Projet sensométrie

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1 Déclaration de répertoire de travail et Importation du ficher tableau

```
setwd("D:/Projet4/Partie_R")
getwd()

library(readxl)
tableau=read_xlsx("reponses_JPO-rempli-centre_revisé.xlsx", sheet=5)
inid=read_xlsx("reponses_JPO-rempli-centre_revisé.xlsx", sheet=4)
attach(tableau)
attach(inid)

# Petite parenthése

decoupe_age = cut(tableau$age,breaks=c(0,30,56),labels = c("moins âgé","plus âgés"))
tableau_modif = cbind(tableau,decoupe_age)
table(decoupe_age)

# Recodage de la variable CSP
tableau$CSP[tableau$CSP == "agriculteur"] <- "non etudiant"
tableau$CSP[tableau$CSP == "autre"] <- "non etudiant"
tableau$CSP[tableau$CSP == "cadre"] <- "non etudiant"
tableau$CSP[tableau$CSP == "employe"] <- "non etudiant"
table(tableau$CSP)

#write.table(tableau_modif,file = "D:/Projet4/Partie_R/ficher.csv")
```

2 Test de normalité sur toutes les variables

```
# Creation de fonction de test de normalité

## Hypothéses

# H0: il y'a normalité
# H1: pas de normalité

## Régle de décision

# Rejet de H0 <-> p.value < 5% ou 1%
#Acceptation de H0 <-> p.value > 5% ou 1%

montest_norm<-function(A){

test_1 = shapiro.test(A)$p.value
test_2 = ks.test(A,"pnorm")$p.value
```

```
  resum = cbind(test_1,test_2,test_1,test_2)


return(resum)

}
```

Excécution de la fonction

```
## La variable âge

var_age = montest_norm(tableau$age)

rownames(var_age)[nrow(var_age)]="âge"

## La variable Vintensite
Vint = montest_norm(Vintensite)

rownames(Vint)[nrow(Vint)]="Vintensite"

## La variable Vcompact

Vcomp = montest_norm(Vcompact)

rownames(Vcomp)[nrow(Vcomp)]="Vcompact"

## La variable Vtexture

Vtext = montest_norm(Vtexture)

rownames(Vtext)[nrow(Vtext)]="Vtexture"

## La variable Vtons

Vtons = montest_norm(tableau$Vtons)

rownames(Vtons)[nrow(Vtons)]="Vtons"

## La variable Vbrillance

Vbril = montest_norm(Vbrillance)

rownames(Vbril)[nrow(Vbril)]="Vbrillance"

## La variable Vattirance

Vatt = montest_norm(Vattirance)

rownames(Vatt)[nrow(Vatt)]="Vattirance"

## La variable Ofruit

Ofruit = montest_norm(tableau$Ofruit)

rownames(Ofruit)[nrow(Ofruit)]="Ofruit"

## La variable Oamer
```

```r
Oamer = montest_norm(tableau$Oamer)
rownames(Oamer)[nrow(Oamer)]="Oamer"

## La variable Oepice

Oepice = montest_norm(tableau$Oepice)
rownames(Oepice)[nrow(Oepice)]="Oepice"

## La variable Ovegetale

Oveg = montest_norm(Ovegetale)
rownames(Oveg)[nrow(Oveg)]="Ovegetale"


## La variable Gdurete

Gdurete = montest_norm(tableau$Gdurete)
rownames(Gdurete)[nrow(Gdurete)]="Gdurete"

## La variable Gintense

Gintense = montest_norm(tableau$Gintense)
rownames(Gintense)[nrow(Gintense)]="Gintense"

## La variable Gvegetal

Gveg = montest_norm(Gvegetal)
rownames(Gveg)[nrow(Gveg)]="Gvegetal"

## La variable Giode

Giode = montest_norm(tableau$Giode)
rownames(Giode)[nrow(Giode)]="Giode"

## La variable Gsale

Gsale = montest_norm(tableau$Gsale)
rownames(Gsale)[nrow(Gsale)]="Gsale"

## La variable Gfruite

Gfruite = montest_norm(tableau$Gfruite)
rownames(Gfruite)[nrow(Gfruite)]="Gfruite"

## La variable Gepice

Gepice = montest_norm(tableau$Gepice)
```

```r
rownames(Gepice)[nrow(Gepice)]="Gepice"

## La variable Gsucre

Gsucre = montest_norm(tableau$Gsucre)

rownames(Gsucre)[nrow(Gsucre)]="Gsucre"

## La variable Gacide

Gacide = montest_norm(tableau$Gacide)

rownames(Gacide)[nrow(Gacide)]="Gacide"

## La variable Gamer

Gamer = montest_norm(tableau$Gamer)

rownames(Gamer)[nrow(Gamer)]="Gamer"

## La variable Fagreable

Fagre = montest_norm(Fagreable)

rownames(Fagre)[nrow(Fagre)]="Fagreable"

## La variable Fagreable

Fintens = montest_norm(Fintensite)

rownames(Fintens)[nrow(Fintens)]="Fintensite"

## La variable Fpersistance

Fpersist = montest_norm(Fpersistance)

rownames(Fpersist)[nrow(Fpersist)]="Fpersistance"

## La variable Fnote

Fnote = montest_norm(tableau$Fnote)

rownames(Fnote)[nrow(Fnote)]="Fnote"

## La variable Fharmonie

Fharmo = montest_norm(Fharmonie)

rownames(Fharmo)[nrow(Fharmo)]="Fharmonie"

## La variable Farome

Farome = montest_norm(tableau$Farome)

rownames(Farome)[nrow(Farome)]="Farome"

## Création d'un récapitulatif des tests
```

```
tableau_recap = rbind(var_age, Vint, Vcomp, Vtext, Vtons, Vbril, Vatt, Ofruit, Oamer, O
epice, Oveg, Gdurete, Gintense, Gveg, Giode, Gsale, Gfruite, Gepice, Gsucre, Gacide, Ga
mer, Fagre, Fintens, Fpersist, Fnote, Fharmo, Farome)
colnames(tableau_recap)=c("test1_seuil1","test2_seuil1","test1_seuil2","test2_seuil2")

library(knitr)
kable(tableau_recap)
```

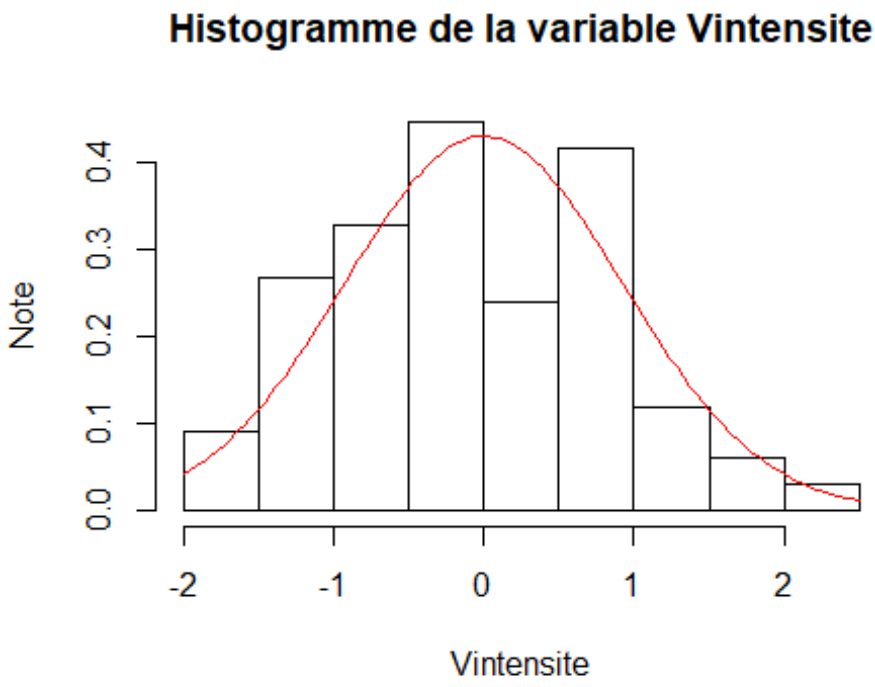
	test1_seuil1	test2_seuil1	test1_seuil2	test2_seuil2
âge	0.0000000	0.0000000	0.0000000	0.0000000
Vintensite	0.5529998	0.8056936	0.5529998	0.8056936
Vcompact	0.0167806	0.0182919	0.0167806	0.0182919
Vtexture	0.0213313	0.1573011	0.0213313	0.1573011
Vtons	0.1792710	0.1573011	0.1792710	0.1573011
Vbrillance	0.5982709	0.3635340	0.5982709	0.3635340
Vattirance	0.0465867	0.0366311	0.0465867	0.0366311
Ofruit	0.2129608	0.3364049	0.2129608	0.3364049
Oamer	0.0691517	0.3364049	0.0691517	0.3364049
Oepice	0.0915322	0.6199772	0.0915322	0.6199772
Ovegetale	0.1239082	0.1813051	0.1239082	0.1813051
Gdurete	0.0048602	0.0296859	0.0048602	0.0296859
Gintense	0.0048180	0.1666005	0.0048180	0.1666005
Gvegetal	0.0166196	0.1048569	0.0166196	0.1048569
Giode	0.0193038	0.0895842	0.0193038	0.0895842
Gsale	0.0004162	0.0023009	0.0004162	0.0023009
Gfruite	0.0135613	0.0159959	0.0135613	0.0159959
Gepice	0.0043877	0.0243141	0.0043877	0.0243141
Gsucre	0.0000021	0.0000096	0.0000021	0.0000096
Gacide	0.0808084	0.1519599	0.0808084	0.1519599
Gamer	0.2154469	0.2105516	0.2154469	0.2105516
Fagreable	0.0280508	0.1974827	0.0280508	0.1974827
Fintensite	0.0288554	0.0326751	0.0288554	0.0326751
Fpersistance	0.1081512	0.0569433	0.1081512	0.0569433
Fnote	0.0135102	0.0366311	0.0135102	0.0366311
Fharmonie	0.2798659	0.6993742	0.2798659	0.6993742
Farome	0.0624806	0.3364049	0.0624806	0.3364049

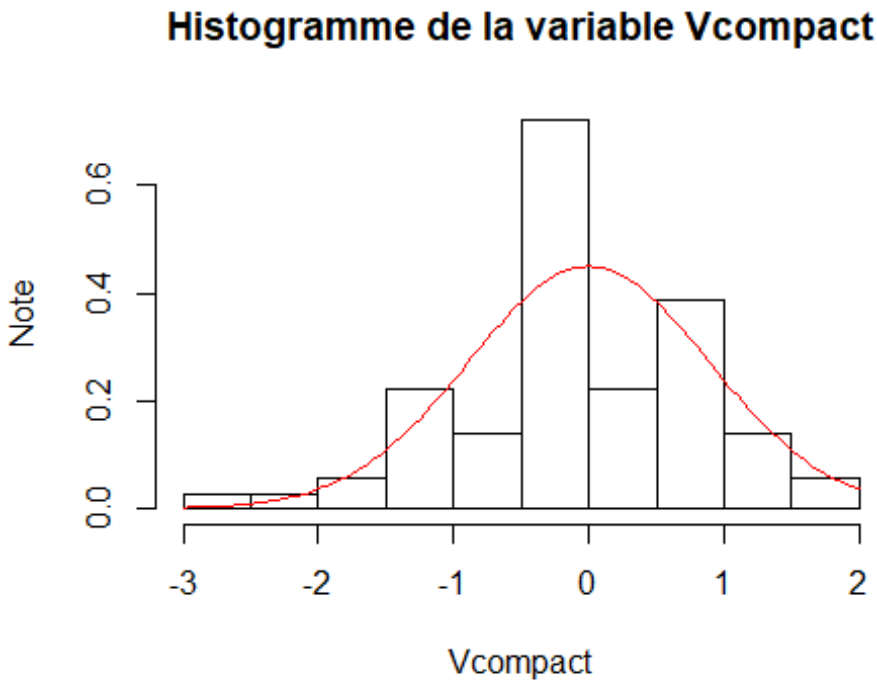
```
#write.table(tableau_recap,file = "D:/Projet4/Partie_R/Tab_normalité.txt")
```

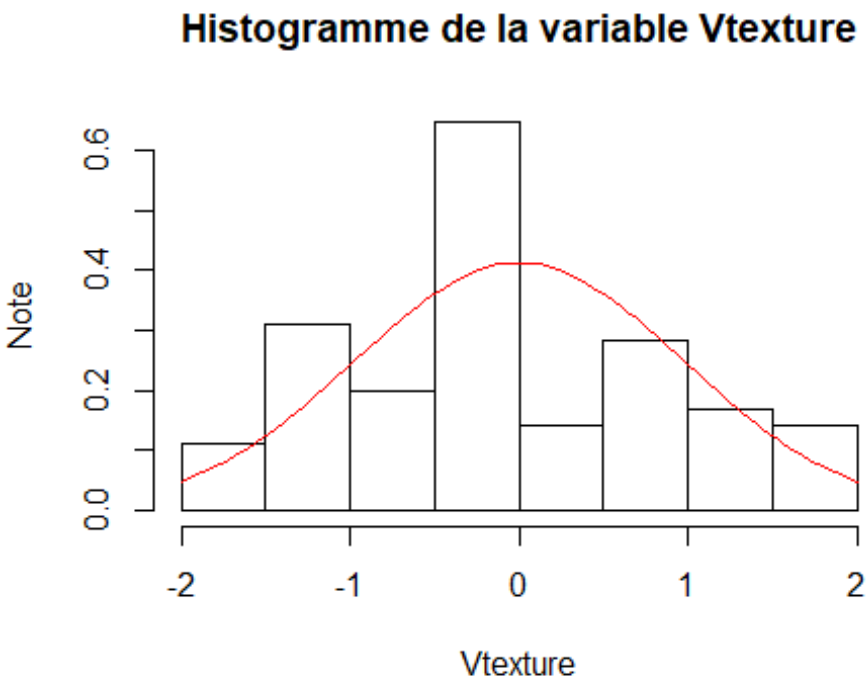
2.1 Partie graphique de la normalité

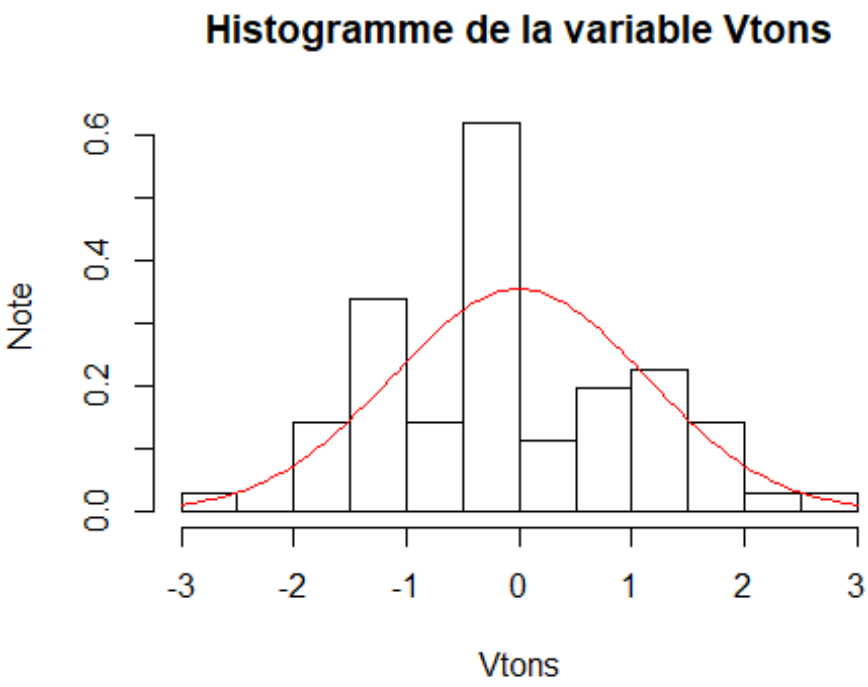
```
require(qqplotr)


# Histogramme
```

