.007769 0.023734
                                  0.002472 0.015254
                                                      0.006371
                                                                 efectores
```

[938 rows x 63 columns]

Composición de pseudo aminoácidos (PseAAC) efectores fusarium\_oxysporum dataset 3, sin valores atípicos. Estadísticas.

	ХО	X1	Х2	ХЗ	X4	Х5	\
count	938.000000	938.000000	938.000000	938.000000	938.000000	938.000000	
mean	0.056738	0.010177	0.039942	0.042645	0.026934	0.046901	
std	0.025549	0.007739	0.018405	0.018775	0.014658	0.024146	
min	0.003820	0.000000	0.000000	0.002022	0.000000	0.002888	
25%	0.037492	0.004374	0.025907	0.029130	0.016740	0.028829	
50%	0.053041	0.008605	0.039382	0.042364	0.025640	0.042067	
75%	0.073362	0.014442	0.051770	0.055228	0.034963	0.061959	
max	0.196516	0.044096	0.100533	0.110165	0.108911	0.134587	
	Х6	Х7	Х8	Х9	Y	52 \	
count	938.000000	938.000000	938.000000	938.000000	938.0000		
mean	0.017673	0.036650	0.034629	0.062933	0.0041		
std	0.017673	0.030030	0.017474	0.028518	0.0041		
min	0.000000	0.001807	0.000000	0.000000	0.1160		
25%	0.009775	0.023634	0.021473	0.040855	0.0078		
50%	0.016124	0.035630	0.032826	0.062730	0.0058		
75%	0.023528	0.047342	0.045853	0.080750	0.0166		
max	0.064252	0.110165	0.109147	0.164327	0.1107		
	Х53	X54	<b>X</b> 55	X56	X57	X58	\
count	X53 938.000000	X54 938.000000	X55 938.000000	X56 938.000000	X57 938.000000	X58 938.000000	\
count mean	938.000000 0.009528		938.000000 0.008883	938.000000 0.003280	938.000000 0.009756	938.000000 0.004640	\
	938.000000	938.000000 0.003359 0.025285	938.000000	938.000000	938.000000	938.000000	\
mean std min	938.000000 0.009528	938.000000 0.003359 0.025285 -0.177212	938.000000 0.008883 0.021155 -0.104845	938.000000 0.003280	938.000000 0.009756 0.021802 -0.094774	938.000000 0.004640	\
mean std min 25%	938.000000 0.009528 0.021780	938.000000 0.003359 0.025285 -0.177212 -0.008769	938.000000 0.008883 0.021155	938.000000 0.003280 0.024051	938.000000 0.009756 0.021802 -0.094774 -0.000794	938.000000 0.004640 0.022691	\
mean std min 25% 50%	938.000000 0.009528 0.021780 -0.089836 -0.001840 0.010534	938.000000 0.003359 0.025285 -0.177212 -0.008769 0.004282	938.000000 0.008883 0.021155 -0.104845 -0.001471 0.010171	938.000000 0.003280 0.024051 -0.099683 -0.009073 0.004745	938.000000 0.009756 0.021802 -0.094774 -0.000794 0.010706	938.000000 0.004640 0.022691 -0.083933 -0.008798 0.005797	\
mean std min 25%	938.000000 0.009528 0.021780 -0.089836 -0.001840 0.010534 0.021852	938.000000 0.003359 0.025285 -0.177212 -0.008769 0.004282 0.016194	938.000000 0.008883 0.021155 -0.104845 -0.001471 0.010171 0.020853	938.000000 0.003280 0.024051 -0.099683 -0.009073	938.000000 0.009756 0.021802 -0.094774 -0.000794	938.000000 0.004640 0.022691 -0.083933 -0.008798 0.005797 0.018243	\
mean std min 25% 50%	938.000000 0.009528 0.021780 -0.089836 -0.001840 0.010534	938.000000 0.003359 0.025285 -0.177212 -0.008769 0.004282	938.000000 0.008883 0.021155 -0.104845 -0.001471 0.010171	938.000000 0.003280 0.024051 -0.099683 -0.009073 0.004745	938.000000 0.009756 0.021802 -0.094774 -0.000794 0.010706	938.000000 0.004640 0.022691 -0.083933 -0.008798 0.005797	\
mean std min 25% 50% 75%	938.000000 0.009528 0.021780 -0.089836 -0.001840 0.010534 0.021852 0.108204	938.000000 0.003359 0.025285 -0.177212 -0.008769 0.004282 0.016194 0.143768	938.000000 0.008883 0.021155 -0.104845 -0.001471 0.010171 0.020853 0.096122	938.000000 0.003280 0.024051 -0.099683 -0.009073 0.004745 0.016525	938.000000 0.009756 0.021802 -0.094774 -0.000794 0.010706 0.021797	938.000000 0.004640 0.022691 -0.083933 -0.008798 0.005797 0.018243	\
mean std min 25% 50% 75% max	938.000000 0.009528 0.021780 -0.089836 -0.001840 0.010534 0.021852 0.108204	938.000000 0.003359 0.025285 -0.177212 -0.008769 0.004282 0.016194 0.143768	938.000000 0.008883 0.021155 -0.104845 -0.001471 0.010171 0.020853 0.096122	938.000000 0.003280 0.024051 -0.099683 -0.009073 0.004745 0.016525	938.000000 0.009756 0.021802 -0.094774 -0.000794 0.010706 0.021797	938.000000 0.004640 0.022691 -0.083933 -0.008798 0.005797 0.018243	\
mean std min 25% 50% 75% max	938.000000 0.009528 0.021780 -0.089836 -0.001840 0.010534 0.021852 0.108204 X59 938.000000	938.000000 0.003359 0.025285 -0.177212 -0.008769 0.004282 0.016194 0.143768 X60 938.000000	938.000000 0.008883 0.021155 -0.104845 -0.001471 0.010171 0.020853 0.096122 X61 938.000000	938.000000 0.003280 0.024051 -0.099683 -0.009073 0.004745 0.016525	938.000000 0.009756 0.021802 -0.094774 -0.000794 0.010706 0.021797	938.000000 0.004640 0.022691 -0.083933 -0.008798 0.005797 0.018243	\
mean std min 25% 50% 75% max count mean	938.000000 0.009528 0.021780 -0.089836 -0.001840 0.010534 0.021852 0.108204 X59 938.000000 0.009406	938.000000 0.003359 0.025285 -0.177212 -0.008769 0.004282 0.016194 0.143768 X60 938.000000 0.003365	938.000000 0.008883 0.021155 -0.104845 -0.001471 0.010171 0.020853 0.096122 X61 938.000000 0.009162	938.000000 0.003280 0.024051 -0.099683 -0.009073 0.004745 0.016525	938.000000 0.009756 0.021802 -0.094774 -0.000794 0.010706 0.021797	938.000000 0.004640 0.022691 -0.083933 -0.008798 0.005797 0.018243	\
mean std min 25% 50% 75% max  count mean std	938.000000 0.009528 0.021780 -0.089836 -0.001840 0.010534 0.021852 0.108204 X59 938.000000 0.009406 0.021317	938.000000 0.003359 0.025285 -0.177212 -0.008769 0.004282 0.016194 0.143768 X60 938.000000 0.003365 0.024823	938.000000 0.008883 0.021155 -0.104845 -0.001471 0.010171 0.020853 0.096122 X61 938.000000 0.009162 0.022379	938.000000 0.003280 0.024051 -0.099683 -0.009073 0.004745 0.016525	938.000000 0.009756 0.021802 -0.094774 -0.000794 0.010706 0.021797	938.000000 0.004640 0.022691 -0.083933 -0.008798 0.005797 0.018243	\
mean std min 25% 50% 75% max  count mean std min	938.000000 0.009528 0.021780 -0.089836 -0.001840 0.010534 0.021852 0.108204 X59 938.000000 0.009406 0.021317 -0.101665	938.000000 0.003359 0.025285 -0.177212 -0.008769 0.004282 0.016194 0.143768 X60 938.000000 0.003365 0.024823 -0.127330	938.000000 0.008883 0.021155 -0.104845 -0.001471 0.010171 0.020853 0.096122 X61 938.000000 0.009162 0.022379 -0.095484	938.000000 0.003280 0.024051 -0.099683 -0.009073 0.004745 0.016525	938.000000 0.009756 0.021802 -0.094774 -0.000794 0.010706 0.021797	938.000000 0.004640 0.022691 -0.083933 -0.008798 0.005797 0.018243	\
mean std min 25% 50% 75% max  count mean std min 25%	938.000000 0.009528 0.021780 -0.089836 -0.001840 0.010534 0.021852 0.108204  X59 938.000000 0.009406 0.021317 -0.101665 -0.002265	938.000000 0.003359 0.025285 -0.177212 -0.008769 0.004282 0.016194 0.143768 X60 938.000000 0.003365 0.024823 -0.127330 -0.008893	938.000000 0.008883 0.021155 -0.104845 -0.001471 0.010171 0.020853 0.096122 X61 938.000000 0.009162 0.022379 -0.095484 -0.002312	938.000000 0.003280 0.024051 -0.099683 -0.009073 0.004745 0.016525	938.000000 0.009756 0.021802 -0.094774 -0.000794 0.010706 0.021797	938.000000 0.004640 0.022691 -0.083933 -0.008798 0.005797 0.018243	\
mean std min 25% 50% 75% max  count mean std min 25% 50%	938.000000 0.009528 0.021780 -0.089836 -0.001840 0.010534 0.021852 0.108204  X59 938.000000 0.009406 0.021317 -0.101665 -0.002265 0.009988	938.000000 0.003359 0.025285 -0.177212 -0.008769 0.004282 0.016194 0.143768 X60 938.000000 0.003365 0.024823 -0.127330 -0.008893 0.005144	938.000000 0.008883 0.021155 -0.104845 -0.001471 0.010171 0.020853 0.096122 X61 938.000000 0.009162 0.022379 -0.095484 -0.002312 0.009824	938.000000 0.003280 0.024051 -0.099683 -0.009073 0.004745 0.016525	938.000000 0.009756 0.021802 -0.094774 -0.000794 0.010706 0.021797	938.000000 0.004640 0.022691 -0.083933 -0.008798 0.005797 0.018243	\
mean std min 25% 50% 75% max  count mean std min 25%	938.000000 0.009528 0.021780 -0.089836 -0.001840 0.010534 0.021852 0.108204  X59 938.000000 0.009406 0.021317 -0.101665 -0.002265	938.000000 0.003359 0.025285 -0.177212 -0.008769 0.004282 0.016194 0.143768 X60 938.000000 0.003365 0.024823 -0.127330 -0.008893	938.000000 0.008883 0.021155 -0.104845 -0.001471 0.010171 0.020853 0.096122 X61 938.000000 0.009162 0.022379 -0.095484 -0.002312	938.000000 0.003280 0.024051 -0.099683 -0.009073 0.004745 0.016525	938.000000 0.009756 0.021802 -0.094774 -0.000794 0.010706 0.021797	938.000000 0.004640 0.022691 -0.083933 -0.008798 0.005797 0.018243	

[8 rows x 62 columns]

no\_efectores

Composición de pseudo aminoácidos (PseAAC) no\_efectores fusarium\_oxysporum dataset 3, sin valores atípicos.

Valores del documento csv.

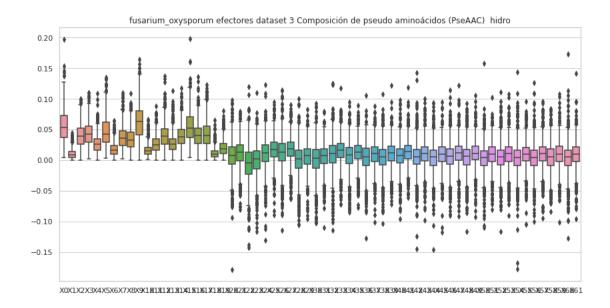
	XO	X1	X2	ХЗ	Х4	Х5	Х6	\
0	0.023325	0.000000	0.012349	0.027442	0.004802	0.009605	0.004116	
1	0.079516	0.002410	0.028915	0.040963	0.026505	0.057829	0.007229	
2	0.046594	0.014337	0.046594	0.060930	0.025089	0.046594	0.021505	
3	0.032186	0.004598	0.010346	0.009196	0.040233	0.035635	0.004598	
4	0.018710	0.009355	0.042098	0.023388	0.032743	0.042098	0.023388	
	•••	•••	•••		•••	•••		
995	0.089591	0.011377	0.061150	0.049773	0.021331	0.039818	0.029864	
996	0.090652	0.011573	0.044362	0.061721	0.044362	0.059792	0.021216	
997	0.062557	0.013732	0.033567	0.047299	0.022887	0.051876	0.018309	
998	0.061677	0.020238	0.039512	0.039512	0.027947	0.045294	0.014455	
999	0.068271	0.034669	0.046403	0.097606	0.043736	0.051737	0.059737	
	Х7	Х8	Х9	X	(53 X	(54 X	(55 \	
0	0.021953	0.023325	0.020581	0.0158	884 0.0166	325 0.0239	904	
1	0.040963	0.062649	0.081925	0.0111	.92 0.0266	889 0.0317	'06	
2	0.068099	0.039426	0.107524	0.0293		373 -0.0064		
3	0.039083	0.020691	0.050579	0.0026	94 -0.0122	271 -0.0209	946	
4	0.023388	0.023388	0.046776	0.0100	95 -0.0537	768 -0.0354	160	
• •	•••	•••	•••	***				
995	0.048351	0.036974	0.086747		79 -0.0050			
996	0.055934	0.042433	0.059792			018 -0.0134		
997	0.047299	0.038144	0.071712	0.0215		719 -0.0030		
998	0.026020	0.017347	0.068423	0.0003				
999	0.084272	0.077338	0.118407	0.0333	346 0.0188	375 0.0229	934	
	X56	X57	X58	X59	X60	X61		X62
0	0.008862	0.023636	0.006904	0.024881	0.017457	0.032266	no_efecto	
1	-0.018886		0.000304	0.024001	0.017437	0.000695	no_efecto	
2	0.020286	0.013200	0.005383	0.017322	0.100258	0.036044	no_efecto	
3		-0.001684	0.003383	0.001142	0.100236		no_efecto	
4	0.013112	0.001004	0.027231		-0.010619	0.003193	no_efecto	
						0.027081	no_erecto	1162
 995	 0.015451	 0.009657	 0.016625	0.013719	-0.006604	0.037432	no_efecto	res
996	-0.002574		-0.017208		-0.015383		no_efecto	
997	0.008393	0.011741	0.008578		-0.001226		no_efecto	
998	0.023961	0.003836	0.007339		-0.020017		no_efecto	
	-0.015935		0.020224	0.015028	0.004825	0.029103	no_efecto	

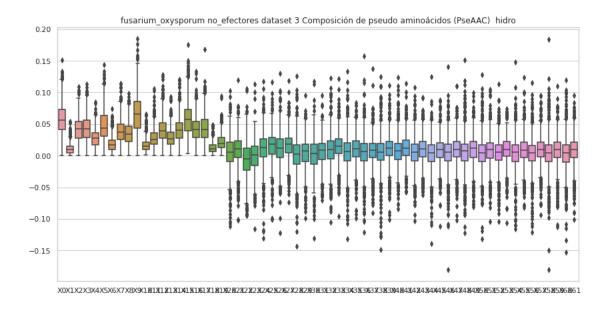
[896 rows x 63 columns]

Composición de pseudo aminoácidos (PseAAC) no\_efectores fusarium\_oxysporum dataset 3, sin valores atípicos. Estadísticas.

	XO	X1	Х2	ХЗ	Х4	Х5	\
count	896.000000	896.000000	896.000000	896.000000	896.000000	896.000000	
mean	0.058595	0.010838	0.041779	0.042789	0.027753	0.048162	
std	0.025095	0.008446	0.019248	0.019166	0.013929	0.023954	
min	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	
25%	0.040967	0.004694	0.028015	0.029033	0.017564	0.030375	
50%	0.056264	0.009467	0.042622	0.042366	0.027434	0.043768	
75%	0.073125	0.014613	0.054066	0.056423	0.036540	0.063542	
max	0.151408	0.054545	0.108888	0.112806	0.085018	0.143327	
	Х6	Х7	Х8	Х9	X	52 \	
count	896.000000	896.000000	896.000000	896.000000	896.0000	00	
mean	0.018451	0.038302	0.034762	0.065657	0.0042	88	
std	0.010938	0.018451	0.016971	0.029325	0.0226	86	
min	0.000000	0.000000	0.000000	0.000000	0.1046	89	
25%	0.010032	0.025313	0.021901	0.043810	0.0070	47	
50%	0.017277	0.036620	0.033570	0.065278	0.0059	09	
75%	0.024547	0.049632	0.046266	0.085682	0.0167	12	
max	0.074514	0.114332	0.098591	0.184839	0.1127	20	
	X53	X54	X55	X56	X57	X58	\
count	X53 896.000000	X54 896.000000	X55 896.000000	X56 896.000000	X57 896.000000	X58 896.000000	\
count mean							\
	896.000000	896.000000	896.000000	896.000000	896.000000	896.000000	\
mean	896.000000 0.009240 0.021253 -0.106843	896.000000 0.003553	896.000000 0.008556	896.000000 0.002831	896.000000 0.009055	896.000000 0.003689	\
mean std	896.000000 0.009240 0.021253	896.000000 0.003553 0.025737	896.000000 0.008556 0.022503	896.000000 0.002831 0.024913	896.000000 0.009055 0.021353	896.000000 0.003689 0.027129	\
mean std min	896.000000 0.009240 0.021253 -0.106843	896.000000 0.003553 0.025737 -0.115717	896.000000 0.008556 0.022503 -0.081651	896.000000 0.002831 0.024913 -0.121184	896.000000 0.009055 0.021353 -0.093838	896.000000 0.003689 0.027129 -0.180303	\
mean std min 25%	896.000000 0.009240 0.021253 -0.106843 -0.001291	896.000000 0.003553 0.025737 -0.115717 -0.009216	896.000000 0.008556 0.022503 -0.081651 -0.003008	896.000000 0.002831 0.024913 -0.121184 -0.007783	896.000000 0.009055 0.021353 -0.093838 -0.001596	896.000000 0.003689 0.027129 -0.180303 -0.009441	\
mean std min 25% 50%	896.000000 0.009240 0.021253 -0.106843 -0.001291 0.009749	896.000000 0.003553 0.025737 -0.115717 -0.009216 0.005460	896.000000 0.008556 0.022503 -0.081651 -0.003008 0.008830	896.000000 0.002831 0.024913 -0.121184 -0.007783 0.004658	896.000000 0.009055 0.021353 -0.093838 -0.001596 0.010006	896.000000 0.003689 0.027129 -0.180303 -0.009441 0.004580	\
mean std min 25% 50% 75%	896.000000 0.009240 0.021253 -0.106843 -0.001291 0.009749 0.022143	896.000000 0.003553 0.025737 -0.115717 -0.009216 0.005460 0.017289 0.147773	896.000000 0.008556 0.022503 -0.081651 -0.003008 0.008830 0.021178 0.124195	896.000000 0.002831 0.024913 -0.121184 -0.007783 0.004658 0.016281	896.000000 0.009055 0.021353 -0.093838 -0.001596 0.010006 0.021157	896.000000 0.003689 0.027129 -0.180303 -0.009441 0.004580 0.017583	
mean std min 25% 50% 75%	896.000000 0.009240 0.021253 -0.106843 -0.001291 0.009749 0.022143 0.073663	896.000000 0.003553 0.025737 -0.115717 -0.009216 0.005460 0.017289 0.147773	896.000000 0.008556 0.022503 -0.081651 -0.003008 0.008830 0.021178 0.124195	896.000000 0.002831 0.024913 -0.121184 -0.007783 0.004658 0.016281	896.000000 0.009055 0.021353 -0.093838 -0.001596 0.010006 0.021157	896.000000 0.003689 0.027129 -0.180303 -0.009441 0.004580 0.017583	\
mean std min 25% 50% 75%	896.000000 0.009240 0.021253 -0.106843 -0.001291 0.009749 0.022143 0.073663 X59 896.000000	896.000000 0.003553 0.025737 -0.115717 -0.009216 0.005460 0.017289 0.147773 X60 896.000000	896.000000 0.008556 0.022503 -0.081651 -0.003008 0.008830 0.021178 0.124195 X61 896.000000	896.000000 0.002831 0.024913 -0.121184 -0.007783 0.004658 0.016281	896.000000 0.009055 0.021353 -0.093838 -0.001596 0.010006 0.021157	896.000000 0.003689 0.027129 -0.180303 -0.009441 0.004580 0.017583	\
mean std min 25% 50% 75% max	896.000000 0.009240 0.021253 -0.106843 -0.001291 0.009749 0.022143 0.073663	896.000000 0.003553 0.025737 -0.115717 -0.009216 0.005460 0.017289 0.147773	896.000000 0.008556 0.022503 -0.081651 -0.003008 0.008830 0.021178 0.124195	896.000000 0.002831 0.024913 -0.121184 -0.007783 0.004658 0.016281	896.000000 0.009055 0.021353 -0.093838 -0.001596 0.010006 0.021157	896.000000 0.003689 0.027129 -0.180303 -0.009441 0.004580 0.017583	\
mean std min 25% 50% 75% max  count mean std	896.000000 0.009240 0.021253 -0.106843 -0.001291 0.009749 0.022143 0.073663 X59 896.000000 0.008249 0.023846	896.000000 0.003553 0.025737 -0.115717 -0.009216 0.005460 0.017289 0.147773 X60 896.000000 0.003406 0.026981	896.000000 0.008556 0.022503 -0.081651 -0.003008 0.008830 0.021178 0.124195  X61 896.000000 0.008660 0.022538	896.000000 0.002831 0.024913 -0.121184 -0.007783 0.004658 0.016281	896.000000 0.009055 0.021353 -0.093838 -0.001596 0.010006 0.021157	896.000000 0.003689 0.027129 -0.180303 -0.009441 0.004580 0.017583	\
mean std min 25% 50% 75% max  count mean std min	896.000000 0.009240 0.021253 -0.106843 -0.001291 0.009749 0.022143 0.073663 X59 896.000000 0.008249 0.023846 -0.113131	896.000000 0.003553 0.025737 -0.115717 -0.009216 0.005460 0.017289 0.147773 X60 896.000000 0.003406	896.000000 0.008556 0.022503 -0.081651 -0.003008 0.008830 0.021178 0.124195  X61 896.000000 0.008660 0.022538 -0.101082	896.000000 0.002831 0.024913 -0.121184 -0.007783 0.004658 0.016281	896.000000 0.009055 0.021353 -0.093838 -0.001596 0.010006 0.021157	896.000000 0.003689 0.027129 -0.180303 -0.009441 0.004580 0.017583	\
mean std min 25% 50% 75% max  count mean std min 25%	896.000000 0.009240 0.021253 -0.106843 -0.001291 0.009749 0.022143 0.073663 X59 896.000000 0.008249 0.023846	896.000000 0.003553 0.025737 -0.115717 -0.009216 0.005460 0.017289 0.147773 X60 896.000000 0.003406 0.026981 -0.153209 -0.009926	896.000000 0.008556 0.022503 -0.081651 -0.003008 0.008830 0.021178 0.124195  X61 896.000000 0.008660 0.022538	896.000000 0.002831 0.024913 -0.121184 -0.007783 0.004658 0.016281	896.000000 0.009055 0.021353 -0.093838 -0.001596 0.010006 0.021157	896.000000 0.003689 0.027129 -0.180303 -0.009441 0.004580 0.017583	\
mean std min 25% 50% 75% max  count mean std min 25% 50%	896.000000 0.009240 0.021253 -0.106843 -0.001291 0.009749 0.022143 0.073663 X59 896.000000 0.008249 0.023846 -0.113131 -0.003433 0.009749	896.000000 0.003553 0.025737 -0.115717 -0.009216 0.005460 0.017289 0.147773 X60 896.000000 0.003406 0.026981 -0.153209 -0.009926 0.004917	896.000000 0.008556 0.022503 -0.081651 -0.003008 0.008830 0.021178 0.124195  X61 896.000000 0.008660 0.022538 -0.101082 -0.003210 0.009417	896.000000 0.002831 0.024913 -0.121184 -0.007783 0.004658 0.016281	896.000000 0.009055 0.021353 -0.093838 -0.001596 0.010006 0.021157	896.000000 0.003689 0.027129 -0.180303 -0.009441 0.004580 0.017583	\
mean std min 25% 50% 75% max  count mean std min 25%	896.000000 0.009240 0.021253 -0.106843 -0.001291 0.009749 0.022143 0.073663 X59 896.000000 0.008249 0.023846 -0.113131 -0.003433	896.000000 0.003553 0.025737 -0.115717 -0.009216 0.005460 0.017289 0.147773 X60 896.000000 0.003406 0.026981 -0.153209 -0.009926	896.000000 0.008556 0.022503 -0.081651 -0.003008 0.008830 0.021178 0.124195 X61 896.000000 0.008660 0.022538 -0.101082 -0.003210	896.000000 0.002831 0.024913 -0.121184 -0.007783 0.004658 0.016281	896.000000 0.009055 0.021353 -0.093838 -0.001596 0.010006 0.021157	896.000000 0.003689 0.027129 -0.180303 -0.009441 0.004580 0.017583	
mean std min 25% 50% 75% max  count mean std min 25% 50%	896.000000 0.009240 0.021253 -0.106843 -0.001291 0.009749 0.022143 0.073663 X59 896.000000 0.008249 0.023846 -0.113131 -0.003433 0.009749	896.000000 0.003553 0.025737 -0.115717 -0.009216 0.005460 0.017289 0.147773 X60 896.000000 0.003406 0.026981 -0.153209 -0.009926 0.004917	896.000000 0.008556 0.022503 -0.081651 -0.003008 0.008830 0.021178 0.124195  X61 896.000000 0.008660 0.022538 -0.101082 -0.003210 0.009417	896.000000 0.002831 0.024913 -0.121184 -0.007783 0.004658 0.016281	896.000000 0.009055 0.021353 -0.093838 -0.001596 0.010006 0.021157	896.000000 0.003689 0.027129 -0.180303 -0.009441 0.004580 0.017583	

[8 rows x 62 columns]





# 6 Covarianza de auto cruzamiento (ACC) hidro\_mass

```
[11]: #hidro_mass
    transf = "Covarianza de auto cruzamiento (ACC) "
    transf2 = "ACC"
    estado = "con valores atípicos.\n"
```

```
comp = "hidro_mass"
df=""
for etiq in "efectores", "no_efectores":
   titulo = (str(transf)+" "+ str(comp)+" "+ str(etiq) + " "+ str(nombre2) +", u
→" + str(estado))
    print (str(etiq))
    if etiq == "efectores":
        df=ACC_hidro_mass_efec
    if etiq == "no_efectores":
        df=ACC_hidro_mass_no_efec
    #del df['X13']
    print (str(titulo) + "Valores del documento csv.\n")
    print (df)
    print ("\n\n" + str(titulo) + "Estadísticas.\n")
    print(df.describe())
    print ("\n\n")
    #Gráfica de caja y bigotes
    sns.set(style="whitegrid")
    fig , ax = plt.subplots(figsize=(14,7))
    ax = sns.boxplot(data=df)
    ax.set_title(organismo +' '+str(etiq)+" dataset "+str(dataset)+"__
 →"+str(transf)+" "+str(comp)+" "+str(estado))
```

### efectores

Covarianza de auto cruzamiento (ACC) hidro\_mass efectores fusarium\_oxysporum dataset 3, con valores atípicos.