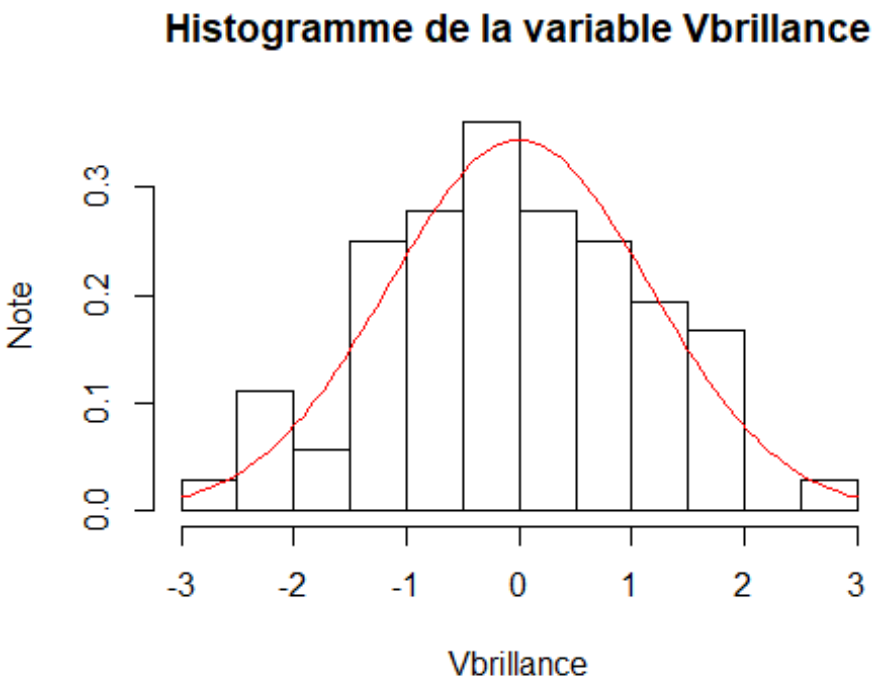
```
for(i in 12:37){
  #X11()
   hist(tableau[[i]], freq = FALSE,main =paste("Histogramme de la variable",colnames(ta
bleau[,i])),xlab=colnames(tableau[,i]),ylab="Note")

  curve(dnorm(x, mean=mean(tableau[[i]],na.rm = TRUE), sd=sd(tableau[[i]],na.rm = TRUE)
), add=TRUE,col="red")

}
```

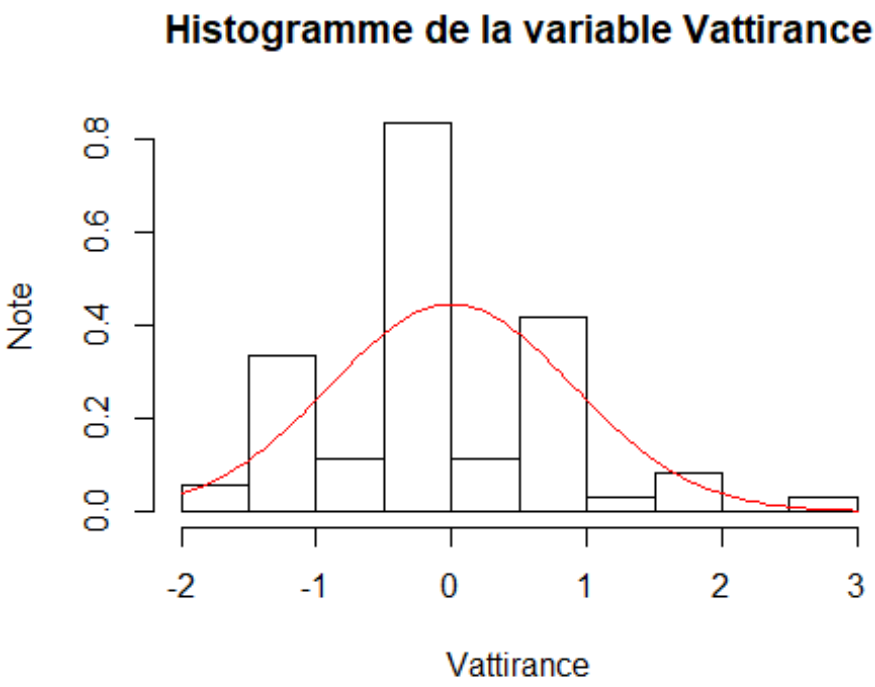


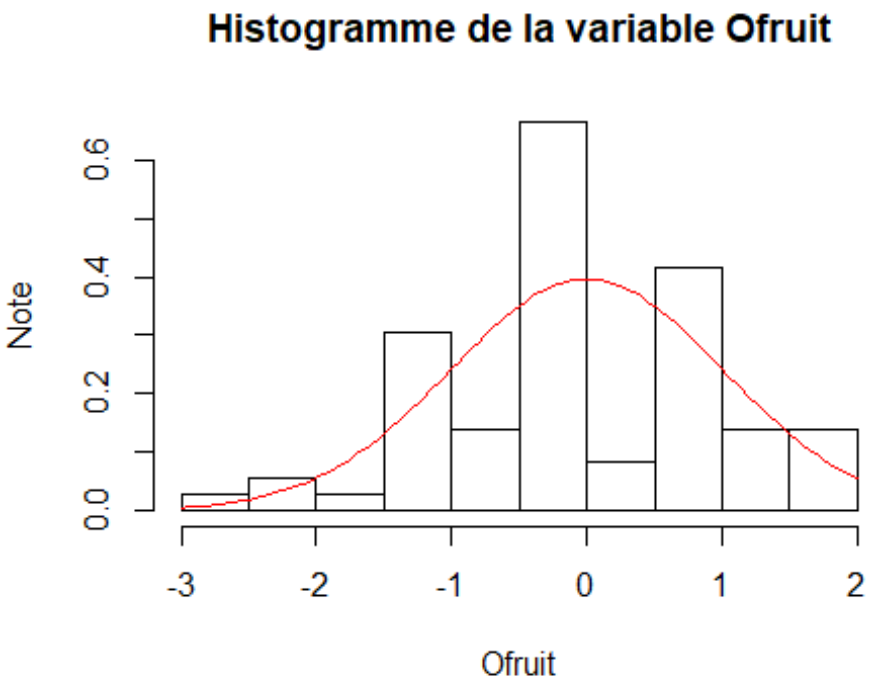


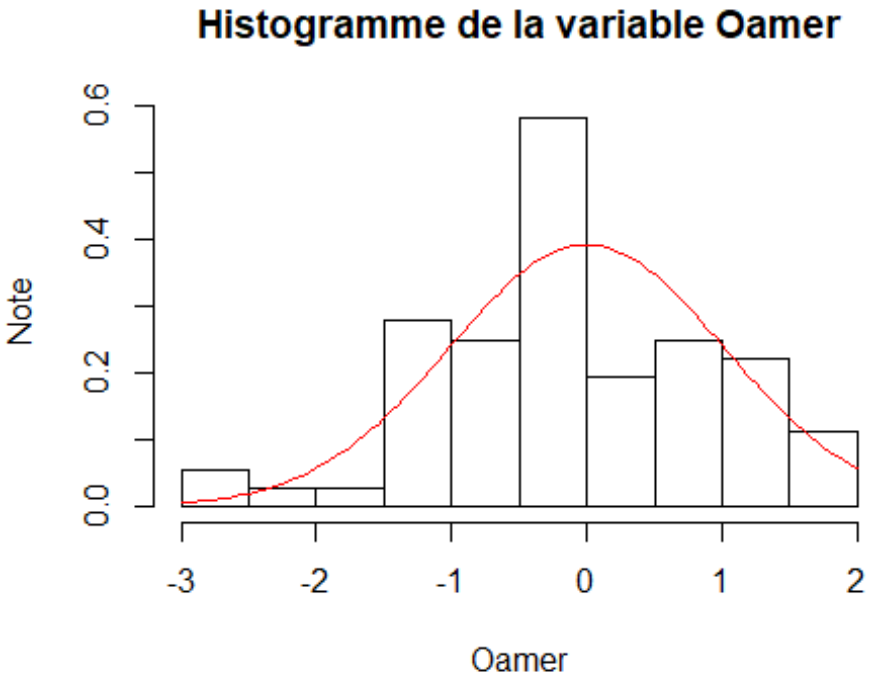

Histogramme de la variable Vtexture
Note
0.0
0.2
0.4
0.6
-2
-1
0
1
2
Vtexture

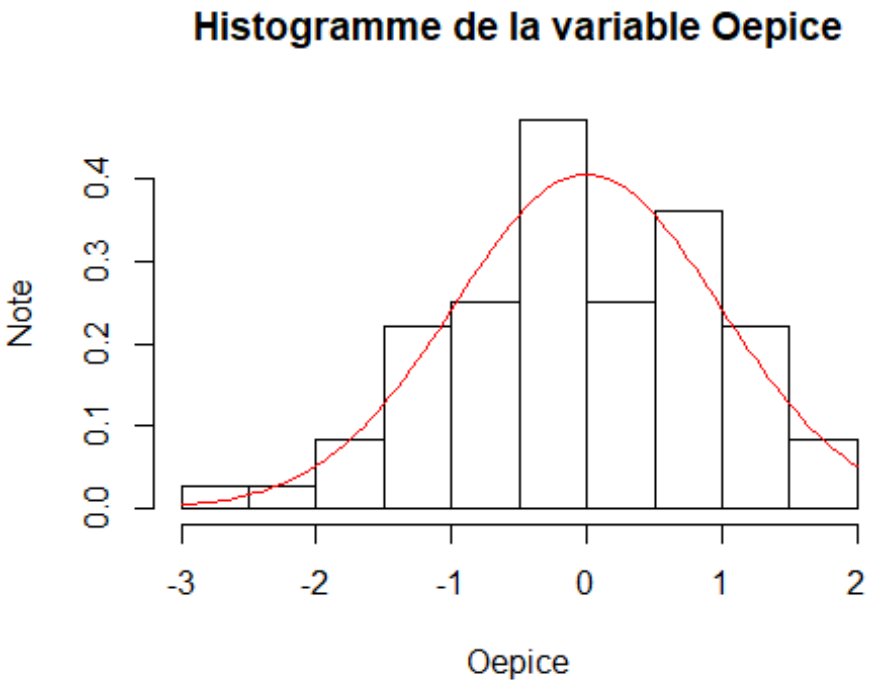

Histogramme de la variable Vtons
Note
0.0
0.2
0.4
0.6
-3
-2
-1
0
1
2
3
Vtons

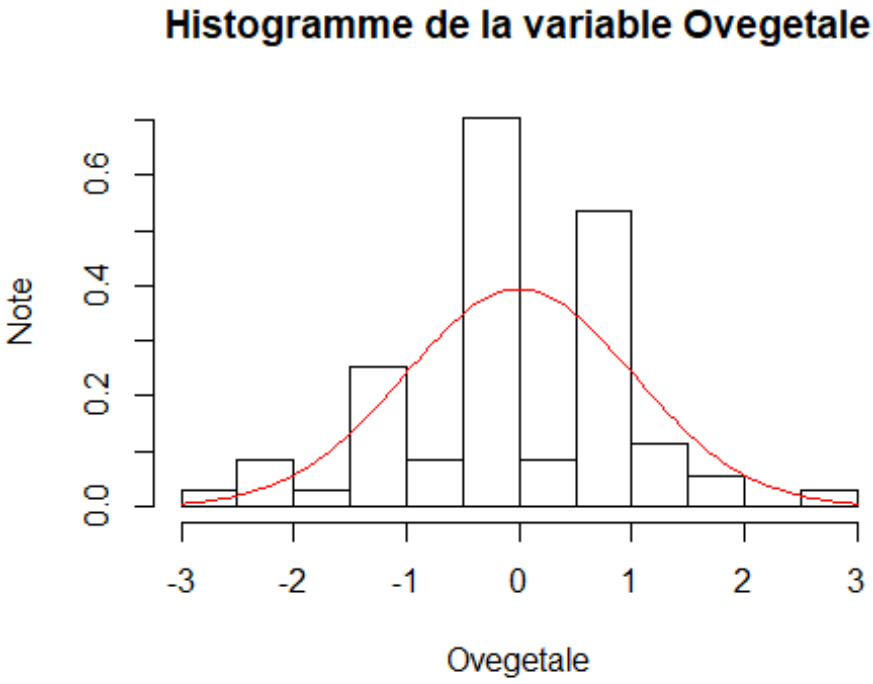

Histogramme de la variable Vbrillance
Note
0.0
0.1
0.2
0.3
-3
-2
-1
0
1
2
3
Vbrillance

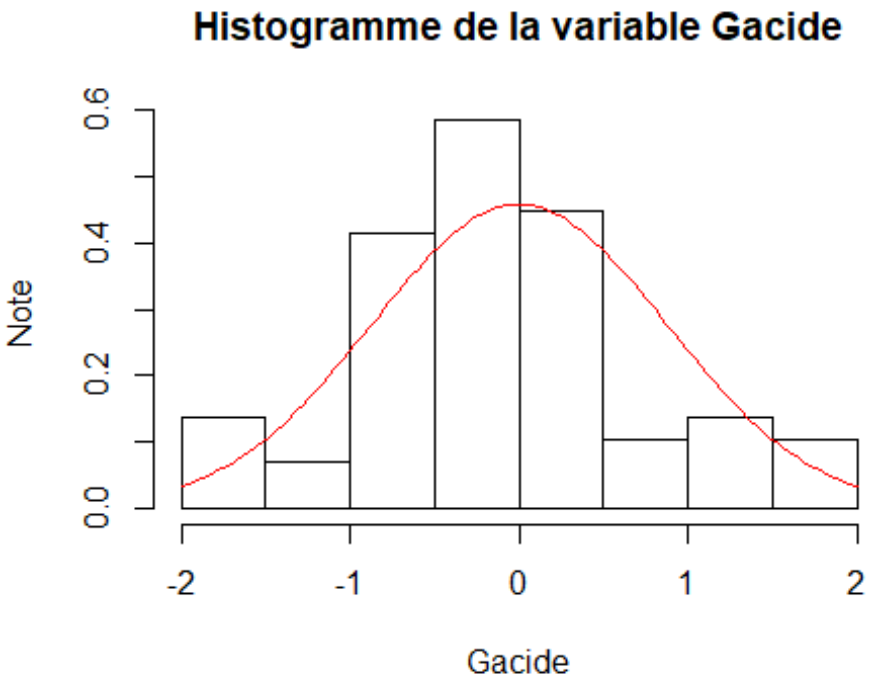

Histogramme de la variable Vattirance
Note
0.0
0.2
0.4
0.6
0.8
-2
-1
0
1
2
3
Vattirance