```
XΟ
                   X 1
                             X2
                                      Х3
                                                Х4
                                                          X5
                                                                   X6 \
0
  -0.013952 -0.055806 -0.016258 0.085893 -0.058251 -0.090093 0.057338
    0.079270 0.056174 0.036470 0.066935 -0.052461 -0.073548 -0.091442
1
  -0.005653 0.073230 -0.024098 0.124723 -0.015845 0.041716 0.048514
    0.063594 -0.023570 -0.003357 0.041148 -0.058540 0.052066 -0.002636
4
   -0.026582 0.001799 0.007927 0.023703 0.005890 -0.078885 0.019054
995 -0.029162 -0.047127 0.042632 0.042425 0.014037 -0.034396 0.039998
996 -0.009585 -0.026947 -0.006991 0.025855 0.008368 -0.056399 0.021435
997 0.071460 0.074796 0.039679 0.051660 0.050697 0.031004 0.001941
998 0.026544 -0.015703 0.018220 -0.025364 0.060470 -0.026365 0.045653
999 -0.053670 0.016357 -0.041410 0.032333 -0.041042 0.109892 -0.025769
          Х7
                    Х8
                             Х9
                                      X10
                                               X11
                                                         X12
                                                                   X13
   -0.057351 -0.120778 0.033428 0.016161 -0.044863 0.004956 efectores
```

[1000 rows x 14 columns]

Covarianza de auto cruzamiento (ACC) hidro\_mass efectores fusarium\_oxysporum dataset 3, con valores atípicos.
Estadísticas.

count         1000.000000         1000.000000         1000.000000         1000.000000         1000.000000           mean         0.010348         0.014272         0.012095         0.015219         0.006169           std         0.056958         0.052961         0.058724         0.055861         0.054444           min         -0.263027         -0.183567         -0.229413         -0.254152         -0.259674           25%         -0.024015         -0.015746         -0.019766         -0.016778         -0.027608           50%         0.011114         0.012355         0.013946         0.015729         0.006843           75%         0.042358         0.045974         0.043814         0.045682         0.036343           max         0.285876         0.260422         0.343249         0.209486         0.279217           X5         X6         X7         X8         X9         \           count         1000.000000         1000.000000         1000.000000         1000.000000         1000.000000         0.001172           std         0.058424         0.057415         0.053266         0.062578         0.060317		XO	X1	Х2	ХЗ	X4	\
std         0.056958         0.052961         0.058724         0.055861         0.054444           min         -0.263027         -0.183567         -0.229413         -0.254152         -0.259674           25%         -0.024015         -0.015746         -0.019766         -0.016778         -0.027608           50%         0.011114         0.012355         0.013946         0.015729         0.006843           75%         0.042358         0.045974         0.043814         0.045682         0.036343           max         0.285876         0.260422         0.343249         0.209486         0.279217           count         1000.000000         1000.000000         1000.000000         1000.000000         1000.000000         1000.000000           mean         0.003705         0.011595         0.003101         0.005200         0.001172           std         0.058424         0.057415         0.053266         0.062578         0.060317	count	1000.000000	1000.000000	1000.000000	1000.000000	1000.000000	
min         -0.263027         -0.183567         -0.229413         -0.254152         -0.259674           25%         -0.024015         -0.015746         -0.019766         -0.016778         -0.027608           50%         0.011114         0.012355         0.013946         0.015729         0.006843           75%         0.042358         0.045974         0.043814         0.045682         0.036343           max         0.285876         0.260422         0.343249         0.209486         0.279217           count         1000.000000         1000.000000         1000.000000         1000.000000         1000.000000         1000.000000         1000.000000           mean         0.003705         0.011595         0.003101         0.005200         0.001172           std         0.058424         0.057415         0.053266         0.062578         0.060317	mean	0.010348	0.014272	0.012095	0.015219	0.006169	
25% -0.024015 -0.015746 -0.019766 -0.016778 -0.027608 50% 0.011114 0.012355 0.013946 0.015729 0.006843 75% 0.042358 0.045974 0.043814 0.045682 0.036343 max 0.285876 0.260422 0.343249 0.209486 0.279217   X5 X6 X7 X8 X9 \ count 1000.000000 1000.000000 1000.000000 1000.000000 mean 0.003705 0.011595 0.003101 0.005200 0.001172 std 0.058424 0.057415 0.053266 0.062578 0.060317	std	0.056958	0.052961	0.058724	0.055861	0.054444	
50% 0.011114 0.012355 0.013946 0.015729 0.006843 75% 0.042358 0.045974 0.043814 0.045682 0.036343 max 0.285876 0.260422 0.343249 0.209486 0.279217    X5 X6 X7 X8 X9 \ count 1000.000000 1000.000000 1000.000000 1000.000000 mean 0.003705 0.011595 0.003101 0.005200 0.001172 std 0.058424 0.057415 0.053266 0.062578 0.060317	min	-0.263027	-0.183567	-0.229413	-0.254152	-0.259674	
75% 0.042358 0.045974 0.043814 0.045682 0.036343 max 0.285876 0.260422 0.343249 0.209486 0.279217  X5 X6 X7 X8 X9 \ count 1000.000000 1000.000000 1000.000000 1000.000000 mean 0.003705 0.011595 0.003101 0.005200 0.001172 std 0.058424 0.057415 0.053266 0.062578 0.060317	25%	-0.024015	-0.015746	-0.019766	-0.016778	-0.027608	
max       0.285876       0.260422       0.343249       0.209486       0.279217         X5       X6       X7       X8       X9       \         count       1000.000000       1000.00000       1000.00000       1000.000000       1000.00000       1000.00000       1000.00000       1000.00000       1000.00000       1000.00000       1000.00000       1000.00000       1000.00000       1000.00000       1000.00000       1000.00000       1000.00000       1000.00000       1000.00000 <th< td=""><td>50%</td><td>0.011114</td><td>0.012355</td><td>0.013946</td><td>0.015729</td><td>0.006843</td><td></td></th<>	50%	0.011114	0.012355	0.013946	0.015729	0.006843	
X5 X6 X7 X8 X9 \ count 1000.000000 1000.000000 1000.000000 1000.000000 mean 0.003705 0.011595 0.003101 0.005200 0.001172 std 0.058424 0.057415 0.053266 0.062578 0.060317	75%	0.042358	0.045974	0.043814	0.045682	0.036343	
count         1000.000000         1000.000000         1000.000000         1000.000000         1000.000000           mean         0.003705         0.011595         0.003101         0.005200         0.001172           std         0.058424         0.057415         0.053266         0.062578         0.060317	max	0.285876	0.260422	0.343249	0.209486	0.279217	
count         1000.000000         1000.000000         1000.000000         1000.000000         1000.000000           mean         0.003705         0.011595         0.003101         0.005200         0.001172           std         0.058424         0.057415         0.053266         0.062578         0.060317							
mean     0.003705     0.011595     0.003101     0.005200     0.001172       std     0.058424     0.057415     0.053266     0.062578     0.060317						Х9	\
std 0.058424 0.057415 0.053266 0.062578 0.060317	count	1000.000000	1000.000000	1000.000000	1000.000000	1000.000000	
	mean	0.003705	0.011595				
	std	0.058424	0.057415	0.053266	0.062578	0.060317	
min $-0.294020$ $-0.254184$ $-0.261201$ $-0.282011$ $-0.450844$	min	-0.294020	-0.254184	-0.261201	-0.282011	-0.450844	
25% -0.026543 -0.019069 -0.025323 -0.026031 -0.033725	25%	-0.026543	-0.019069	-0.025323	-0.026031	-0.033725	
50% 0.002735 0.009159 0.003093 0.004801 0.002620	50%	0.002735	0.009159	0.003093	0.004801	0.002620	
75% 0.038076 0.040139 0.033747 0.037029 0.034925	75%	0.038076	0.040139	0.033747	0.037029	0.034925	
max 0.346640 0.422461 0.264442 0.326305 0.457589	max	0.346640	0.422461	0.264442	0.326305	0.457589	
X10 X11 X12		X10	X11	X12			
count 1000.000000 1000.000000 1000.000000	count	1000.000000	1000.000000	1000.000000			
mean 0.005889 0.005761 0.002333	mean	0.005889	0.005761	0.002333			
std 0.053645 0.052559 0.059495	std	0.053645	0.052559	0.059495			
min -0.437327 -0.218862 -0.437060	min	-0.437327	-0.218862	-0.437060			
25% -0.021162 -0.024041 -0.027850	25%	-0.021162	-0.024041	-0.027850			
50% 0.007207 0.006723 0.003775	50%	0.007207	0.006723	0.003775			
75% 0.035127 0.036622 0.033518	75%	0.035127	0.036622	0.033518			
max 0.210045 0.425213 0.438232	max	0.210045	0.425213	0.438232			

### no\_efectores

Covarianza de auto cruzamiento (ACC) hidro\_mass no\_efectores fusarium\_oxysporum dataset 3, con valores atípicos.

Valores del documento csv.

	XO	X1	X2	ХЗ	X4	X5	X6 \
0	0.053348	0.141385	0.043101	0.117595	0.024031	0.001686	0.092818
1	0.007214	-0.013362	0.001787	-0.098859	0.071497	-0.060806	0.001910
2	0.027217	-0.038720	-0.045296	-0.008883	0.043747	0.001794	-0.008728
3	-0.039541	0.048749	0.063758	-0.019483	0.117205	-0.110431	0.022551
4	-0.107434	-0.033984	0.010014	0.039722	-0.049609	0.033628	0.010495
	•••	•••	•••		•••	•••	
995	-0.019027	-0.050533	0.030565	-0.028120	-0.057040	-0.029417	0.022302
996	0.019079	-0.007947	-0.118229	-0.042741	0.025989	-0.040300	-0.018607
997	-0.059939	-0.003591	0.024773	0.052936	-0.007596	0.032044	0.030041
998	0.045852	-0.015087	-0.006784	0.013931	0.011105	0.044499	-0.024902
999	-0.008411	0.009243	-0.020681	0.032634	0.024320	-0.021888	0.036567
	Х7	Х8	Х9	X10	X11	X12	X13
0	X7 -0.036484	X8 0.079850	X9 -0.023570		X11 -0.057383		X13 no_efectores
0				0.044934		0.030276	
-	-0.036484	0.079850	-0.023570	0.044934 0.034523	-0.057383	0.030276 -0.099802	no_efectores
1	-0.036484 -0.015156	0.079850 0.012392	-0.023570 0.013532 0.030212	0.044934 0.034523	-0.057383 -0.037565 -0.070270	0.030276 -0.099802	no_efectores no_efectores
1 2	-0.036484 -0.015156 -0.028171	0.079850 0.012392 0.046146	-0.023570 0.013532 0.030212 0.088514	0.044934 0.034523 0.039604	-0.057383 -0.037565 -0.070270 -0.039715	0.030276 -0.099802 -0.096562 0.021147	no_efectores no_efectores no_efectores
1 2 3	-0.036484 -0.015156 -0.028171 -0.050111	0.079850 0.012392 0.046146 0.022263	-0.023570 0.013532 0.030212 0.088514	0.044934 0.034523 0.039604 -0.045660	-0.057383 -0.037565 -0.070270 -0.039715	0.030276 -0.099802 -0.096562 0.021147	no_efectores no_efectores no_efectores no_efectores
1 2 3 4	-0.036484 -0.015156 -0.028171 -0.050111 0.143631	0.079850 0.012392 0.046146 0.022263 0.030380 	-0.023570 0.013532 0.030212 0.088514 0.074750	0.044934 0.034523 0.039604 -0.045660 -0.005950	-0.057383 -0.037565 -0.070270 -0.039715 -0.054161 	0.030276 -0.099802 -0.096562 0.021147 -0.033390	no_efectores no_efectores no_efectores no_efectores
1 2 3 4	-0.036484 -0.015156 -0.028171 -0.050111 0.143631  -0.085616	0.079850 0.012392 0.046146 0.022263 0.030380 	-0.023570 0.013532 0.030212 0.088514 0.074750  0.000161	0.044934 0.034523 0.039604 -0.045660 -0.005950 	-0.057383 -0.037565 -0.070270 -0.039715 -0.054161  0.037701	0.030276 -0.099802 -0.096562 0.021147 -0.033390 	no_efectores no_efectores no_efectores no_efectores no_efectores
1 2 3 4  995 996	-0.036484 -0.015156 -0.028171 -0.050111 0.143631  -0.085616	0.079850 0.012392 0.046146 0.022263 0.030380  -0.055882 0.008786	-0.023570 0.013532 0.030212 0.088514 0.074750  0.000161 0.016317	0.044934 0.034523 0.039604 -0.045660 -0.005950  0.013521	-0.057383 -0.037565 -0.070270 -0.039715 -0.054161  0.037701 0.025125	0.030276 -0.099802 -0.096562 0.021147 -0.033390  -0.078678	no_efectores no_efectores no_efectores no_efectores no_efectores
1 2 3 4  995 996	-0.036484 -0.015156 -0.028171 -0.050111 0.143631  -0.085616 -0.015602	0.079850 0.012392 0.046146 0.022263 0.030380  -0.055882 0.008786	-0.023570 0.013532 0.030212 0.088514 0.074750  0.000161 0.016317	0.044934 0.034523 0.039604 -0.045660 -0.005950  0.013521 -0.012117	-0.057383 -0.037565 -0.070270 -0.039715 -0.054161  0.037701 0.025125	0.030276 -0.099802 -0.096562 0.021147 -0.033390  -0.078678 -0.020400 0.054517	no_efectores no_efectores no_efectores no_efectores no_efectores no_efectores

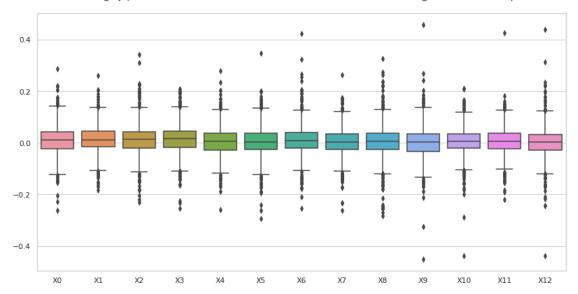
[1000 rows x 14 columns]

Covarianza de auto cruzamiento (ACC) hidro\_mass no\_efectores fusarium\_oxysporum dataset 3, con valores atípicos.
Estadísticas.

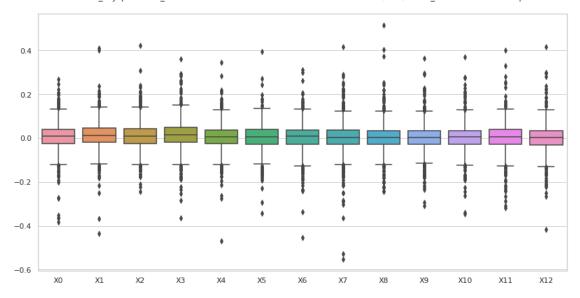
	XO	X1	Х2	ХЗ	Х4	\
count	1000.000000	1000.000000	1000.000000	1000.000000	1000.000000	
mean	0.006811	0.012647	0.009877	0.014037	0.006733	
std	0.063225	0.062775	0.060695	0.065203	0.061202	
min	-0.384333	-0.436285	-0.243138	-0.364879	-0.470186	
25%	-0.024660	-0.020142	-0.023839	-0.019200	-0.025756	
50%	0.007953	0.012419	0.009699	0.014093	0.007102	
75%	0.039295	0.045033	0.042206	0.049153	0.038405	

max	0.269161	0.410313	0.423256	0.362413	0.344166	
	Х5	Х6	Х7	Х8	Х9	\
count	1000.000000	1000.000000	1000.000000	1000.000000	1000.000000	
mean	0.005687	0.004595	0.003664	0.004195	0.002411	
std	0.060546	0.061549	0.069284	0.062430	0.062212	
min	-0.344119	-0.453110	-0.552803	-0.244072	-0.310392	
25%	-0.026830	-0.027451	-0.026448	-0.027931	-0.027012	
50%	0.006142	0.008176	0.002275	0.003817	0.002038	
75%	0.040125	0.038250	0.036749	0.033653	0.033570	
max	0.395409	0.310543	0.416296	0.515183	0.363748	
	X10	X11	X12			
count	1000.000000	1000.000000	1000.000000			
mean	0.003310	0.004739	0.002840			
std	0.062501	0.064264	0.063630			
min	-0.347046	-0.317403	-0.417323			
25%	-0.029012	-0.027769	-0.031195			
50%	0.004657	0.004899	0.003202			
75%	0.034664	0.038851	0.034901			
max	0.370957	0.402715	0.418022			

fusarium\_oxysporum efectores dataset 3 Covarianza de auto cruzamiento (ACC) hidro\_mass con valores atípicos.



fusarium\_oxysporum no\_efectores dataset 3 Covarianza de auto cruzamiento (ACC) hidro\_mass con valores atípicos.



## 6.1 Covarianza de auto cruzamiento (ACC) hidro\_mass, sin valores atípicos