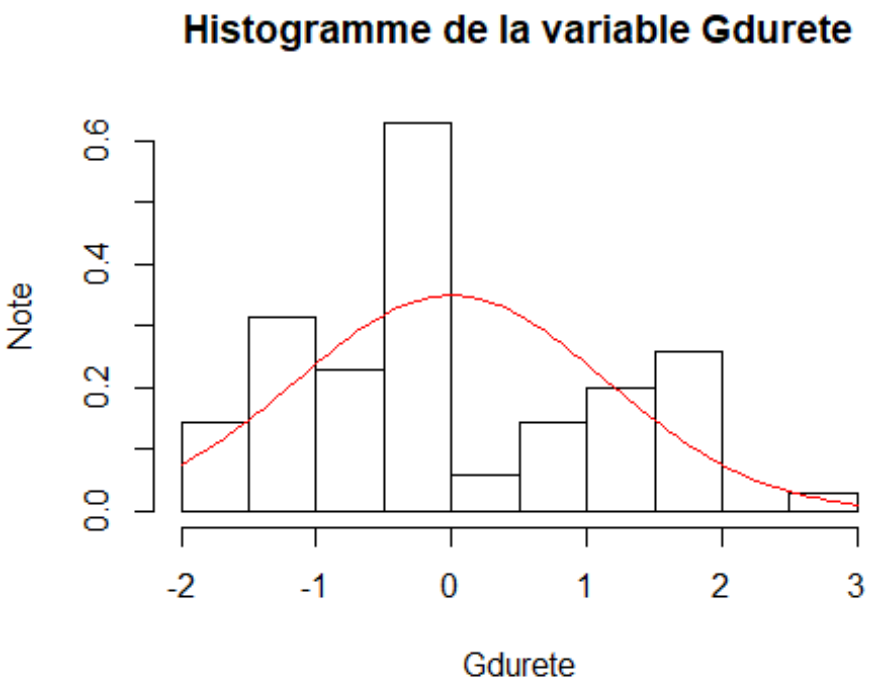

Histogramme de la variable Ofruit
Note
0.0
0.2
0.4
0.6
-3
-2
-1
0
1
2
Ofruit

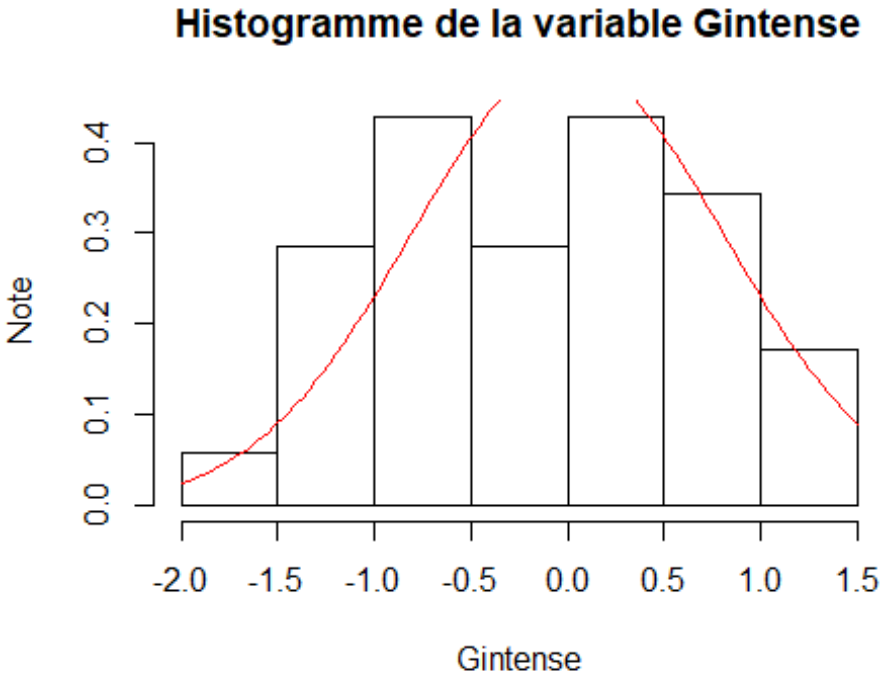

Histogramme de la variable Oamer
Note
0.0
0.2
0.4
0.6
-3
-2
-1
0
1
2
Oamer

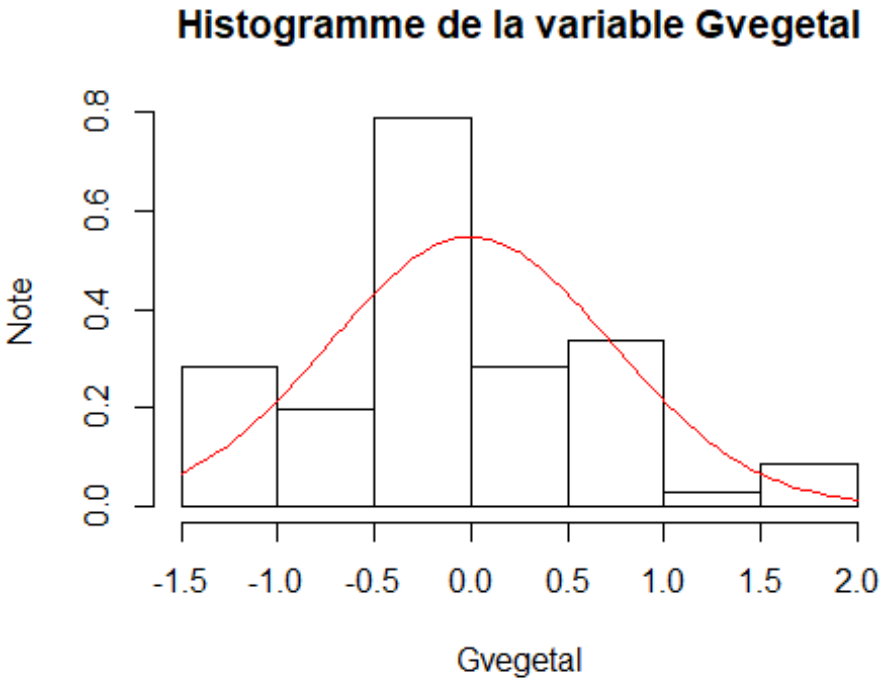

Histogramme de la variable Oepice
Note
0.0
0.1
0.2
0.3
0.4
-3
-2
-1
0
1
2
Oepice

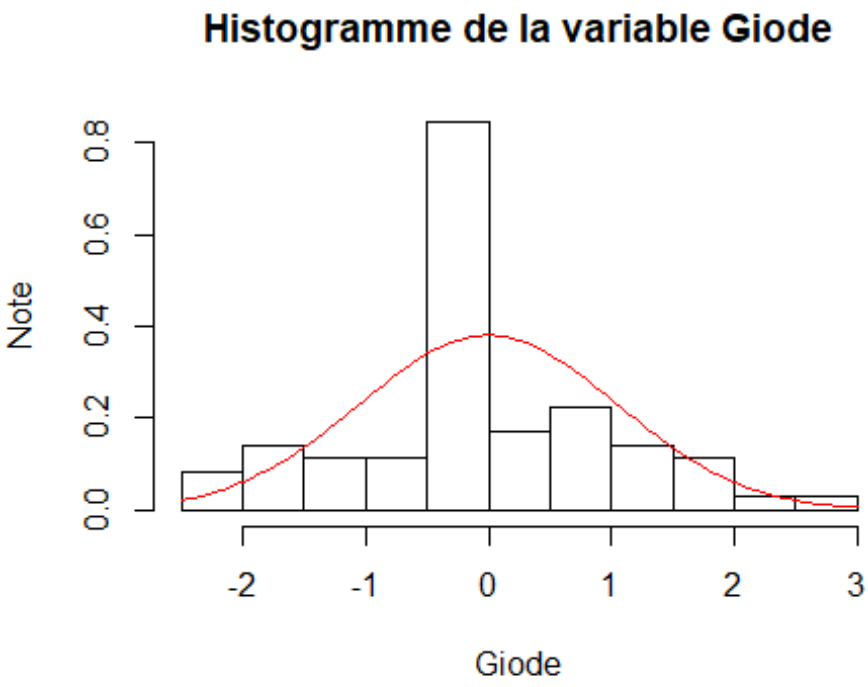

Histogramme de la variable Ovegetale
Note
0.0
0.2
0.4
0.6
-3
-2
-1
0
1
2
3
Ovegetale

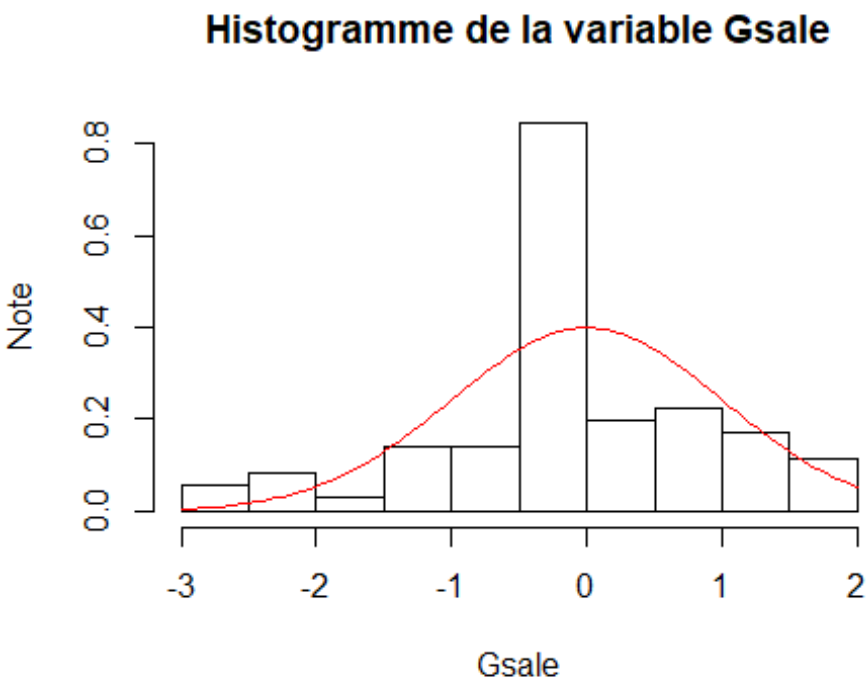

Histogramme de la variable Gacide
Note
0.0
0.2
0.4
0.6
-2
-1
0
1
2
Gacide

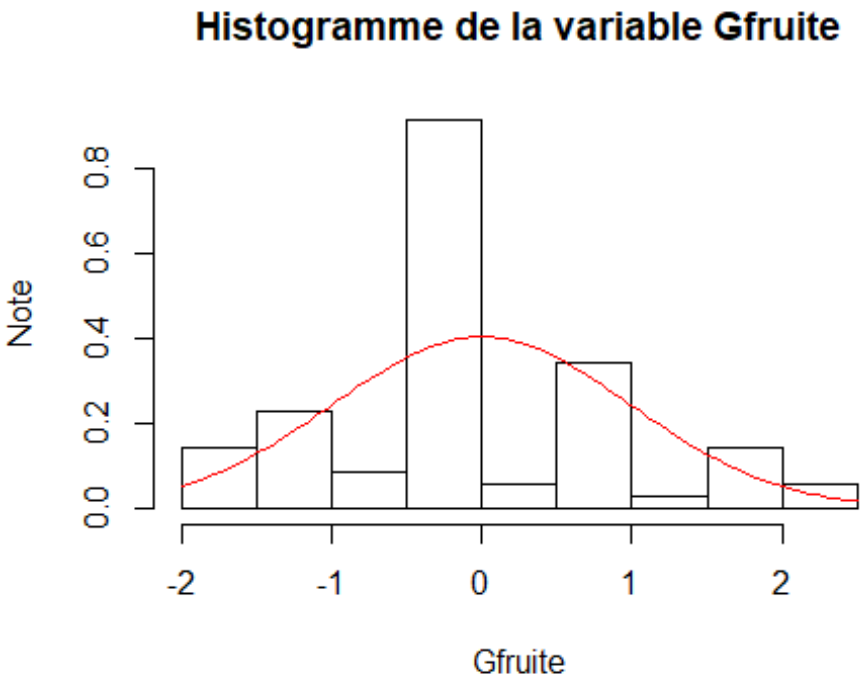

Histogramme de la variable Gdurete
Note
0.0
0.2
0.4
0.6
-2
-1
0
1
2
3
Gdurete

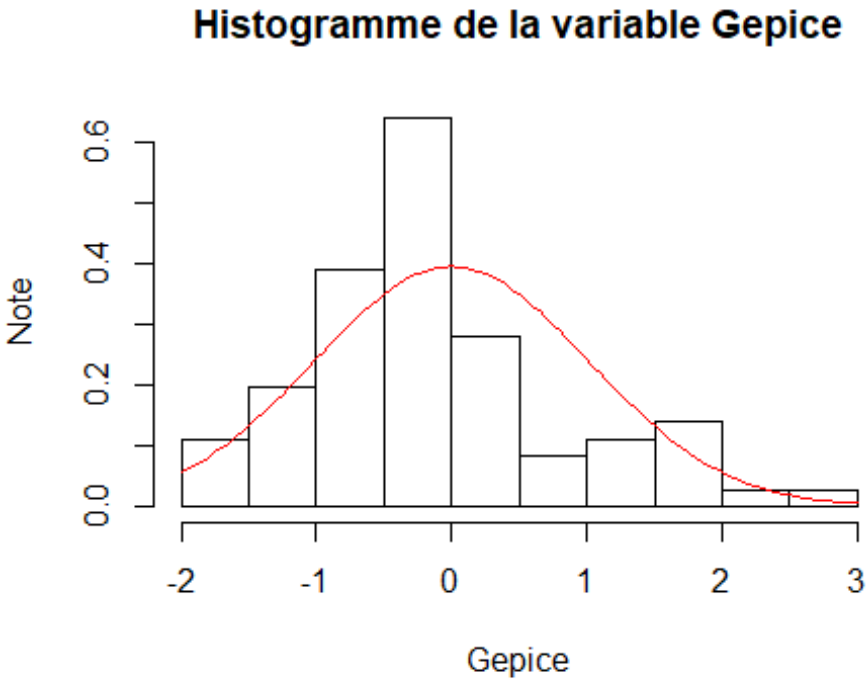

Histogramme de la variable Gintense
Note
0.0
0.1
0.2
0.3
0.4
-2.0
-1.5
-1.0
-0.5
0.0
0.5
1.0
1.5
Gintense

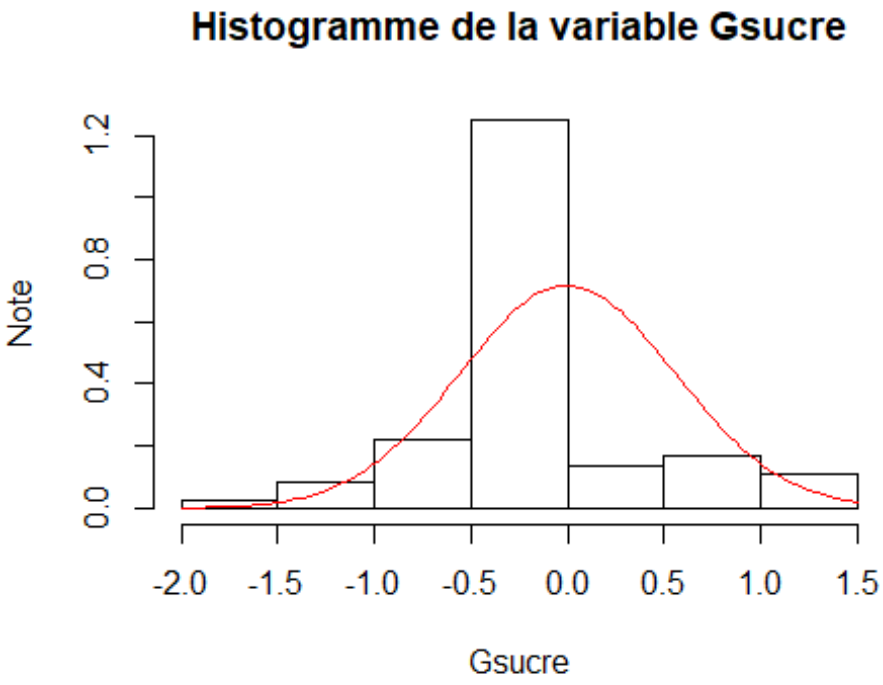

Histogramme de la variable Gvegetal
Note
0.0
0.2
0.4
0.6
0.8
-1.5
-1.0
-0.5
0.0
0.5
1.0
1.5
2.0
Gvegetal

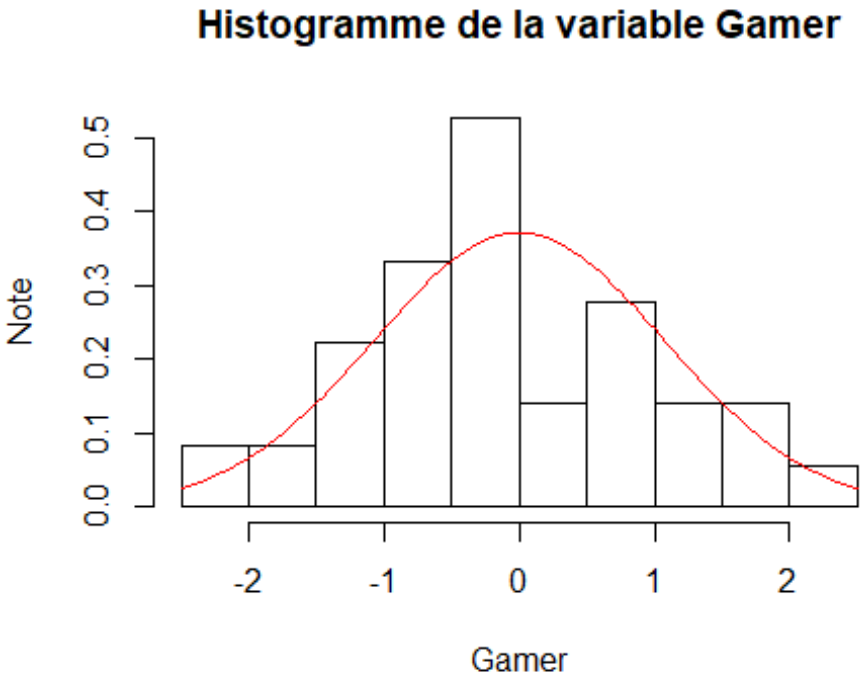

Histogramme de la variable Giode
Note
0.0
0.2
0.4
0.6
0.8
-2
-1
0
1
2
3
Giode

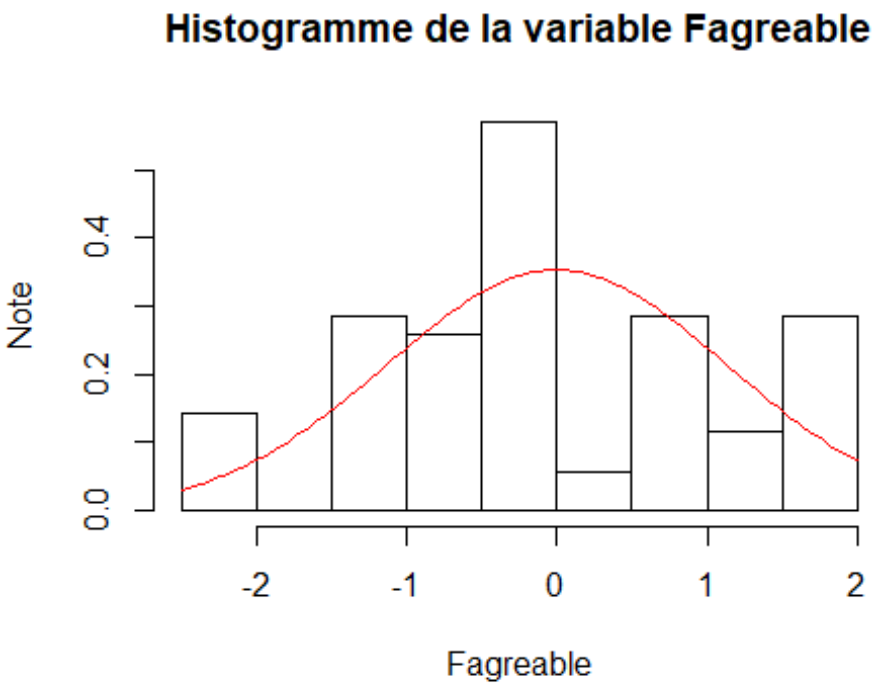

Histogramme de la variable Gsale
Note
0.0
0.2
0.4
0.6
0.8
-3
-2
-1
0
1
2
Gsale

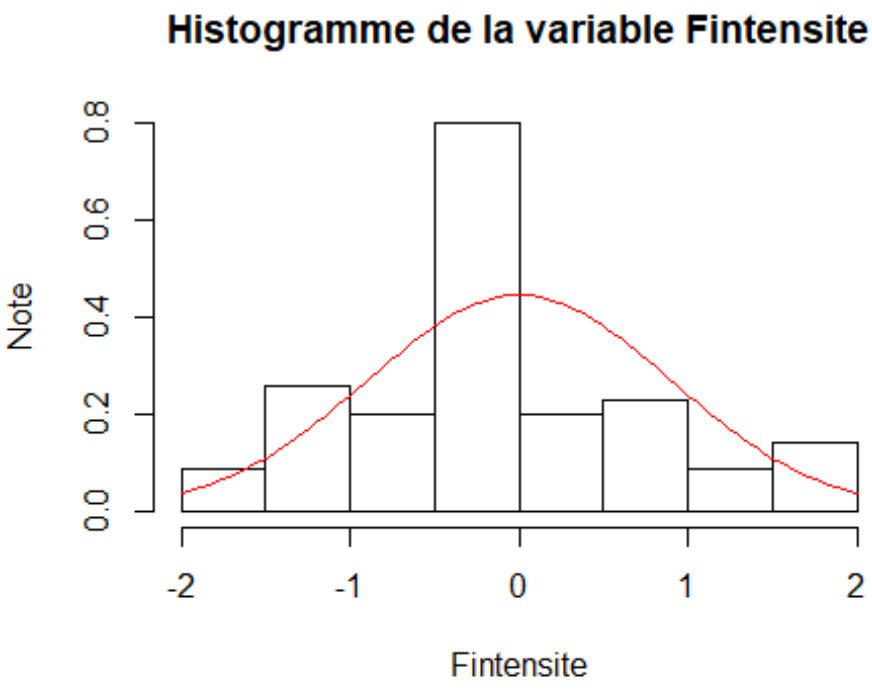

Histogramme de la variable Gfruite
Note
0.0
0.2
0.4
0.6
0.8
-2
-1
0
1
2
Gfruite

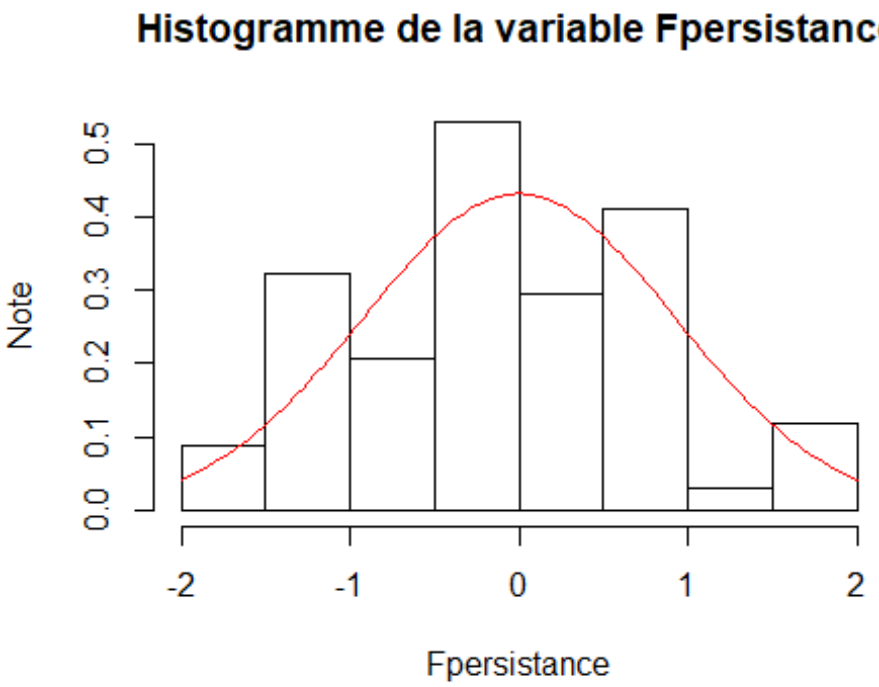

Histogramme de la variable Gepice
Note
0.0
0.2
0.4
0.6
-2
-1
0
1
2
3
Gepice

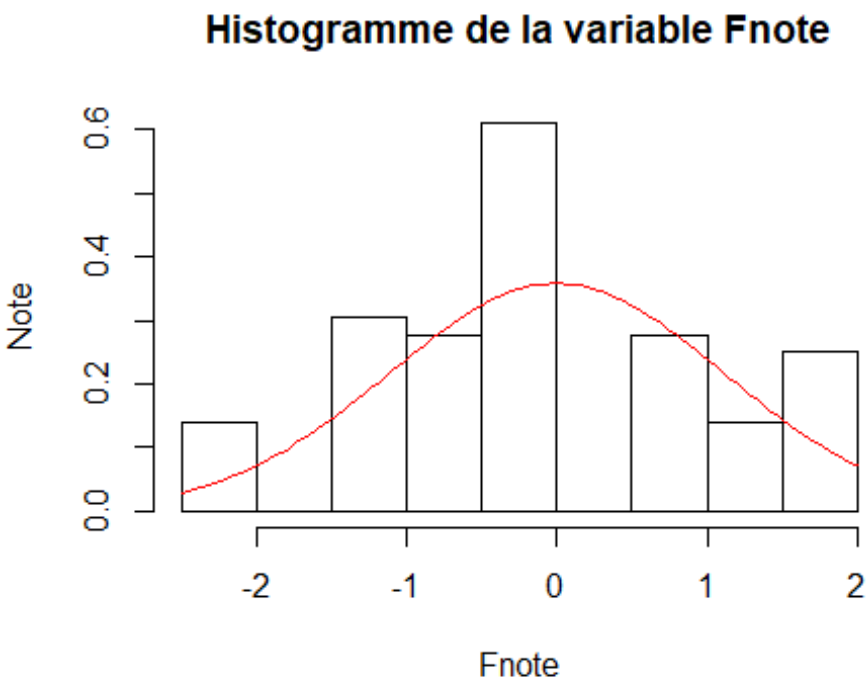

Histogramme de la variable Gsucre
Note
0.0
0.4
0.8
1.2
-2.0
-1.5
-1.0
-0.5
0.0
0.5
1.0
1.5
Gsucre

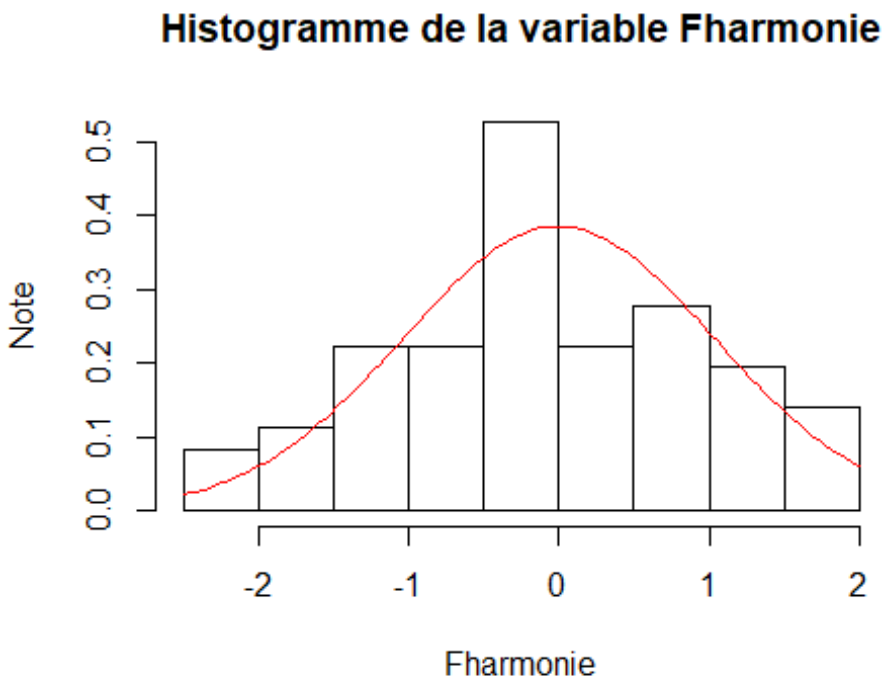

Histogramme de la variable Gamer
Note
0.0
0.1
0.2
0.3
0.4
0.5
-2
-1
0
1
2
Gamer

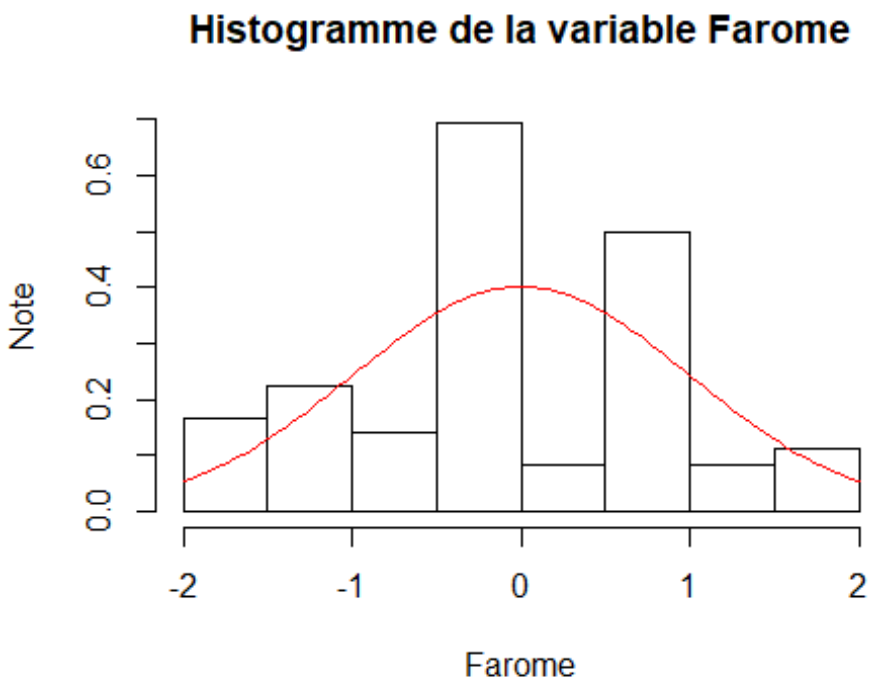

Histogramme de la variable Fagreable
Note
0.0
0.2
0.4
-2
-1
0
1
2
Fagreable


Histogramme de la variable Fintensite
Note
0.0
0.2
0.4
0.6
0.8
-2
-1
0
1
2
Fintensite