```
[12]: #hidro_mass
      transf = "Covarianza de auto cruzamiento (ACC) "
      transf2 = "ACC"
      estado = "sin valores atípicos.\n"
      comp = "hidro_mass"
      df=""
      out = (str(r3) + '/ds' + str(dataset) + '_' + str(transf2) + '_' + str(comp) +_{\square}
      →'_' + str(organismo) + '.csv')
      os.makedirs(str(r3), exist_ok=True)
      df_out = pd.DataFrame()
      for etiq in "efectores", "no_efectores":
          titulo = (str(transf)+" "+ str(comp)+" "+ str(etiq) + " "+ str(nombre2) +",
       →" + str(estado))
          print (str(etiq))
          if etiq == "efectores":
              df=ACC_hidro_mass_efec
          if etiq == "no_efectores":
              df=ACC_hidro_mass_no_efec
          del df['X13']
```

```
#Se eliminan todas las filas que tengan valores atípicos en al menos una de<sub>l</sub>
\rightarrow sus columnas.
   df = (df[(np.abs(stats.zscore(df)) < 3).all(axis=1)])</pre>
   df['X13'] = etiq
   df_out = pd.concat([df_out,df])
   #Guarda la lista csv sin valores atípicos.
   df_out.to_csv(str(out), index=False, header=False)
   print (str(titulo) + "Valores del documento csv.\n")
   print (df)
   print ("\n\n" + str(titulo) + "Estadísticas.\n")
   print(df.describe())
   print ("\n\n")
   #Gráfica de caja y bigotes
   sns.set(style="whitegrid")
   fig , ax = plt.subplots(figsize=(14,7))
   ax = sns.boxplot(data=df)
   ax.set_title(organismo +' '+str(etiq)+" dataset "+str(dataset)+"__
→"+str(transf)+" "+str(comp))
```

### efectores

Covarianza de auto cruzamiento (ACC) hidro\_mass efectores fusarium\_oxysporum dataset 3, sin valores atípicos.

```
XΟ
                                       ХЗ
                    Х1
                             Х2
                                                 Х4
                                                          Х5
                                                                    X6 \
   -0.013952 -0.055806 -0.016258 0.085893 -0.058251 -0.090093 0.057338
0
1
    0.079270 \quad 0.056174 \quad 0.036470 \quad 0.066935 \quad -0.052461 \quad -0.073548 \quad -0.091442
   -0.005653 0.073230 -0.024098 0.124723 -0.015845 0.041716 0.048514
3
    0.063594 -0.023570 -0.003357 0.041148 -0.058540 0.052066 -0.002636
   -0.026582 0.001799 0.007927 0.023703 0.005890 -0.078885 0.019054
994 0.045926 0.032206 -0.015503 0.026210 -0.012588 -0.045361 -0.034476
996 -0.009585 -0.026947 -0.006991 0.025855 0.008368 -0.056399 0.021435
    0.071460 \quad 0.074796 \quad 0.039679 \quad 0.051660 \quad 0.050697 \quad 0.031004 \quad 0.001941
997
998 0.026544 -0.015703 0.018220 -0.025364 0.060470 -0.026365 0.045653
999 -0.053670 0.016357 -0.041410 0.032333 -0.041042 0.109892 -0.025769
          Х7
                    Х8
                             Х9
                                      X10
                                                X11
                                                         X12
                                                                    X13
0
   -0.057351 -0.120778 0.033428 0.016161 -0.044863 0.004956 efectores
1
    2
    0.112347 0.078609 -0.014261 0.155434 -0.034611 0.024162 efectores
   -0.054396 0.007558 0.011947 -0.001724 -0.070259 -0.063530 efectores
    0.031834 -0.020183 -0.075950 -0.005706 0.073329 -0.002064 efectores
994 -0.020546 0.028726 0.031524 -0.052547 0.007874 0.005590 efectores
```

```
996 -0.019324 -0.028057 -0.029680 -0.020381 0.011931 0.011891 efectores

997 0.039878 0.036302 0.070155 0.061502 0.015388 0.013143 efectores

998 0.044963 0.015439 -0.037238 -0.011701 0.022741 0.017734 efectores

999 0.048549 -0.059975 0.016429 0.027688 0.057160 -0.023499 efectores
```

[911 rows x 14 columns]

Covarianza de auto cruzamiento (ACC) hidro\_mass efectores fusarium\_oxysporum dataset 3, sin valores atípicos. Estadísticas.

	XO	X1	Х2	хз	X4	Х5	\
count	911.000000	911.000000	911.000000	911.000000	911.000000	911.000000	
mean	0.009664	0.014501	0.012312	0.015324	0.006509	0.004131	
std	0.049283	0.045882	0.049519	0.048343	0.047094	0.050251	
min	-0.149004	-0.129051	-0.151751	-0.140028	-0.137606	-0.165358	
25%	-0.021987	-0.013380	-0.017133	-0.013642	-0.025408	-0.024592	
50%	0.010504	0.012302	0.014403	0.015731	0.007152	0.002977	
75%	0.040654	0.043832	0.042533	0.044159	0.034815	0.035783	
max	0.176091	0.146824	0.183725	0.161899	0.167813	0.171128	
	Х6	Х7	Х8	Х9	X10	X11	\
count	911.000000	911.000000	911.000000	911.000000	911.000000	911.000000	
mean	0.009223	0.003790	0.004963	0.000639	0.005666	0.006012	
std	0.046863	0.045871	0.050070	0.049753	0.045447	0.045931	
min	-0.160145	-0.137238	-0.167186	-0.167845	-0.153076	-0.140681	
25%	-0.017379	-0.024102	-0.024675	-0.030140	-0.020718	-0.022597	
50%	0.008211	0.003363	0.004849	0.002536	0.005605	0.006750	
75%	0.036943	0.032709	0.034784	0.032881	0.032284	0.036068	
max	0.178498	0.155451	0.164220	0.171383	0.162904	0.161640	
	X12						
count	911.000000						
mean	0.001927						
std	0.048756						
min	-0.170955						
25%	-0.026385						
50%	0.003709						
75%	0.031007						
max	0.177903						

### no\_efectores

Covarianza de auto cruzamiento (ACC) hidro\_mass no\_efectores fusarium\_oxysporum dataset 3, sin valores atípicos.