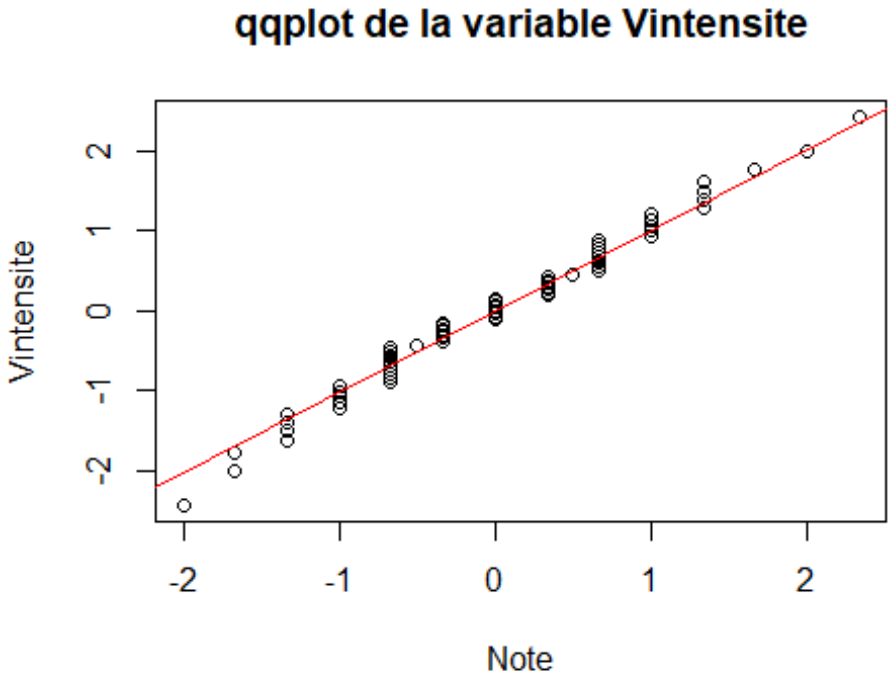

Histogramme de la variable Fpersistance
Note
0.0
0.1
0.2
0.3
0.4
0.5
-2
-1
0
1
2
Fpersistance

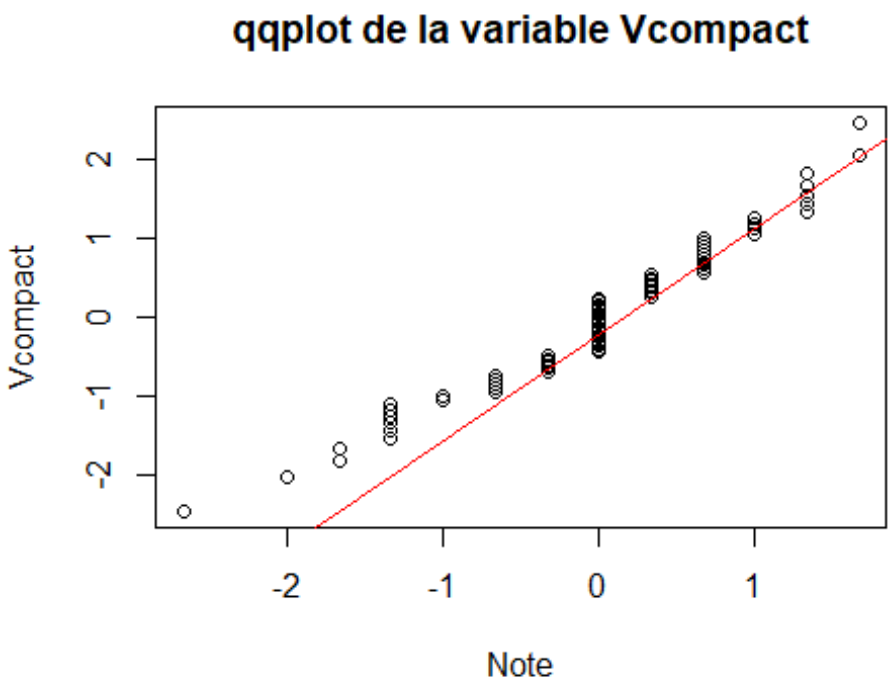

Histogramme de la variable Fnote
Note
0.0
0.2
0.4
0.6
-2
-1
0
1
2
Fnote

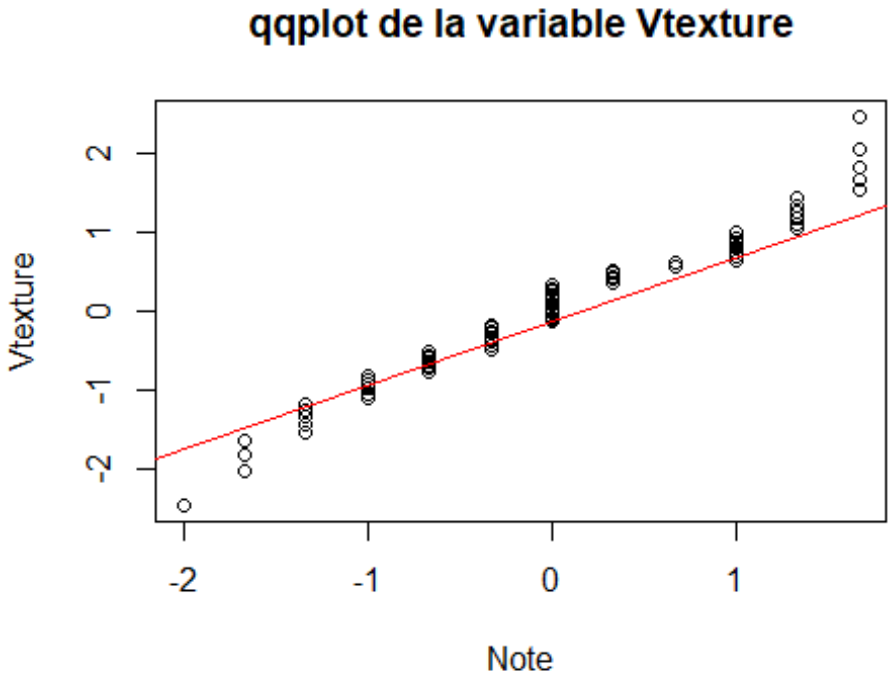


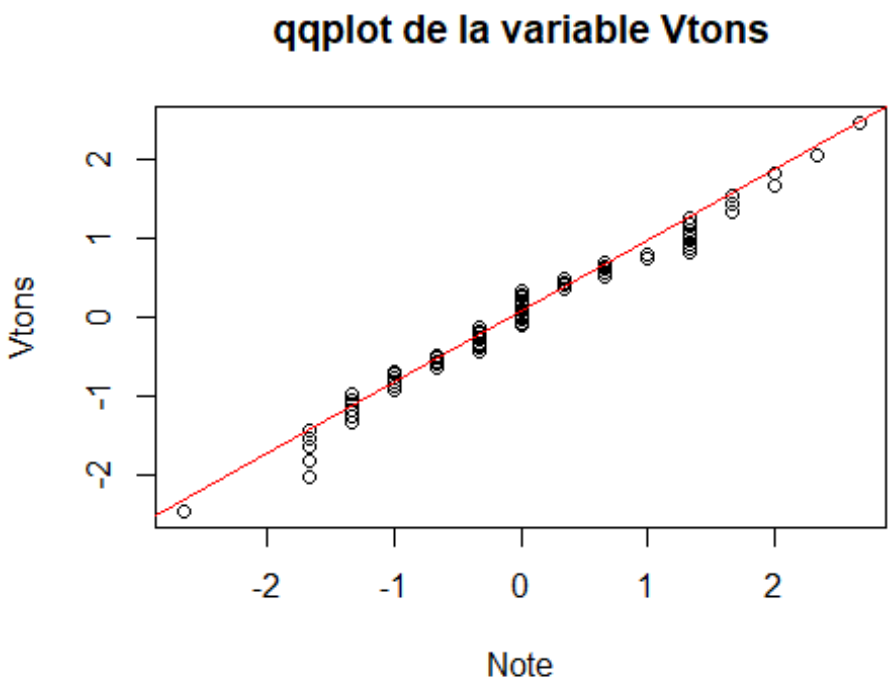


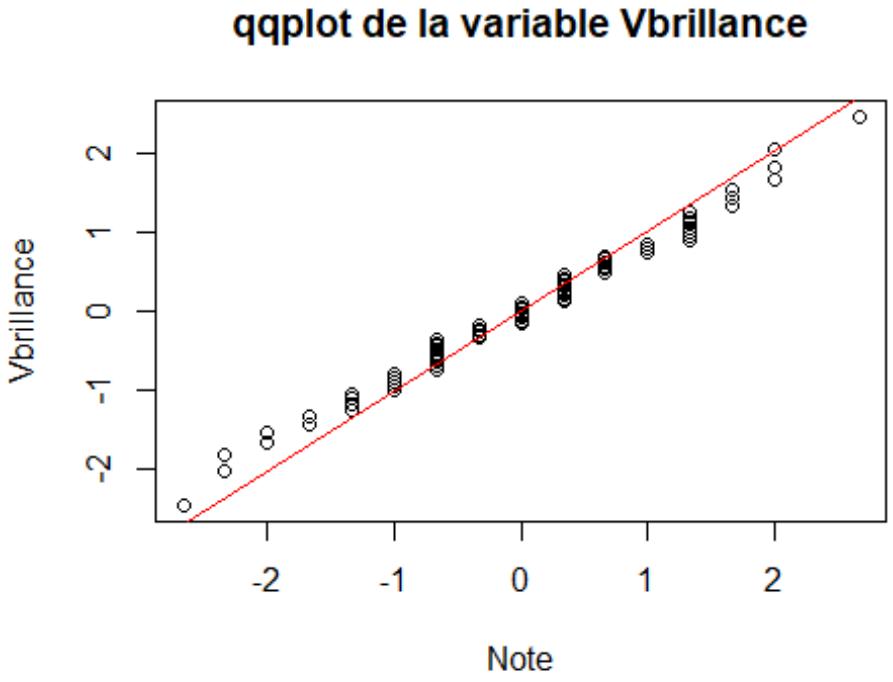

```
# QQplot


for(i in 12:37){
   qqnorm(tableau[[i]], datax=TRUE,main =paste("qqplot de la variable",colnames(tableau
[,i])),xlab=colnames(tableau[,i]),ylab="Note")
  qqline(tableau[[i]],datax=TRUE,col="red")

}
```

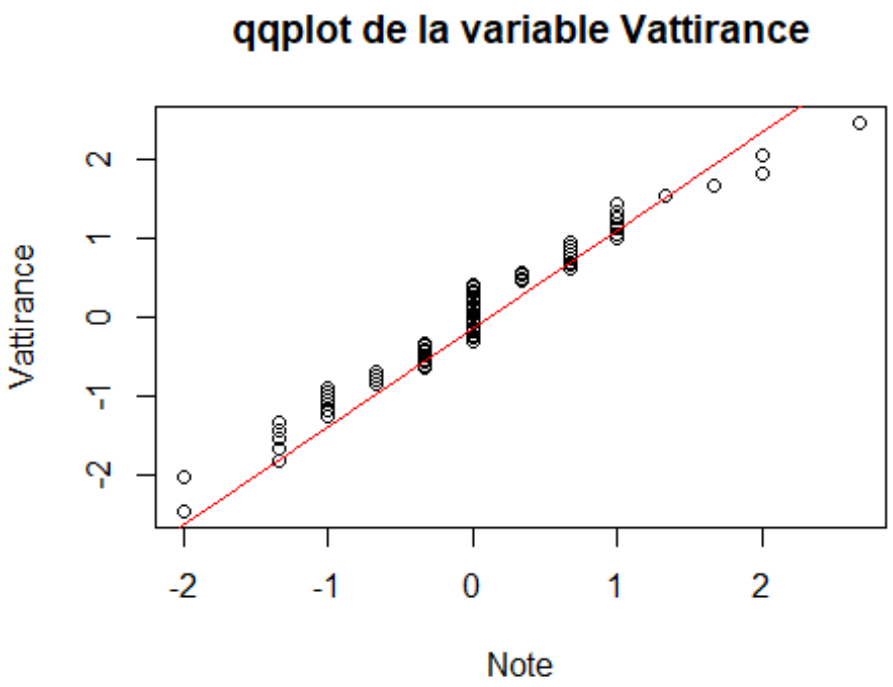

qqplot de la variable Vintensite
Vintensite
Note
-2
-1
0
1
2

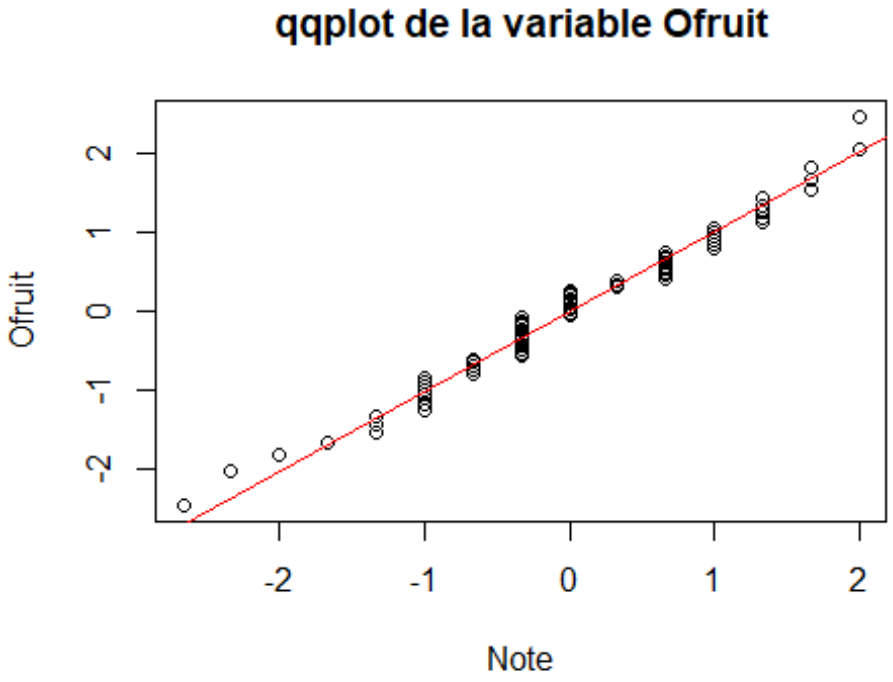

qqplot de la variable Vcompact
Vcompact
Note
-2
-1
0
1
2

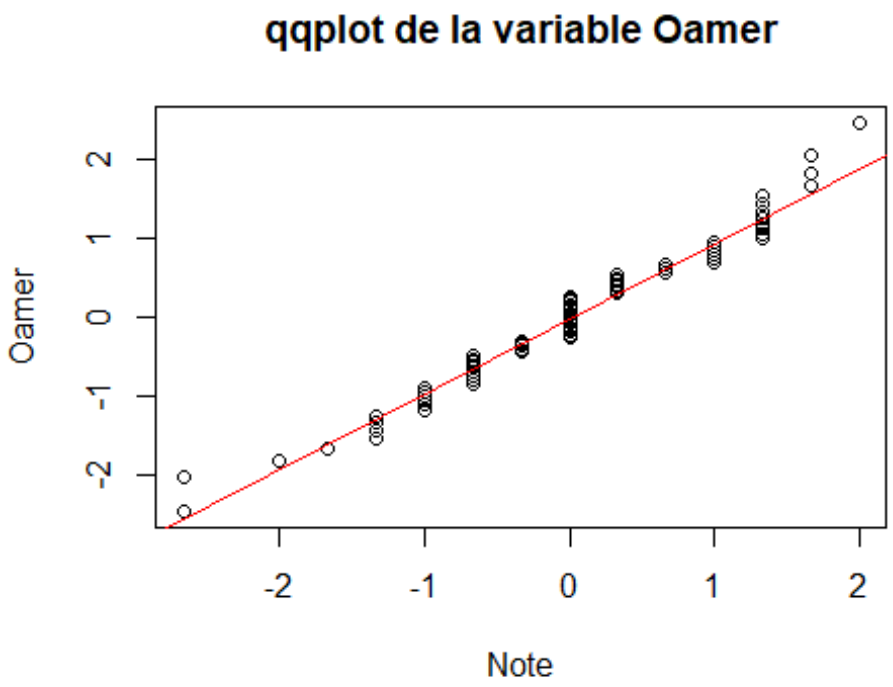

qqplot de la variable Vtexture
Vtexture
Note
-2
-1
0
1
2

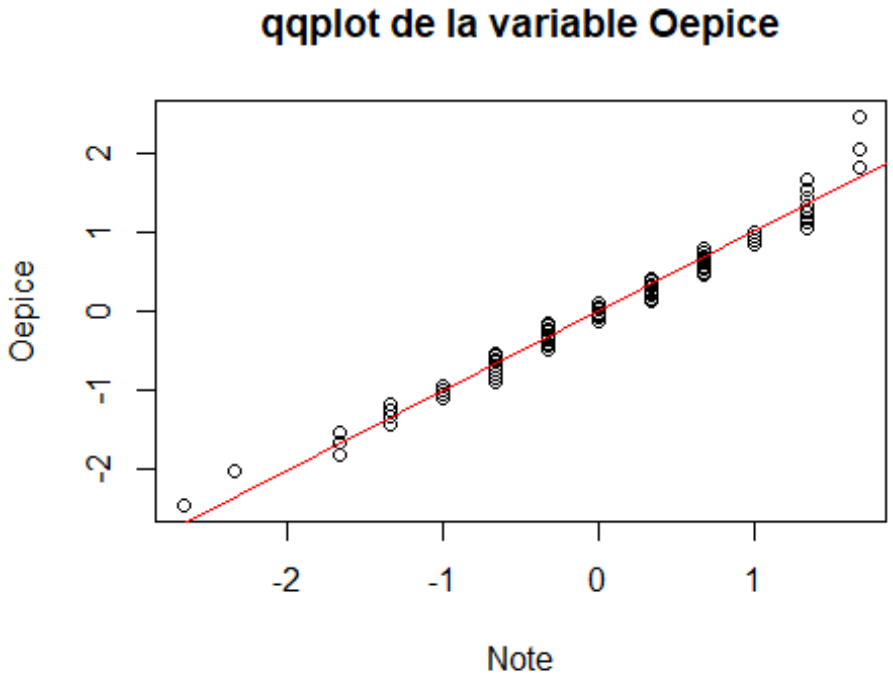

qqplot de la variable Vtons
Vtons
Note
-2
-1
0
1
2

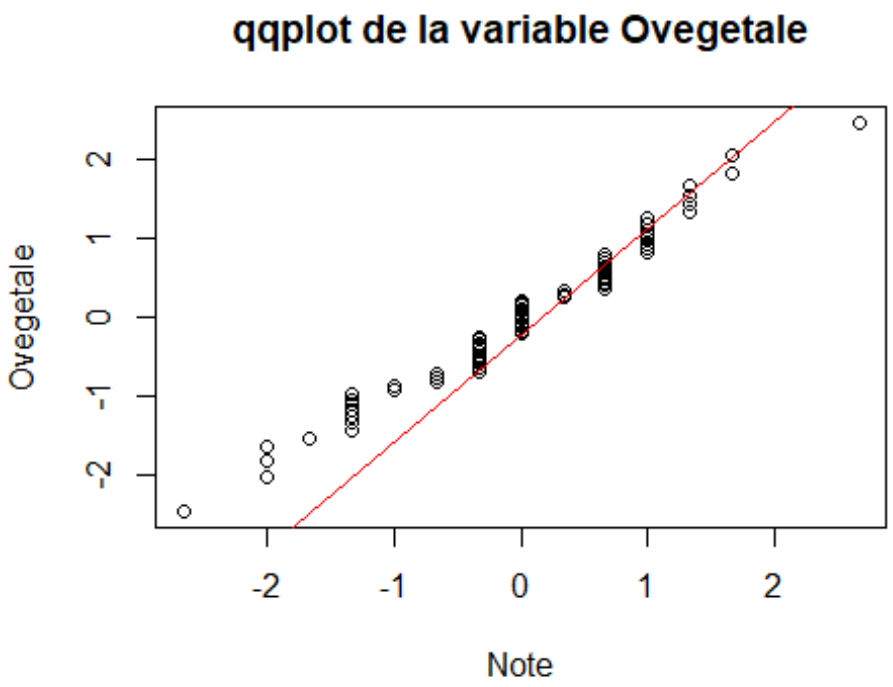

qqplot de la variable Vbrillance
Vbrillance
Note
-2
-1
0
1
2

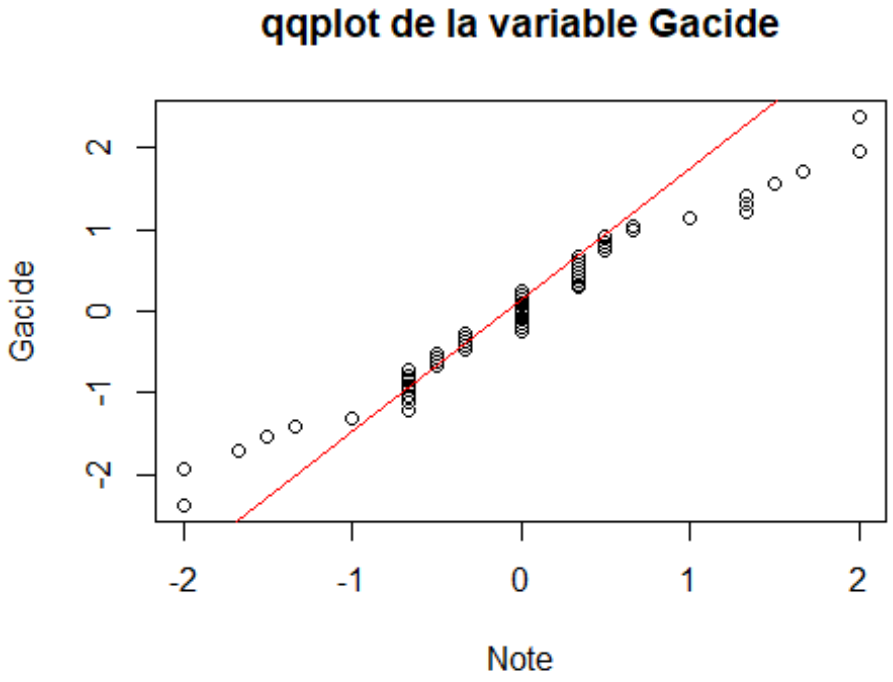

qqplot de la variable Vattirance
Vattirance
Note
-2
-1
0
1
2

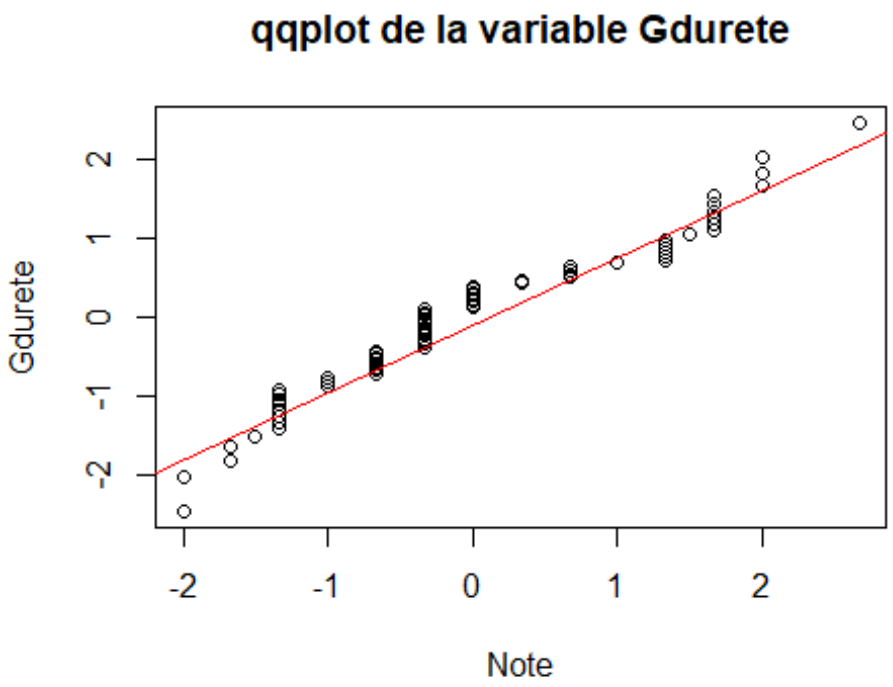

qqplot de la variable Ofruit
Ofruit
Note
-2
-1
0
1
2

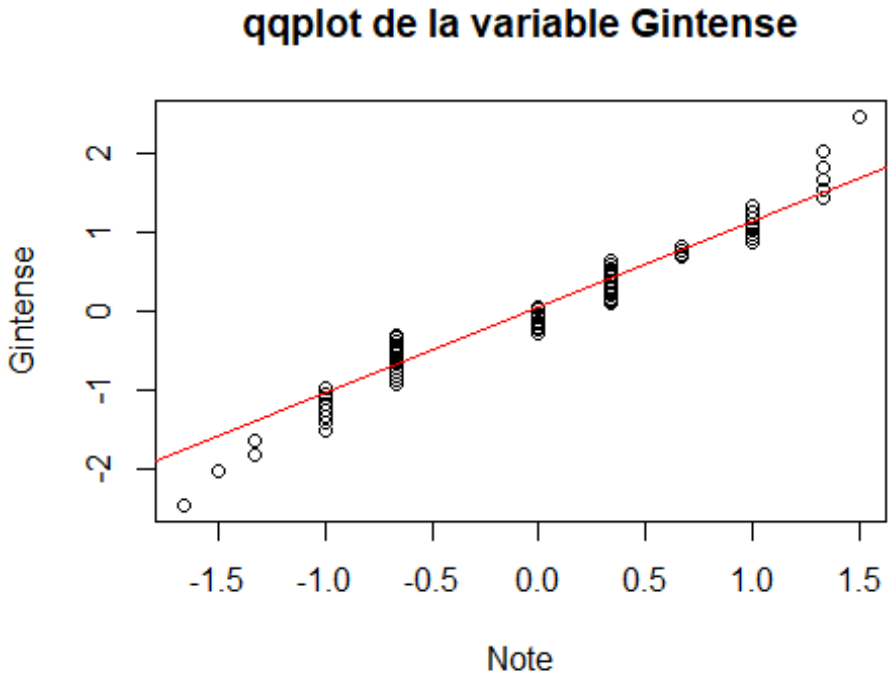