```
XΟ
                    Х1
                             Х2
                                       ХЗ
                                                 Х4
                                                          Х5
                                                                    X6 \
0
    0.053348 0.141385 0.043101 0.117595 0.024031 0.001686
                                                             0.092818
1
    0.007214 -0.013362 0.001787 -0.098859 0.071497 -0.060806
                                                              0.001910
2
    0.027217 - 0.038720 - 0.045296 - 0.008883 0.043747 0.001794 - 0.008728
3
   -0.039541 0.048749 0.063758 -0.019483 0.117205 -0.110431
                                                              0.022551
   -0.107434 -0.033984 0.010014 0.039722 -0.049609 0.033628 0.010495
. .
                 •••
                                •••
995 -0.019027 -0.050533 0.030565 -0.028120 -0.057040 -0.029417
996 0.019079 -0.007947 -0.118229 -0.042741 0.025989 -0.040300 -0.018607
997 -0.059939 -0.003591 0.024773 0.052936 -0.007596 0.032044 0.030041
998 0.045852 -0.015087 -0.006784 0.013931 0.011105 0.044499 -0.024902
999 -0.008411 0.009243 -0.020681 0.032634 0.024320 -0.021888
                                                              0.036567
          Х7
                    8X
                              Х9
                                      X10
                                                X11
                                                          X12
                                                                       X13
0
   -0.036484 0.079850 -0.023570 0.044934 -0.057383 0.030276 no_efectores
1
   -0.015156 0.012392 0.013532 0.034523 -0.037565 -0.099802 no_efectores
2
   -0.028171 0.046146 0.030212 0.039604 -0.070270 -0.096562 no_efectores
3
   -0.050111 0.022263 0.088514 -0.045660 -0.039715 0.021147
                                                              no efectores
4
    0.143631 0.030380 0.074750 -0.005950 -0.054161 -0.033390 no efectores
995 -0.085616 -0.055882 0.000161 0.013521 0.037701 -0.078678 no efectores
996 -0.015602 0.008786 0.016317 -0.012117 0.025125 -0.020400 no efectores
997 -0.022220 -0.019662 0.040208 -0.007746 -0.053893 0.054517
                                                              no_efectores
998 0.009030 0.009868 -0.003145 0.022436 0.060962 0.054522 no_efectores
999 0.012826 -0.016231 0.000218 0.025107 0.040599 -0.009592 no_efectores
```

[912 rows x 14 columns]

Covarianza de auto cruzamiento (ACC) hidro\_mass no\_efectores fusarium\_oxysporum dataset 3, sin valores atípicos.

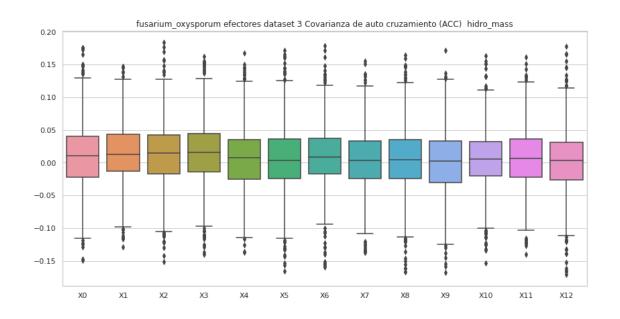
Estadísticas.

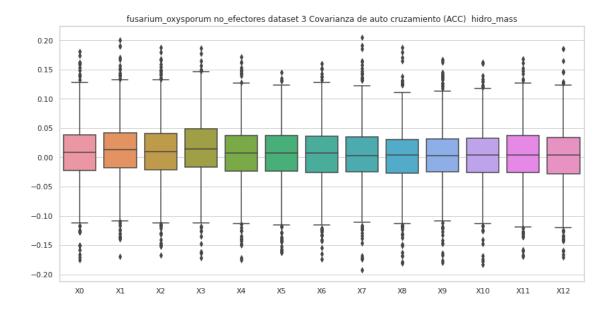
	XO	X1	Х2	ХЗ	X4	Х5	\
count	912.000000	912.000000	912.000000	912.000000	912.000000	912.000000	
mean	0.008236	0.012668	0.009868	0.014778	0.007509	0.006516	
std	0.050804	0.050289	0.051210	0.051618	0.050040	0.050994	
min	-0.174670	-0.169784	-0.166874	-0.171734	-0.175190	-0.163100	
25%	-0.021872	-0.018266	-0.020871	-0.016937	-0.023529	-0.023659	
50%	0.008439	0.013036	0.009581	0.014257	0.007610	0.006944	
75%	0.038043	0.042392	0.040803	0.048265	0.037132	0.037489	
max	0.181215	0.199946	0.187243	0.186208	0.171221	0.145730	
	Х6	Х7	Х8	Х9	X10	X11	\
count	912.000000	912.000000	912.000000	912.000000	912.000000	912.000000	
mean	0.005297	0.005078	0.003005	0.003239	0.003279	0.005764	
std	0.048651	0.051464	0.048637	0.049451	0.047680	0.050624	

min	-0.174214	-0.192474	-0.181119	-0.179458	-0.183367	-0.169892
25%	-0.025596	-0.025154	-0.026896	-0.024270	-0.026337	-0.025656
50%	0.007947	0.002365	0.003861	0.002688	0.004480	0.004389
75%	0.036002	0.035322	0.030727	0.031889	0.032182	0.037104
max	0.159992	0.204944	0.187392	0.167019	0.162611	0.168252

X12

count	912.000000
mean	0.003435
std	0.049084
min	-0.170560
25%	-0.028005
50%	0.003723
75%	0.033334
max	0.185607





## 7 Covarianza de auto cruzamiento (ACC) mass

```
[13]: #mass
      transf = "Covarianza de auto cruzamiento (ACC) "
      transf2 = "ACC"
      estado = "con valores atípicos.\n"
      comp = "mass"
      df=""
      for etiq in "efectores", "no_efectores":
          titulo = (str(transf)+" "+ str(comp)+" "+ str(etiq) + " "+ str(nombre2) +",
       →" + str(estado))
          print (str(etiq))
          if etiq == "efectores":
              df=ACC_mass_efec
          if etiq == "no_efectores":
              df=ACC_mass_no_efec
          #del df['X13']
          print (str(titulo) + "Valores del documento csv.\n")
          print ("\n\n" + str(titulo) + "Estadísticas.\n")
          print(df.describe())
          print ("\n\n")
```

#### efectores

Covarianza de auto cruzamiento (ACC) mass efectores fusarium\_oxysporum dataset 3, con valores atípicos.

Valores del documento csv.

```
XΟ
                  Х1
                           Х2
                                    ХЗ
                                             Х4
                                                      Х5
                                                               X6 \
   -0.013952 -0.055806 -0.016258 0.085893 -0.058251 -0.090093 0.057338
0
    0.079270 \quad 0.056174 \quad 0.036470 \quad 0.066935 \quad -0.052461 \quad -0.073548 \quad -0.091442
1
2
   -0.005653 0.073230 -0.024098 0.124723 -0.015845 0.041716 0.048514
    0.063594 -0.023570 -0.003357 0.041148 -0.058540 0.052066 -0.002636
3
   -0.026582 0.001799 0.007927 0.023703 0.005890 -0.078885 0.019054
. .
995 -0.029162 -0.047127 0.042632 0.042425 0.014037 -0.034396 0.039998
996 -0.009585 -0.026947 -0.006991 0.025855 0.008368 -0.056399 0.021435
997 0.071460 0.074796 0.039679 0.051660 0.050697 0.031004 0.001941
998 0.026544 -0.015703 0.018220 -0.025364 0.060470 -0.026365 0.045653
999 -0.053670 0.016357 -0.041410 0.032333 -0.041042 0.109892 -0.025769
         Х7
                   8X
                            Х9
                                    X10
                                             X11
                                                      X12
                                                               X13
0
   -0.057351 -0.120778 0.033428 0.016161 -0.044863 0.004956 efectores
1
    0.009447 -0.062696 0.024572 -0.024681 -0.022205 -0.066736 efectores
2
    3
   -0.054396  0.007558  0.011947  -0.001724  -0.070259  -0.063530
                                                          efectores
4
    0.031834 -0.020183 -0.075950 -0.005706 0.073329 -0.002064 efectores
995 0.038504 -0.015822 0.018644 0.209351 -0.088961 -0.005836 efectores
996 -0.019324 -0.028057 -0.029680 -0.020381 0.011931 0.011891 efectores
    998 0.044963 0.015439 -0.037238 -0.011701 0.022741 0.017734 efectores
999 0.048549 -0.059975 0.016429 0.027688 0.057160 -0.023499 efectores
```

[1000 rows x 14 columns]

Covarianza de auto cruzamiento (ACC) mass efectores fusarium\_oxysporum dataset 3, con valores atípicos.
Estadísticas.

```
X0 X1 X2 X3 X4 \
count 1000.000000 1000.000000 1000.000000 1000.000000 mean 0.010348 0.014272 0.012095 0.015219 0.006169
```

std	0.056958	0.052961	0.058724	0.055861	0.054444	
min	-0.263027	-0.183567	-0.229413	-0.254152	-0.259674	
25%	-0.024015	-0.015746	-0.019766	-0.016778	-0.027608	
50%	0.011114	0.012355	0.013946	0.015729	0.006843	
75%	0.042358	0.045974	0.043814	0.045682	0.036343	
max	0.285876	0.260422	0.343249	0.209486	0.279217	
	Х5	Х6	Х7	Х8	Х9	\
count	1000.000000	1000.000000	1000.000000	1000.000000	1000.000000	
mean	0.003705	0.011595	0.003101	0.005200	0.001172	
std	0.058424	0.057415	0.053266	0.062578	0.060317	
min	-0.294020	-0.254184	-0.261201	-0.282011	-0.450844	
25%	-0.026543	-0.019069	-0.025323	-0.026031	-0.033725	
50%	0.002735	0.009159	0.003093	0.004801	0.002620	
75%	0.038076	0.040139	0.033747	0.037029	0.034925	
max	0.346640	0.422461	0.264442	0.326305	0.457589	
	X10	X11	X12			
count	1000.000000	1000.000000	1000.000000			
mean	0.005889	0.005761	0.002333			
std	0.053645	0.052559	0.059495			
min	-0.437327	-0.218862	-0.437060			
25%	-0.021162	-0.024041	-0.027850			
50%	0.007207	0.006723	0.003775			
75%	0.035127	0.036622	0.033518			
max	0.210045	0.425213	0.438232			

## no\_efectores

Covarianza de auto cruzamiento (ACC) mass no\_efectores fusarium\_oxysporum dataset 3, con valores atípicos.

XO	X1	Х2	ХЗ	X4	Х5	Х6	\
0.053348	0.141385	0.043101	0.117595	0.024031	0.001686	0.092818	
0.007214	-0.013362	0.001787	-0.098859	0.071497	-0.060806	0.001910	
0.027217	-0.038720	-0.045296	-0.008883	0.043747	0.001794	-0.008728	
-0.039541	0.048749	0.063758	-0.019483	0.117205	-0.110431	0.022551	
-0.107434	-0.033984	0.010014	0.039722	-0.049609	0.033628	0.010495	
•••	•••	•••		•••	•••		
-0.019027	-0.050533	0.030565	-0.028120	-0.057040	-0.029417	0.022302	
0.019079	-0.007947	-0.118229	-0.042741	0.025989	-0.040300	-0.018607	
-0.059939	-0.003591	0.024773	0.052936	-0.007596	0.032044	0.030041	
0.045852	-0.015087	-0.006784	0.013931	0.011105	0.044499	-0.024902	
-0.008411	0.009243	-0.020681	0.032634	0.024320	-0.021888	0.036567	
Х7	Х8	Х9	X10	X11	X12		X13
	0.053348 0.007214 0.027217 -0.039541 -0.107434  -0.019027 0.019079 -0.059939 0.045852 -0.008411	0.053348	0.053348	0.053348       0.141385       0.043101       0.117595         0.007214       -0.013362       0.001787       -0.098859         0.027217       -0.038720       -0.045296       -0.008883         -0.039541       0.048749       0.063758       -0.019483         -0.107434       -0.033984       0.010014       0.039722               -0.019027       -0.050533       0.030565       -0.028120         0.019079       -0.007947       -0.118229       -0.042741         -0.059939       -0.003591       0.024773       0.052936         0.045852       -0.015087       -0.006784       0.013931         -0.008411       0.009243       -0.020681       0.032634	0.053348       0.141385       0.043101       0.117595       0.024031         0.007214       -0.013362       0.001787       -0.098859       0.071497         0.027217       -0.038720       -0.045296       -0.008883       0.043747         -0.039541       0.048749       0.063758       -0.019483       0.117205         -0.107434       -0.033984       0.010014       0.039722       -0.049609                -0.019027       -0.050533       0.030565       -0.028120       -0.057040         0.019079       -0.007947       -0.118229       -0.042741       0.025989         -0.059939       -0.003591       0.024773       0.052936       -0.007596         0.045852       -0.015087       -0.006784       0.013931       0.011105         -0.008411       0.009243       -0.020681       0.032634       0.024320	0.053348       0.141385       0.043101       0.117595       0.024031       0.001686         0.007214       -0.013362       0.001787       -0.098859       0.071497       -0.060806         0.027217       -0.038720       -0.045296       -0.008883       0.043747       0.001794         -0.039541       0.048749       0.063758       -0.019483       0.117205       -0.110431         -0.107434       -0.033984       0.010014       0.039722       -0.049609       0.033628                 -0.019027       -0.050533       0.030565       -0.028120       -0.057040       -0.029417         0.019079       -0.007947       -0.118229       -0.042741       0.025989       -0.040300         -0.059939       -0.003591       0.024773       0.052936       -0.007596       0.032044         0.045852       -0.015087       -0.006784       0.013931       0.011105       0.044499         -0.008411       0.009243       -0.020681       0.032634       0.024320       -0.021888	0.053348       0.141385       0.043101       0.117595       0.024031       0.001686       0.092818         0.007214       -0.013362       0.001787       -0.098859       0.071497       -0.060806       0.001910         0.027217       -0.038720       -0.045296       -0.008883       0.043747       0.001794       -0.008728         -0.039541       0.048749       0.063758       -0.019483       0.117205       -0.110431       0.022551         -0.107434       -0.033984       0.010014       0.039722       -0.049609       0.033628       0.010495                  -0.019027       -0.050533       0.030565       -0.028120       -0.057040       -0.029417       0.022302         0.019079       -0.007947       -0.118229       -0.042741       0.025989       -0.040300       -0.018607         -0.059939       -0.003591       0.024773       0.052936       -0.007596       0.032044       0.030041         0.045852       -0.015087       -0.006784       0.013931       0.011105       0.044499       -0.024902         -0.008411       0.009243       -0.020681       0.032634       0.024320       -0.021888       0.03

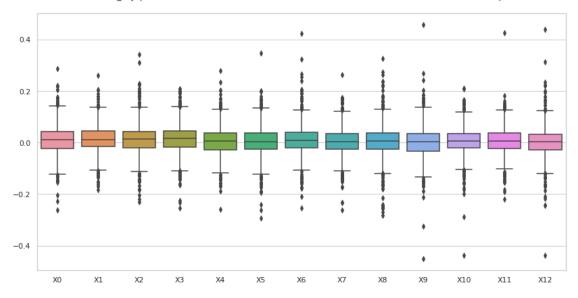
[1000 rows x 14 columns]

Covarianza de auto cruzamiento (ACC) mass no\_efectores fusarium\_oxysporum dataset 3, con valores atípicos.

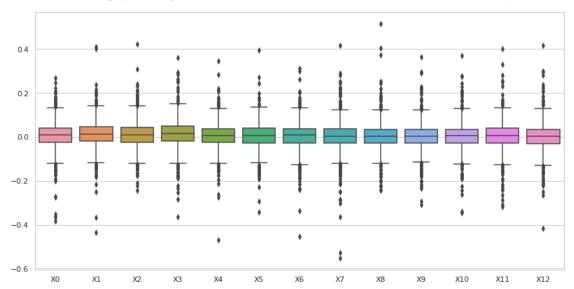
Estadísticas.

	XO	X1	Х2	ХЗ	X4	\
count	1000.000000	1000.000000	1000.000000	1000.000000	1000.000000	
mean	0.006811	0.012647	0.009877	0.014037	0.006733	
std	0.063225	0.062775	0.060695	0.065203	0.061202	
min	-0.384333	-0.436285	-0.243138	-0.364879	-0.470186	
25%	-0.024660	-0.020142	-0.023839	-0.019200	-0.025756	
50%	0.007953	0.012419	0.009699	0.014093	0.007102	
75%	0.039295	0.045033	0.042206	0.049153	0.038405	
max	0.269161	0.410313	0.423256	0.362413	0.344166	
	Х5	Х6	Х7	Х8	Х9	\
count	1000.000000	1000.000000	1000.000000	1000.000000	1000.000000	
mean	0.005687	0.004595	0.003664	0.004195	0.002411	
std	0.060546	0.061549	0.069284	0.062430	0.062212	
min	-0.344119	-0.453110	-0.552803	-0.244072	-0.310392	
25%	-0.026830	-0.027451	-0.026448	-0.027931	-0.027012	
50%	0.006142	0.008176	0.002275	0.003817	0.002038	
75%	0.040125	0.038250	0.036749	0.033653	0.033570	
max	0.395409	0.310543	0.416296	0.515183	0.363748	
	X10	X11	X12			
count	1000.000000	1000.000000	1000.000000			
mean	0.003310	0.004739	0.002840			
std	0.062501	0.064264	0.063630			
min	-0.347046	-0.317403	-0.417323			
25%	-0.029012	-0.027769	-0.031195			
50%	0.004657	0.004899	0.003202			
75%	0.034664	0.038851	0.034901			
max	0.370957	0.402715	0.418022			

fusarium\_oxysporum efectores dataset 3 Covarianza de auto cruzamiento (ACC) mass con valores atípicos.



fusarium\_oxysporum no\_efectores dataset 3 Covarianza de auto cruzamiento (ACC) mass con valores atípicos.



## 7.1 Covarianza de auto cruzamiento (ACC) mass, sin valores atípicos