qqplot de la variable Oamer
Oamer
Note
-2
-1
0
1
2

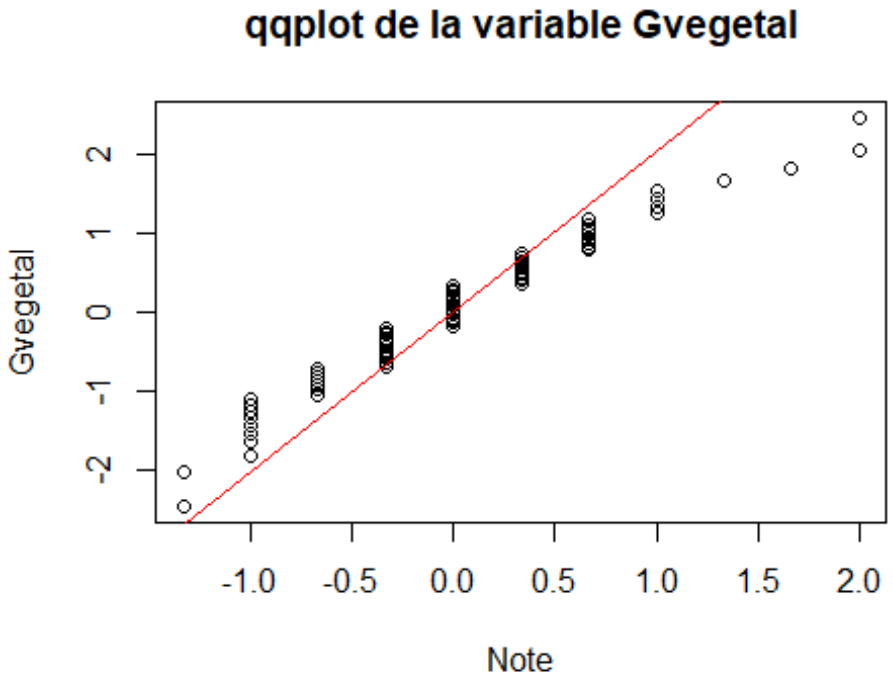

qqplot de la variable Oepice
Oepice
Note
-2
-1
0
1
2

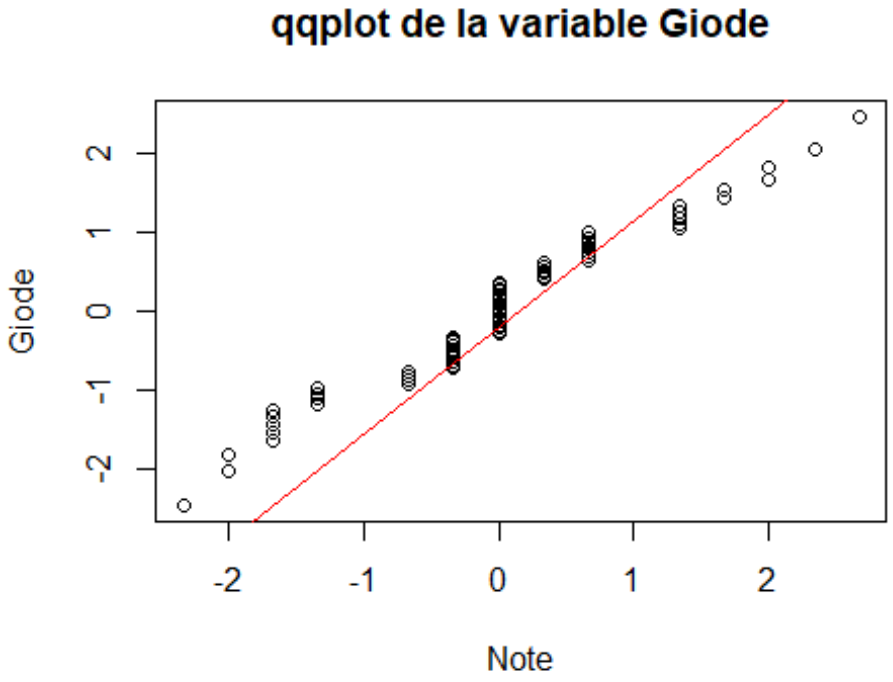

qqplot de la variable Ovegetale
Ovegetale
Note
-2
-1
0
1
2

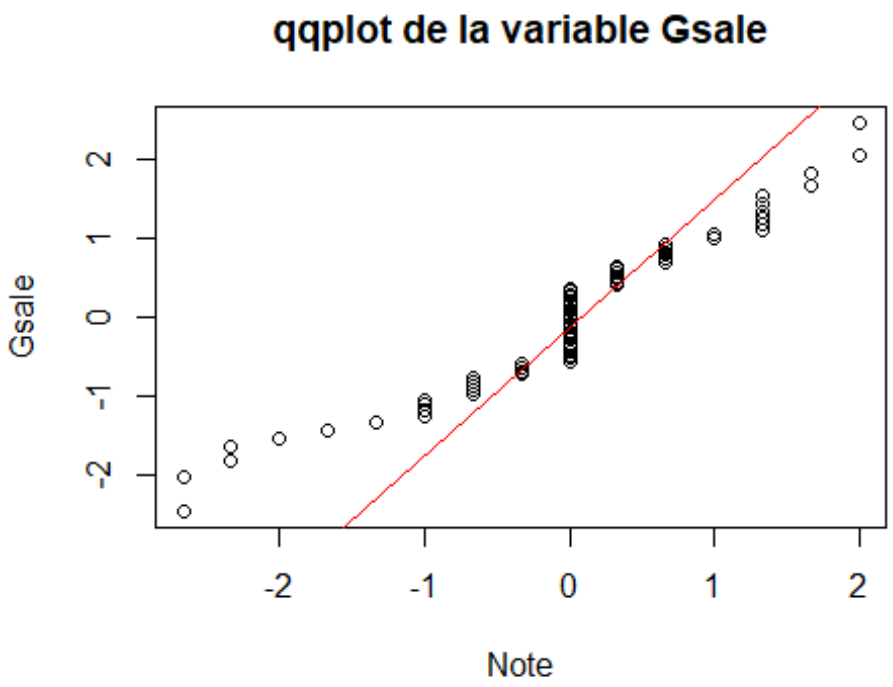

qqplot de la variable Gacide
Gacide
Note
-2
-1
0
1
2

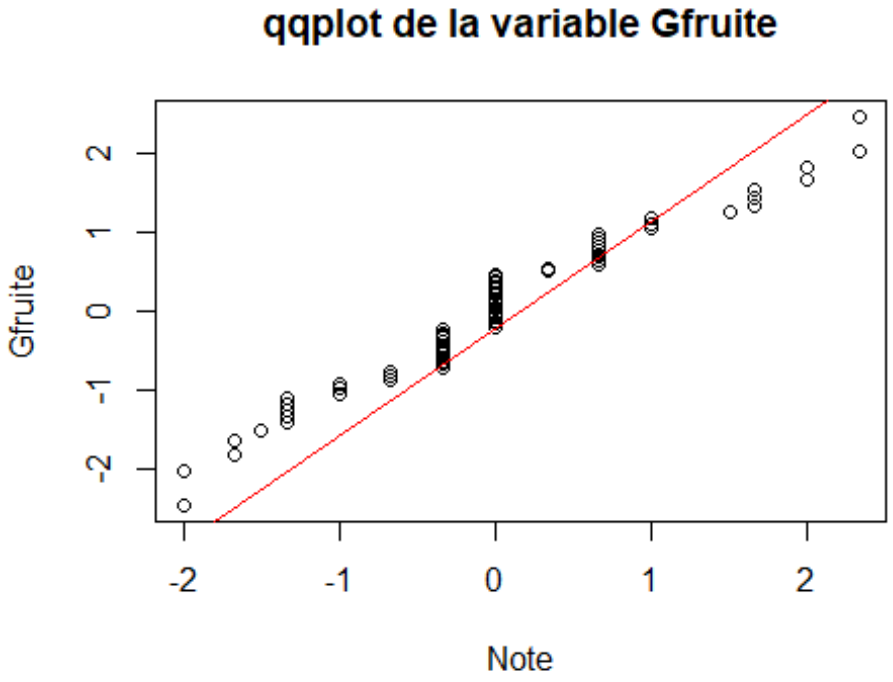

qqplot de la variable Gdurete
Gdurete
Note
-2
-1
0
1
2

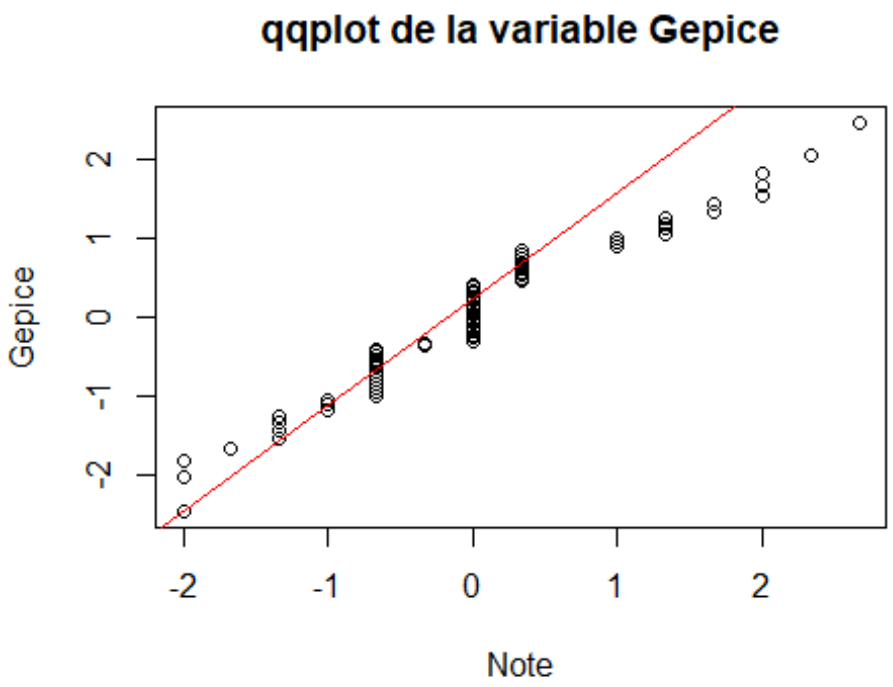

qqplot de la variable Gintense
Gintense
Note
-2
-1
0
1
2
-1.5
-1.0
-0.5
0.0
0.5
1.0
1.5

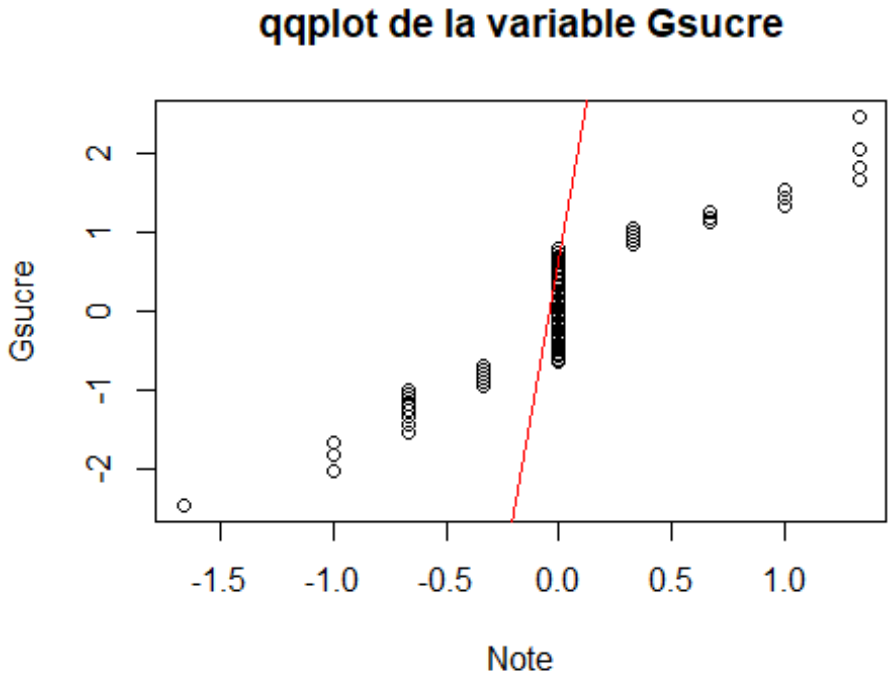

qqplot de la variable Gvegetal
Gvegetal
Note
-2
-1
0
1
2
-1.0
-0.5
0.0
0.5
1.0
1.5
2.0