```
[14]: #mass
      transf = "Covarianza de auto cruzamiento (ACC) "
      transf2 = "ACC"
      estado = "sin valores atípicos.\n"
      comp = "mass"
      df=""
      #Se eliminan todas las filas que tengan valores atípicos en al menos una de susu
       \rightarrow columnas.
      out = (str(r3) + '/ds' + str(dataset) + '_' + str(transf2) + '_' + str(comp) +_{\square}

→'_' + str(organismo) + '.csv')
      os.makedirs(str(r3), exist_ok=True)
      df=""
      df_out = pd.DataFrame()
      for etiq in "efectores", "no_efectores":
          titulo = (str(transf)+" "+ str(comp)+" "+ str(etiq) + " "+ str(nombre2) +", |
       →" + str(estado))
          if etiq == "efectores":
              df=ACC_mass_efec
          if etiq == "no efectores":
               df=ACC_mass_no_efec
          del df['X13']
          #Se eliminan todas las filas que tengan valores atípicos en al menos una de<sub>l</sub>
       \hookrightarrow sus columnas.
          df = (df[(np.abs(stats.zscore(df)) < 3).all(axis=1)])</pre>
          df['X13'] = etiq
          df_out = pd.concat([df_out,df])
          #Guarda la lista csv sin valores atípicos.
          df_out.to_csv(str(out), index=False, header=False)
          print (str(titulo) + "Valores del documento csv.\n")
          print (df)
          print ("\n\n" + str(titulo) + "Estadísticas.\n")
          print(df.describe())
          print ("\n\n")
          #Gráfica de caja y bigotes
          sns.set(style="whitegrid")
          fig , ax = plt.subplots(figsize=(14,7))
          ax = sns.boxplot(data=df)
```

```
ax.set_title(organismo +' '+str(etiq)+" dataset "+str(dataset)+"⊔

→"+str(transf)+" "+str(comp))
```

Covarianza de auto cruzamiento (ACC) mass efectores fusarium\_oxysporum dataset 3, sin valores atípicos.

Valores del documento csv.

```
XΟ
                                      Х3
                   X 1
                             X2
                                                Χ4
                                                         X5
                                                                   X6 \
0
   -0.013952 -0.055806 -0.016258 0.085893 -0.058251 -0.090093 0.057338
    0.079270 \quad 0.056174 \quad 0.036470 \quad 0.066935 \quad -0.052461 \quad -0.073548 \quad -0.091442
1
2
  -0.005653 0.073230 -0.024098 0.124723 -0.015845 0.041716
                                                             0.048514
3
    0.063594 - 0.023570 - 0.003357 \ 0.041148 - 0.058540 \ 0.052066 - 0.002636
   -0.026582 0.001799 0.007927 0.023703 0.005890 -0.078885
                                                             0.019054
994 0.045926 0.032206 -0.015503 0.026210 -0.012588 -0.045361 -0.034476
996 -0.009585 -0.026947 -0.006991 0.025855 0.008368 -0.056399
                                                             0.021435
997
    0.071460 \quad 0.074796 \quad 0.039679 \quad 0.051660 \quad 0.050697 \quad 0.031004 \quad 0.001941
    0.026544 - 0.015703 \quad 0.018220 - 0.025364 \quad 0.060470 - 0.026365 \quad 0.045653
999 -0.053670 0.016357 -0.041410 0.032333 -0.041042 0.109892 -0.025769
          Х7
                   Х8
                             Х9
                                      X10
                                               X11
                                                        X12
                                                                   X13
0
   -0.057351 -0.120778  0.033428  0.016161 -0.044863  0.004956
                                                             efectores
    0.009447 -0.062696  0.024572 -0.024681 -0.022205 -0.066736
1
                                                             efectores
2
    3
   -0.054396 0.007558 0.011947 -0.001724 -0.070259 -0.063530 efectores
4
    0.031834 -0.020183 -0.075950 -0.005706 0.073329 -0.002064 efectores
994 -0.020546 0.028726 0.031524 -0.052547 0.007874 0.005590
                                                             efectores
996 -0.019324 -0.028057 -0.029680 -0.020381 0.011931 0.011891
                                                             efectores
997
    efectores
998 0.044963 0.015439 -0.037238 -0.011701 0.022741 0.017734
                                                             efectores
999
    0.048549 -0.059975 0.016429 0.027688 0.057160 -0.023499
                                                             efectores
```

[911 rows x 14 columns]

Covarianza de auto cruzamiento (ACC) mass efectores fusarium\_oxysporum dataset 3, sin valores atípicos.
Estadísticas.

	XO	X1	Х2	ХЗ	Х4	Х5	\
count	911.000000	911.000000	911.000000	911.000000	911.000000	911.000000	
mean	0.009664	0.014501	0.012312	0.015324	0.006509	0.004131	
std	0.049283	0.045882	0.049519	0.048343	0.047094	0.050251	
min	-0.149004	-0.129051	-0.151751	-0.140028	-0.137606	-0.165358	
25%	-0.021987	-0.013380	-0.017133	-0.013642	-0.025408	-0.024592	
50%	0.010504	0.012302	0.014403	0.015731	0.007152	0.002977	
75%	0.040654	0.043832	0.042533	0.044159	0.034815	0.035783	

max	0.176091	0.146824	0.183725	0.161899	0.167813	0.171128	
	Х6	Х7	Х8	Х9	X10	X11	\
count	911.000000	911.000000	911.000000	911.000000	911.000000	911.000000	
mean	0.009223	0.003790	0.004963	0.000639	0.005666	0.006012	
std	0.046863	0.045871	0.050070	0.049753	0.045447	0.045931	
min	-0.160145	-0.137238	-0.167186	-0.167845	-0.153076	-0.140681	
25%	-0.017379	-0.024102	-0.024675	-0.030140	-0.020718	-0.022597	
50%	0.008211	0.003363	0.004849	0.002536	0.005605	0.006750	
75%	0.036943	0.032709	0.034784	0.032881	0.032284	0.036068	
max	0.178498	0.155451	0.164220	0.171383	0.162904	0.161640	
	X12						
count	911.000000						
mean	0.001927						
std	0.048756						
min	-0.170955						
25%	-0.026385						
50%	0.003709						
75%	0.031007						
max	0.177903						

Covarianza de auto cruzamiento (ACC) mass no\_efectores fusarium\_oxysporum dataset 3, sin valores atípicos.
Valores del documento csv.

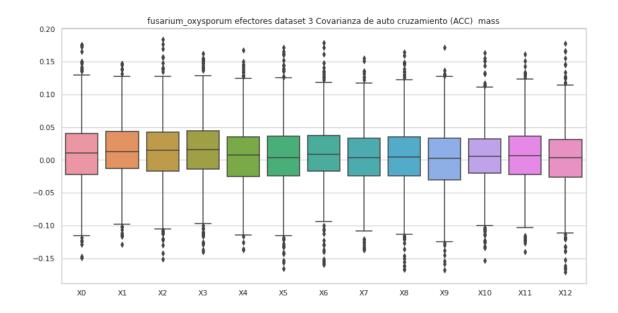
```
XΟ
                    Х1
                              Х2
                                        ХЗ
                                                  Х4
                                                            Х5
                                                                      Х6
0
    0.053348 0.141385
                        0.043101 0.117595 0.024031 0.001686
                                                                0.092818
    0.007214 - 0.013362 \ 0.001787 - 0.098859 \ 0.071497 - 0.060806
1
                                                                0.001910
2
    0.027217 -0.038720 -0.045296 -0.008883
                                            0.043747 0.001794 -0.008728
3
   -0.039541 0.048749
                        0.063758 -0.019483
                                            0.117205 -0.110431
                                                                0.022551
4
   -0.107434 -0.033984
                        0.010014 0.039722 -0.049609
                                                      0.033628
                                                                0.010495
995 -0.019027 -0.050533 0.030565 -0.028120 -0.057040 -0.029417
                                                                0.022302
996 0.019079 -0.007947 -0.118229 -0.042741 0.025989 -0.040300 -0.018607
997 -0.059939 -0.003591 0.024773 0.052936 -0.007596
                                                      0.032044
                                                                0.030041
998 0.045852 -0.015087 -0.006784 0.013931 0.011105
                                                      0.044499 -0.024902
999 -0.008411 0.009243 -0.020681 0.032634 0.024320 -0.021888
                                                                0.036567
          Х7
                                                                         X13
                    Х8
                              Х9
                                       X10
                                                 X11
                                                           X12
0
   -0.036484 0.079850 -0.023570
                                  0.044934 -0.057383 0.030276
                                                                no_efectores
   -0.015156 0.012392 0.013532
                                  0.034523 -0.037565 -0.099802
1
                                                                no_efectores
2
   -0.028171 0.046146 0.030212 0.039604 -0.070270 -0.096562
                                                                no_efectores
3
   -0.050111 0.022263 0.088514 -0.045660 -0.039715 0.021147
                                                                no_efectores
                        0.074750 -0.005950 -0.054161 -0.033390
4
    0.143631 0.030380
                                                                no_efectores
```

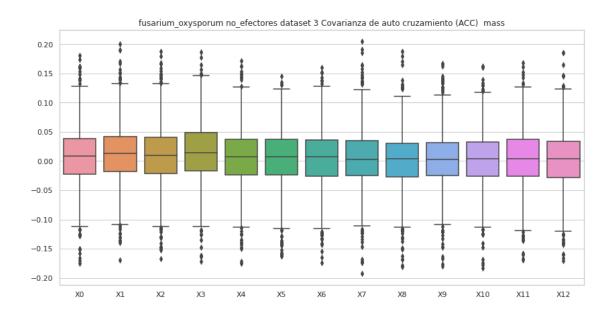
```
995 -0.085616 -0.055882 0.000161 0.013521 0.037701 -0.078678 no_efectores 996 -0.015602 0.008786 0.016317 -0.012117 0.025125 -0.020400 no_efectores 997 -0.022220 -0.019662 0.040208 -0.007746 -0.053893 0.054517 no_efectores 998 0.009030 0.009868 -0.003145 0.022436 0.060962 0.054522 no_efectores 999 0.012826 -0.016231 0.000218 0.025107 0.040599 -0.009592 no_efectores
```

[912 rows x 14 columns]

Covarianza de auto cruzamiento (ACC) mass no\_efectores fusarium\_oxysporum dataset 3, sin valores atípicos. Estadísticas.

	XO	X1	Х2	ХЗ	X4	Х5	\
coun	t 912.000000	912.000000	912.000000	912.000000	912.000000	912.000000	
mean	0.008236	0.012668	0.009868	0.014778	0.007509	0.006516	
std	0.050804	0.050289	0.051210	0.051618	0.050040	0.050994	
min	-0.174670	-0.169784	-0.166874	-0.171734	-0.175190	-0.163100	
25%	-0.021872	-0.018266	-0.020871	-0.016937	-0.023529	-0.023659	
50%	0.008439	0.013036	0.009581	0.014257	0.007610	0.006944	
75%	0.038043	0.042392	0.040803	0.048265	0.037132	0.037489	
max	0.181215	0.199946	0.187243	0.186208	0.171221	0.145730	
	Х6	Х7	Х8	Х9	X10	X11	\
coun	t 912.000000	912.000000	912.000000	912.000000	912.000000	912.000000	
mean	0.005297	0.005078	0.003005	0.003239	0.003279	0.005764	
std	0.048651	0.051464	0.048637	0.049451	0.047680	0.050624	
min	-0.174214	-0.192474	-0.181119	-0.179458	-0.183367	-0.169892	
25%	-0.025596	-0.025154	-0.026896	-0.024270	-0.026337	-0.025656	
50%	0.007947	0.002365	0.003861	0.002688	0.004480	0.004389	
75%	0.036002	0.035322	0.030727	0.031889	0.032182	0.037104	
max	0.159992	0.204944	0.187392	0.167019	0.162611	0.168252	
	X12						
coun	t 912.000000						
mean	0.003435						
std	0.049084						
min	-0.170560						
25%	-0.028005						
50%	0.003723						
75%	0.033334						
max	0.185607						





# 8 Covarianza de auto cruzamiento (ACC) hidro

```
[15]: #hidro
    transf = "Covarianza de auto cruzamiento (ACC) "
    transf2 = "ACC"
    estado = "con valores atípicos.\n"
    comp = "hidro"
    df=""
```

```
for etiq in "efectores", "no_efectores":
    titulo = (str(transf)+" "+ str(comp)+" "+ str(etiq) + " "+ str(nombre2) +", |
 →" + str(estado))
    print (str(etiq))
    if etiq == "efectores":
        df=ACC_hidro_efec
    if etiq == "no_efectores":
        df=ACC_hidro_no_efec
    #del df['X13']
    print (str(titulo) + "Valores del documento csv.\n")
    print ("\n\n" + str(titulo) + "Estadísticas.\n")
    print(df.describe())
    print ("\n\n")
    #Gráfica de caja y bigotes
    sns.set(style="whitegrid")
    fig , ax = plt.subplots(figsize=(14,7))
    ax = sns.boxplot(data=df)
    ax.set_title(organismo +' '+str(etiq)+" dataset "+str(dataset)+"__
 →"+str(transf)+" "+str(comp)+" "+str(estado))
```

### efectores

Covarianza de auto cruzamiento (ACC) hidro efectores fusarium\_oxysporum dataset 3, con valores atípicos.

```
XΟ
                    Х1
                              X2
                                        ХЗ
                                                             Х5
   -0.068279 -0.064832 -0.129218 -0.031865 -0.037906 0.045728 -0.019197
0
1
    0.082729 - 0.010446 \ 0.088468 \ 0.090486 \ 0.058365 \ 0.033042 - 0.062850
2
    0.018646 \ -0.150613 \quad 0.077810 \quad 0.060207 \quad 0.005621 \quad 0.044534 \ -0.020327
    0.011703 - 0.091254 \quad 0.049492 - 0.068715 - 0.033710 - 0.027945 - 0.009435
3
4
  -0.005527 -0.062334 0.030022 0.045908 0.018507 -0.041892 0.125287
995 -0.112615 0.031008 0.058008 0.066753 0.050346 -0.103660 0.050554
996 0.001451 -0.045537 -0.000740 -0.009778 -0.059500 0.011729 -0.000996
997 0.089102 0.104744 0.116950 0.114540 0.128826 0.091404 0.097111
998 0.026800 0.014432 0.063959 0.038476 -0.005332 0.020018 0.038805
999 0.089752 0.092060 0.055072 0.067811 0.007192 0.040600 0.113621
           Х7
                     Х8
                               Х9
                                        X10
                                                  X11
                                                            X12
                                                                       X13
0
     0.022370 -0.019135 0.087817 0.008303 0.052908 -0.016795 efectores
     0.016824 0.041118 -0.045535 -0.010931 -0.029313 0.057552 efectores
   -0.089690 -0.024951 0.045351 -0.020420 -0.043547 0.063616 efectores
```

[1000 rows x 14 columns]

Covarianza de auto cruzamiento (ACC) hidro efectores fusarium\_oxysporum dataset 3, con valores atípicos. Estadísticas.

	XO	X1	Х2	ХЗ	Х4	\
count	1000.000000	1000.000000	1000.000000	1000.000000	1000.000000	
mean	0.011870	-0.021154	0.025988	0.029286	-0.005311	
std	0.064655	0.073052	0.066270	0.064381	0.064153	
min	-0.267801	-0.324418	-0.363712	-0.282006	-0.464266	
25%	-0.030622	-0.061908	-0.012446	-0.007947	-0.041971	
50%	0.009006	-0.021919	0.026824	0.030436	-0.005328	
75%	0.051785	0.019612	0.065348	0.066169	0.031126	
max	0.276397	0.317205	0.284427	0.377371	0.333651	
	Х5	Х6	Х7	Х8	Х9	\
count	1000.000000	1000.000000	1000.000000	1000.000000	1000.000000	
mean	-0.002564	0.022454	0.012774	0.006049	0.010286	
std	0.063987	0.065231	0.063198	0.064021	0.060731	
min	-0.246508	-0.376221	-0.449786	-0.287035	-0.281771	
25%	-0.039272	-0.012225	-0.019818	-0.029003	-0.026673	
50%	-0.002635	0.022479	0.013242	0.003382	0.009357	
75%	0.035419	0.058960	0.047925	0.041961	0.042973	
max	0.249927	0.314419	0.304805	0.378747	0.307820	
	X10	X11	X12			
count	1000.000000	1000.000000	1000.000000			
mean	0.015286	0.004847	0.003702			
std	0.057810	0.062605	0.061344			
min	-0.341000	-0.318298	-0.349122			
25%	-0.017582	-0.028705	-0.028382			
50%	0.015212	0.005973	0.003300			
75%	0.046886	0.040292	0.040048			
max	0.378315	0.358841	0.252956			

## no\_efectores

Covarianza de auto cruzamiento (ACC) hidro no\_efectores fusarium\_oxysporum dataset 3, con valores atípicos.

Valores del documento csv.

	XO	X1	X2	ХЗ	X4	X5	X6 \
0	0.052759	0.042304	0.115265	0.174268	0.077804	0.127750	0.266015
1	0.037065	-0.037607	0.017315	0.048315	0.012567	-0.003120	0.117895
2	0.036156	-0.125834	-0.121387	0.007845	0.066295	0.073209	-0.045575
3	0.040532	0.007921	0.087314	0.048320	0.060518	0.050469	0.027279
4	-0.125378	-0.104711	0.023996	0.021510	0.015422	0.005466	0.048688
	•••	•••	•••		•••	•••	
995	-0.050237	-0.095571	0.153159	0.109246	-0.158970	0.036458	0.071922
996	0.008825	-0.066833	0.034382	0.040247	0.039644	-0.046200	-0.009022
997	0.031435	-0.090082	0.071759	0.042927	-0.044422	0.042274	0.015140
998	0.069085	0.012179	-0.035606	0.085599	0.008826	-0.009335	-0.015649
999	-0.024780	-0.122178	0.033751	0.040638	-0.078313	-0.033271	0.038098
	Х7	Х8	Х9	X10	X11	X12	X13
0	X7 0.062369		X9 0.171993		X11 -0.085301		X13 no_efectores
0	0.062369					0.035767	
	0.062369 0.097446	0.000393	0.171993	0.163327 0.080299	-0.085301	0.035767 0.038499	no_efectores
1	0.062369 0.097446 -0.057456	0.000393 -0.089686	0.171993 0.003335	0.163327 0.080299 0.047158	-0.085301 0.042653	0.035767 0.038499 -0.069332	no_efectores no_efectores
1 2	0.062369 0.097446 -0.057456 0.028038	0.000393 -0.089686 -0.073176	0.171993 0.003335 0.011971 0.005516	0.163327 0.080299 0.047158	-0.085301 0.042653 -0.099967 -0.017945	0.035767 0.038499 -0.069332 0.046218	no_efectores no_efectores no_efectores
1 2 3	0.062369 0.097446 -0.057456 0.028038	0.000393 -0.089686 -0.073176 -0.010534	0.171993 0.003335 0.011971 0.005516	0.163327 0.080299 0.047158 0.008964 -0.029549	-0.085301 0.042653 -0.099967 -0.017945	0.035767 0.038499 -0.069332 0.046218	no_efectores no_efectores no_efectores no_efectores
1 2 3 4	0.062369 0.097446 -0.057456 0.028038 0.002201	0.000393 -0.089686 -0.073176 -0.010534 -0.027232 	0.171993 0.003335 0.011971 0.005516 0.058083	0.163327 0.080299 0.047158 0.008964 -0.029549 	-0.085301 0.042653 -0.099967 -0.017945 -0.006432 	0.035767 0.038499 -0.069332 0.046218 -0.027933	no_efectores no_efectores no_efectores no_efectores
1 2 3 4	0.062369 0.097446 -0.057456 0.028038 0.002201  -0.078091	0.000393 -0.089686 -0.073176 -0.010534 -0.027232 	0.171993 0.003335 0.011971 0.005516 0.058083 	0.163327 0.080299 0.047158 0.008964 -0.029549 	-0.085301 0.042653 -0.099967 -0.017945 -0.006432 	0.035767 0.038499 -0.069332 0.046218 -0.027933  -0.033166	no_efectores no_efectores no_efectores no_efectores no_efectores
1 2 3 4  995 996	0.062369 0.097446 -0.057456 0.028038 0.002201  -0.078091	0.000393 -0.089686 -0.073176 -0.010534 -0.027232  0.013339	0.171993 0.003335 0.011971 0.005516 0.058083 	0.163327 0.080299 0.047158 0.008964 -0.029549  0.030664	-0.085301 0.042653 -0.099967 -0.017945 -0.006432  -0.176916 0.051737	0.035767 0.038499 -0.069332 0.046218 -0.027933  -0.033166	no_efectores no_efectores no_efectores no_efectores no_efectores
1 2 3 4  995 996	0.062369 0.097446 -0.057456 0.028038 0.002201  -0.078091 0.054069 -0.073715	0.000393 -0.089686 -0.073176 -0.010534 -0.027232  0.013339 -0.054607	0.171993 0.003335 0.011971 0.005516 0.058083  -0.034847 -0.096885	0.163327 0.080299 0.047158 0.008964 -0.029549  0.030664 0.020414	-0.085301 0.042653 -0.099967 -0.017945 -0.006432  -0.176916 0.051737 0.020308	0.035767 0.038499 -0.069332 0.046218 -0.027933  -0.033166 0.025533	no_efectores no_efectores no_efectores no_efectores no_efectores no_efectores
1 2 3 4  995 996 997 998	0.062369 0.097446 -0.057456 0.028038 0.002201  -0.078091 0.054069 -0.073715 0.009804	0.000393 -0.089686 -0.073176 -0.010534 -0.027232  0.013339 -0.054607 0.046070	0.171993 0.003335 0.011971 0.005516 0.058083  -0.034847 -0.096885 0.039889 0.051195	0.163327 0.080299 0.047158 0.008964 -0.029549  0.030664 0.020414 0.041622 0.035110	-0.085301 0.042653 -0.099967 -0.017945 -0.006432  -0.176916 0.051737 0.020308 0.001577	0.035767 0.038499 -0.069332 0.046218 -0.027933  -0.033166 0.025533 0.020436 -0.009140	no_efectores no_efectores no_efectores no_efectores no_efectores no_efectores no_efectores no_efectores

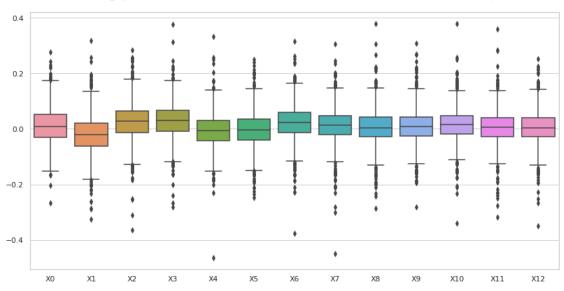
[1000 rows x 14 columns]

Covarianza de auto cruzamiento (ACC) hidro no\_efectores fusarium\_oxysporum dataset 3, con valores atípicos.
Estadísticas.

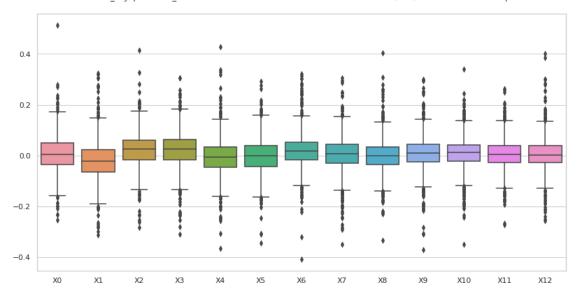
	XO	X1	Х2	ХЗ	X4	\
count	1000.000000	1000.000000	1000.000000	1000.000000	1000.000000	
mean	0.006895	-0.019209	0.020949	0.022681	-0.004858	
std	0.071683	0.075302	0.066279	0.067924	0.071413	
min	-0.254274	-0.311874	-0.282845	-0.310809	-0.366483	
25%	-0.035116	-0.063866	-0.017754	-0.016984	-0.045406	
50%	0.003715	-0.021349	0.024330	0.025874	-0.005796	
75%	0.048892	0.021827	0.060540	0.062795	0.033471	
max	0.512950	0.323348	0.413321	0.306368	0.427504	

	Х5	Х6	Х7	Х8	Х9	\
count	1000.000000	1000.000000	1000.000000	1000.000000	1000.000000	
mean	-0.002720	0.019391	0.006752	-0.001414	0.007650	
std	0.066885	0.067311	0.068202	0.066107	0.067261	
min	-0.345160	-0.408776	-0.350757	-0.335065	-0.372198	
25%	-0.042465	-0.017356	-0.029926	-0.035938	-0.025498	
50%	-0.000613	0.017135	0.006188	0.000053	0.010881	
75%	0.038465	0.053052	0.043203	0.033480	0.043068	
max	0.292450	0.320523	0.306300	0.403996	0.300159	
	X10	X11	X12			
count	1000.000000	1000.000000	1000.000000			
mean	0.010541	0.004339	0.004563			
std	0.063667	0.061588	0.066077			
min	-0.350509	-0.273977	-0.256156			
25%	-0.023547	-0.028578	-0.028685			
50%	0.011455	0.004192	0.001966			
75%	0.041668	0.038379	0.037605			
max	0.340243	0.262514	0.400153			

fusarium\_oxysporum efectores dataset 3 Covarianza de auto cruzamiento (ACC) hidro con valores atípicos.



fusarium\_oxysporum no\_efectores dataset 3 Covarianza de auto cruzamiento (ACC) hidro con valores atípicos.



## 8.1 Covarianza de auto cruzamiento (ACC) hidro, sin valores atípicos

```
[16]: #hidro
     transf = "Covarianza de auto cruzamiento (ACC) "
     transf2 = "ACC"
     estado = "sin valores atípicos.\n"
     comp = "hidro"
     df=""
     out = (str(r3) + '/ds' + str(dataset) + '_' + str(transf2) + '_' + str(comp) +_{\square}
      os.makedirs(str(r3), exist_ok=True)
     df_out = pd.DataFrame()
     for etiq in "efectores", "no_efectores":
         titulo = (str(transf) +" "+ str(etiq) + " " + str(nombre2) + ", " +
      →str(estado))
         print (str(etiq))
         if etiq == "efectores":
             df=ACC_hidro_efec
         if etiq == "no_efectores":
             df=ACC_hidro_no_efec
         del df['X13']
```

```
#Se eliminan todas las filas que tengan valores atípicos en al menos una de<sub>l</sub>
\rightarrow sus columnas.
   df = (df[(np.abs(stats.zscore(df)) < 3).all(axis=1)])</pre>
   df['X13'] = etiq
   df_out = pd.concat([df_out,df])
   #Guarda la lista csv sin valores atípicos.
   df_out.to_csv(str(out), index=False, header=False)
   print (str(titulo) + "Valores del documento csv.\n")
   print (df)
   print ("\n\n" + str(titulo) + "Estadísticas.\n")
   print(df.describe())
   print ("\n\n")
   #Gráfica de caja y bigotes
   sns.set(style="whitegrid")
   fig , ax = plt.subplots(figsize=(14,7))
   ax = sns.boxplot(data=df)
   ax.set_title(organismo +' '+str(etiq)+" dataset "+str(dataset)+"__
→"+str(transf)+" "+str(comp))
```

### efectores

Covarianza de auto cruzamiento (ACC) efectores fusarium\_oxysporum dataset 3, sin valores atípicos.

```
XΟ
                    Х1
                              Х2
                                        ХЗ
                                                  Х4
                                                            Х5
                                                                      X6 \
   -0.068279 -0.064832 -0.129218 -0.031865 -0.037906 0.045728 -0.019197
1
    0.082729 - 0.010446 \ 0.088468 \ 0.090486 \ 0.058365 \ 0.033042 - 0.062850
2
    0.018646 - 0.150613 \quad 0.077810 \quad 0.060207 \quad 0.005621 \quad 0.044534 - 0.020327
    0.011703 - 0.091254 0.049492 - 0.068715 - 0.033710 - 0.027945 - 0.009435
3
   -0.005527 -0.062334 0.030022 0.045908 0.018507 -0.041892 0.125287
995 -0.112615 0.031008 0.058008 0.066753 0.050346 -0.103660 0.050554
996 0.001451 -0.045537 -0.000740 -0.009778 -0.059500 0.011729 -0.000996
997 0.089102 0.104744 0.116950 0.114540 0.128826 0.091404 0.097111
998 0.026800 0.014432 0.063959 0.038476 -0.005332 0.020018 0.038805
999 0.089752 0.092060 0.055072 0.067811 0.007192 0.040600 0.113621
          Х7
                    Х8
                              Х9
                                       X10
                                                 X11
                                                           X12
                                                                      X13
0
    0.022370 -0.019135 0.087817 0.008303 0.052908 -0.016795 efectores
1
    0.016824 0.041118 -0.045535 -0.010931 -0.029313 0.057552 efectores
2
   -0.089690 -0.024951 0.045351 -0.020420 -0.043547 0.063616 efectores
   -0.069476 -0.003804 -0.001651 -0.012783 0.013338 -0.023804 efectores
   -0.062702 -0.004490 0.040809 0.020880 0.085647 -0.045636 efectores
. .
995 0.056688 -0.024686 -0.148477 -0.000850 0.010237 -0.075101 efectores
```

```
996 0.005557 -0.031282 0.009170 -0.055231 -0.022038 -0.022566 efectores

997 0.080449 0.139343 0.122175 0.112651 0.121416 0.115933 efectores

998 0.034999 -0.023856 0.007450 -0.016533 0.045339 -0.020211 efectores

999 0.046654 0.063684 0.024944 -0.013439 -0.043936 0.027612 efectores
```

[922 rows x 14 columns]

Covarianza de auto cruzamiento (ACC) efectores fusarium\_oxysporum dataset 3,  $\sin$  valores atípicos.

Estadísticas.

	XO	X1	Х2	ХЗ	Х4	Х5	\
count	922.000000	922.000000	922.000000	922.000000	922.000000	922.000000	
mean	0.010691	-0.020735	0.025686	0.027757	-0.003672	-0.002053	
std	0.059965	0.063861	0.056585	0.057226	0.056601	0.056842	
min	-0.167053	-0.206008	-0.155620	-0.163420	-0.186708	-0.194353	
25%	-0.029252	-0.060059	-0.010133	-0.007781	-0.038613	-0.036030	
50%	0.007957	-0.021693	0.026824	0.029545	-0.004383	-0.002243	
75%	0.049144	0.018099	0.063929	0.064007	0.030935	0.033877	
max	0.197987	0.195369	0.222087	0.196153	0.173382	0.187299	
	Х6	Х7	Х8	Х9	X10	X11	\
count	922.000000	922.000000	922.000000	922.000000	922.000000	922.000000	
mean	0.023865	0.014475	0.005167	0.009632	0.014297	0.006786	
std	0.056771	0.051685	0.053644	0.051274	0.048311	0.051950	
min	-0.166997	-0.166507	-0.169102	-0.158087	-0.156905	-0.176374	
25%	-0.009899	-0.016606	-0.028091	-0.024820	-0.016807	-0.027603	
50%	0.023169	0.013616	0.003138	0.009287	0.014452	0.006679	
75%	0.058233	0.046218	0.039908	0.042077	0.045121	0.039524	
max	0.188921	0.194179	0.169827	0.183113	0.175925	0.190653	
	X12						
count	922.000000						
mean	0.003958						
std	0.051572						
min	-0.163573						
25%	-0.027072						
50%	0.002795						
75%	0.038333						
max	0.171768						

### no\_efectores

Covarianza de auto cruzamiento (ACC) no\_efectores fusarium\_oxysporum dataset 3,  $\sin$  valores atípicos.

```
XΟ
                    Х1
                              Х2
                                       ХЗ
                                                 Х4
                                                           Х5
                                                                     X6 \
    0.037065 \ -0.037607 \ \ 0.017315 \ \ 0.048315 \ \ 0.012567 \ -0.003120 \ \ 0.117895
1
2
    0.036156 -0.125834 -0.121387 0.007845 0.066295 0.073209 -0.045575
    0.040532 0.007921 0.087314 0.048320 0.060518 0.050469 0.027279
3
4
   -0.125378 -0.104711 0.023996 0.021510 0.015422 0.005466
5
    0.004383 - 0.016233 \quad 0.054917 - 0.020247 - 0.022097 - 0.083243 - 0.007400
. .
995 -0.050237 -0.095571 0.153159 0.109246 -0.158970 0.036458 0.071922
996 0.008825 -0.066833 0.034382 0.040247 0.039644 -0.046200 -0.009022
997 0.031435 -0.090082 0.071759 0.042927 -0.044422 0.042274 0.015140
998 0.069085 0.012179 -0.035606 0.085599 0.008826 -0.009335 -0.015649
999 -0.024780 -0.122178 0.033751 0.040638 -0.078313 -0.033271 0.038098
          Х7
                    Х8
                              Х9
                                       X10
                                                 X11
                                                          X12
                                                                        X13
    0.097446 -0.089686 0.003335 0.080299 0.042653 0.038499 no_efectores
1
2
   -0.057456 -0.073176 0.011971 0.047158 -0.099967 -0.069332 no_efectores
    0.028038 -0.010534 0.005516 0.008964 -0.017945 0.046218 no_efectores
3
4
    0.002201 -0.027232 0.058083 -0.029549 -0.006432 -0.027933 no efectores
5
    0.063429 0.027096 -0.034839 -0.044568 0.041946 -0.074074 no efectores
995 -0.078091 0.013339 -0.034847 0.030664 -0.176916 -0.033166 no efectores
996 0.054069 -0.054607 -0.096885 0.020414 0.051737 0.025533 no efectores
997 -0.073715 0.046070 0.039889 0.041622 0.020308 0.020436 no_efectores
998 0.009804 -0.006456 0.051195 0.035110 0.001577 -0.009140 no_efectores
999 -0.000710 -0.051294 0.047889 -0.053591 -0.033193 -0.018163 no_efectores
```

[906 rows x 14 columns]

Covarianza de auto cruzamiento (ACC) no\_efectores fusarium\_oxysporum dataset 3, sin valores atípicos.
Estadísticas.

	XO	X1	Х2	ХЗ	Х4	Х5	\
count	906.000000	906.000000	906.000000	906.000000	906.000000	906.000000	
mean	0.006452	-0.021029	0.020924	0.024083	-0.006192	-0.002792	
std	0.063096	0.061252	0.055512	0.055911	0.058321	0.055185	
min	-0.207723	-0.235758	-0.175308	-0.152037	-0.202721	-0.173040	
25%	-0.032843	-0.060971	-0.015211	-0.012620	-0.043465	-0.040020	
50%	0.003715	-0.021808	0.024330	0.026442	-0.006232	-0.001060	
75%	0.046547	0.017345	0.058203	0.059446	0.031294	0.035500	
max	0.210172	0.189875	0.210594	0.215772	0.170079	0.173704	
	Х6	Х7	8X	Х9	X10	X11	\
count	906.000000	906.000000	906.000000	906.000000	906.000000	906.000000	
mean	0.017641	0.006216	-0.003223	0.008403	0.010835	0.004450	
std	0.052280	0.055840	0.053970	0.052503	0.050720	0.052863	

min	-0.181352	-0.194971	-0.177009	-0.161815	-0.161053	-0.176916
25%	-0.015511	-0.028349	-0.034878	-0.023089	-0.022072	-0.026367
50%	0.016751	0.006815	-0.000969	0.011085	0.011321	0.004192
75%	0.050983	0.039042	0.030425	0.041196	0.038990	0.036370
max	0.203865	0.194580	0.193713	0.200109	0.192424	0.188647

X12

count	906.000000
mean	0.002279
std	0.050561
min	-0.168456
25%	-0.027309
50%	0.001345
75%	0.033696
max	0.168960