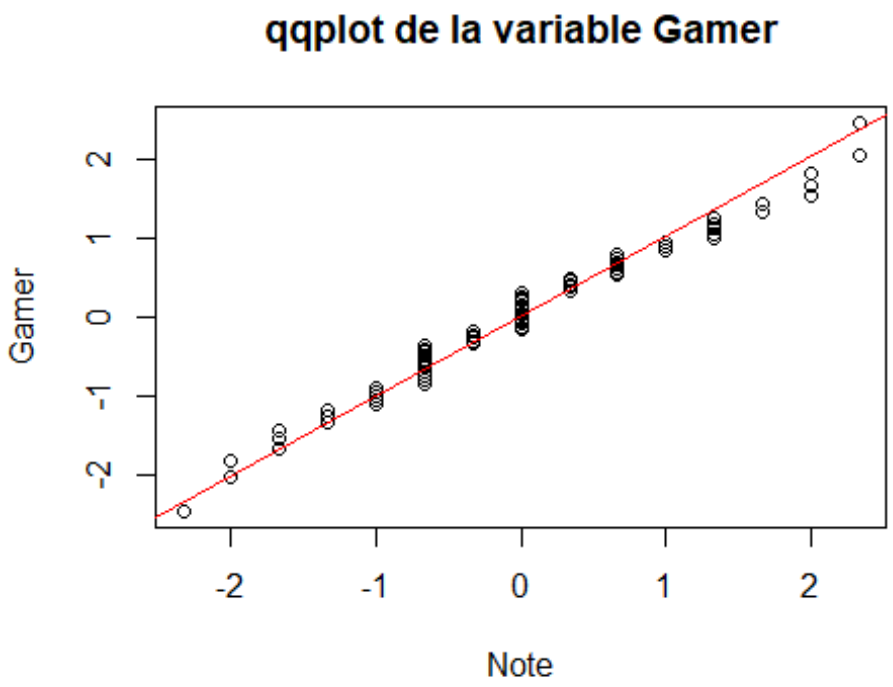

qqplot de la variable Giode
Giode
Note
-2
-1
0
1
2

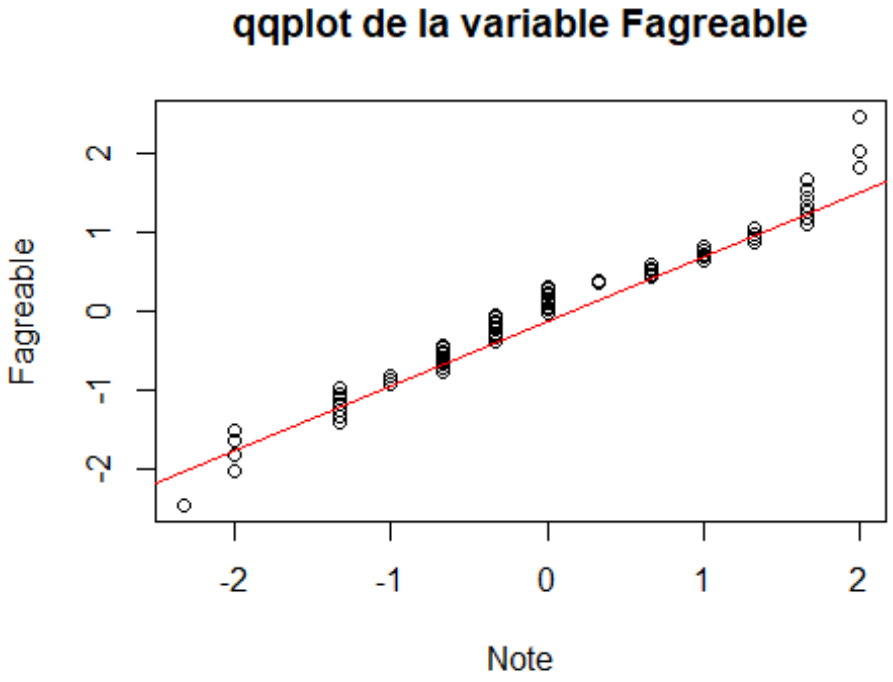

qqplot de la variable Gsale
Gsale
Note
-2
-1
0
1
2

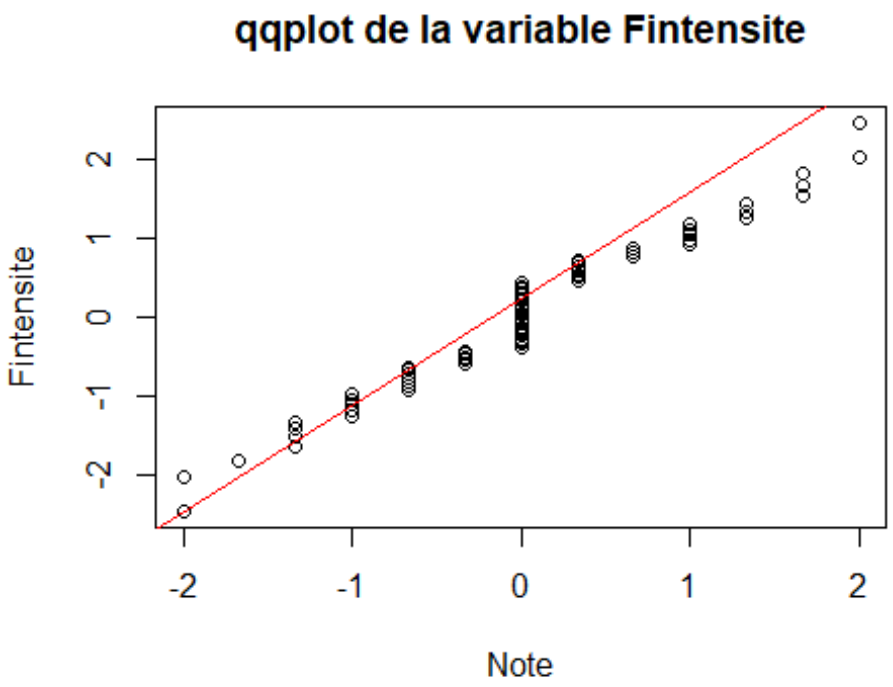

qqplot de la variable Gfruite
Gfruite
Note
-2
-1
0
1
2

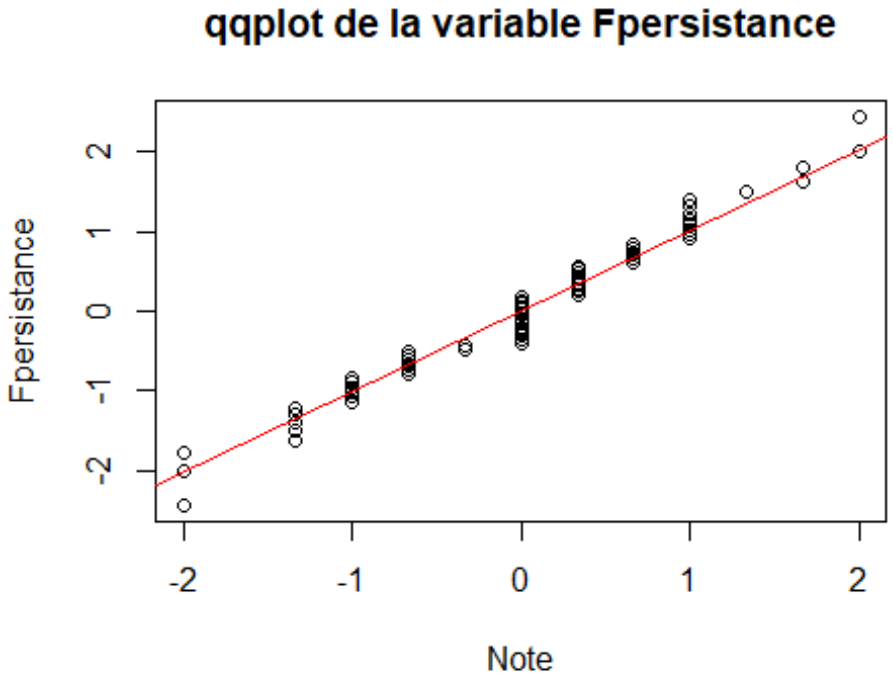

qqplot de la variable Gepice
Gepice
Note
-2
-1
0
1
2

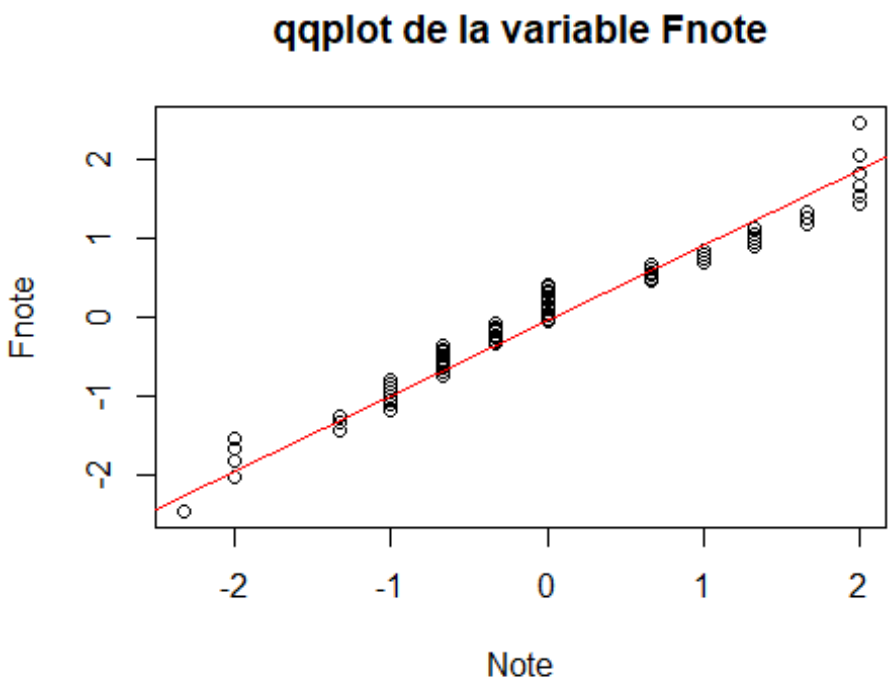

qqplot de la variable Gsucre
Gsucre
Note
-2
-1
0
1
2
-1.5
-1.0
-0.5
0.0
0.5
1.0

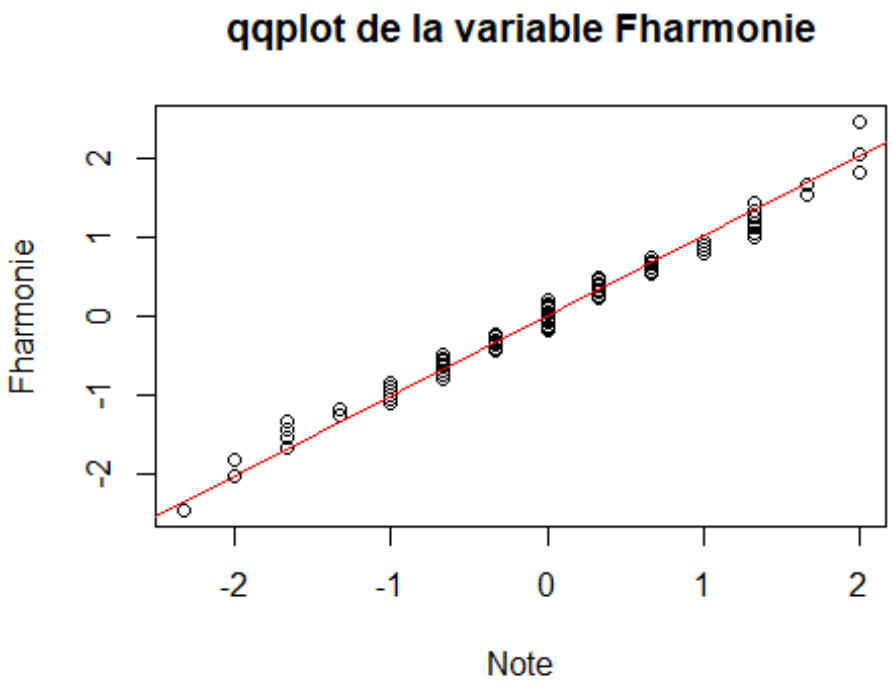

qqplot de la variable Gamer
Gamer
Note
-2
-1
0
1
2

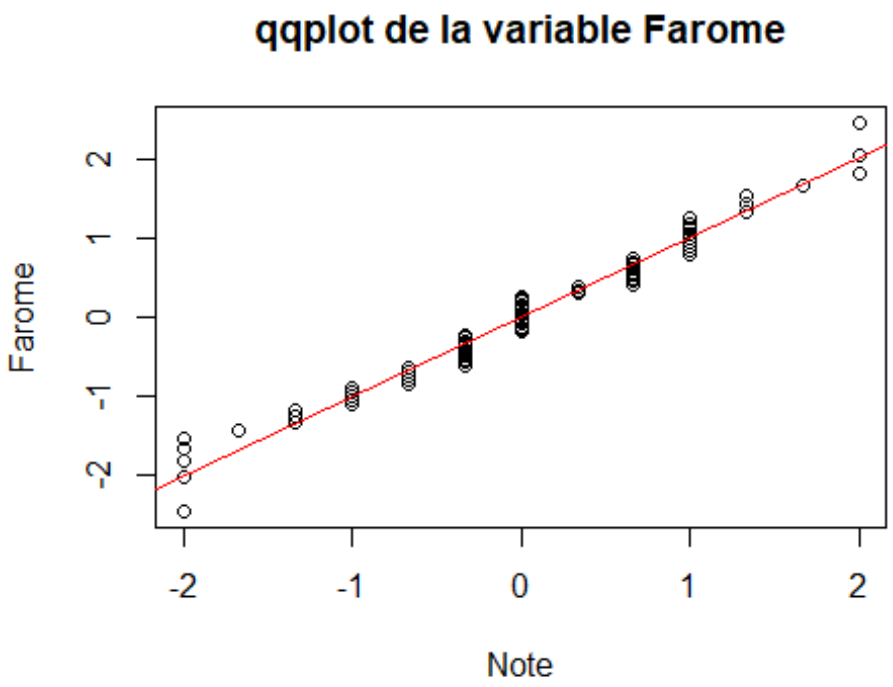

qqplot de la variable Fagreable
Fagreable
Note
-2
-1
0
1
2


qqplot de la variable Fintensite
Fintensite
Note
-2
-1
0
1
2


qqplot de la variable Fpersistance
Fpersistance
Note
-2
-1
0
1
2


qqplot de la variable Fnote
Fnote
Note
-2
-1
0
1
2





3 Test egalité des variances

```
# Creation de fonction de test de variance

## Hypothéses

# H0: il y'a égalité de variance
# H1: pas d'égalité de variance

## Régle de décision
```

```r
# Rejet de H0 <-> p.value < 5% ou 1%
#Acceptation de H0 <-> p.value > 5% ou 1%

montest_var = function(A,B){


test_var = var.test(A,B)$p.value


return(test_var)

}
```

3.1 Caractéristique visuel

```r
 # Intencité de la couleur

T1_vs_T2 = montest_var(T1.VintensiteC,T2.VintensiteC)
T1_vs_T3 = montest_var(T1.VintensiteC,T3.VintensiteC)
T2_vs_T3 = montest_var(T2.VintensiteC,T3.VintensiteC)
var_int = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_int)[nrow(var_int)]="VintensiteC"

# copacité de la couleur

T1_vs_T2 = montest_var(T1.VcompactC,T2.VcompactC)
T1_vs_T3 = montest_var(T1.VcompactC,T3.VcompactC)
T2_vs_T3 = montest_var(T2.VcompactC,T3.VcompactC)
var_comp = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_comp)[nrow(var_comp)]="VcompactC"

# Granulosité texture

T1_vs_T2 = montest_var(T1.VtextureC,T2.VtextureC)
T1_vs_T3 = montest_var(T1.VtextureC,T3.VtextureC)
T2_vs_T3 = montest_var(T2.VtextureC,T3.VtextureC)
var_text = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_text)[nrow(var_text)]="VtextureC"

# Variété de tons

T1_vs_T2 = montest_var(T1.VtonsC,T2.VtonsC)
T1_vs_T3 = montest_var(T1.VtonsC,T3.VtonsC)
T2_vs_T3 = montest_var(T2.VtonsC,T3.VtonsC)
var_tons = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_tons)[nrow(var_tons)]="VtonsC"

# Brillance

T1_vs_T2 = montest_var(T1.VbrillanceC,T2.VbrillanceC)
T1_vs_T3 = montest_var(T1.VbrillanceC,T3.VbrillanceC)
T2_vs_T3 = montest_var(T2.VbrillanceC,T3.VbrillanceC)
var_brill = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_brill)[nrow(var_brill)]="VbrillanceC"
```

```
# Attirance

T1_vs_T2 = montest_var(T1.VattiranceC,T2.VattiranceC)
T1_vs_T3 = montest_var(T1.VattiranceC,T3.VattiranceC)
T2_vs_T3 = montest_var(T2.VattiranceC,T3.VattiranceC)
var_att = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_att)[nrow(var_att)]="VattiranceC"

# Tableau récapitulatif

tab_visuel = rbind(var_int,var_comp,var_text,var_tons,var_brill,var_att)
colnames(tab_visuel)=c("T1 vs T2","T1 vs T3","T2 vs T3")
kable(tab_visuel)
```

	T1 vs T2	T1 vs T3	T2 vs T3
VintensiteC	0.7591940	0.0631713	0.1225945
VcompactC	0.8151354	0.3949479	0.2791895
VtextureC	0.9290364	0.8546618	0.7830335
VtonsC	0.3560290	0.6465475	0.6484002
VbrillanceC	0.5444487	0.6330958	0.2801116
VattiranceC	0.6860958	0.5022689	0.7890384

```
#write.table(tab_visuel,file = "D:/Projet4/Partie_R/VIsuel_égalité_Var.txt")
```

3.2 Caractéristiques olfactives

```
# Odeur fruité

T1_vs_T2 = montest_var(T1.OfruitC,T2.OfruitC)
T1_vs_T3 = montest_var(T1.OfruitC,T3.OfruitC)
T2_vs_T3 = montest_var(T2.OfruitC,T3.OfruitC)
var_fruit = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_fruit)[nrow(var_fruit)]="OfruitC"

# Odeur amer

T1_vs_T2 = montest_var(T1.OamerC,T2.OamerC)
T1_vs_T3 = montest_var(T1.OamerC,T3.OamerC)
T2_vs_T3 = montest_var(T2.OamerC,T3.OamerC)
var_amer = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_amer)[nrow(var_amer)]="OamerC"

# Odeur épicée

T1_vs_T2 = montest_var(T1.OepiceC,T2.OepiceC)
T1_vs_T3 = montest_var(T1.OepiceC,T3.OepiceC)
T2_vs_T3 = montest_var(T2.OepiceC,T3.OepiceC)
var_epice = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_epice)[nrow(var_epice)]="OepiceC"

# Odeur végétale

T1_vs_T2 = montest_var(T1.OvegetaleC,T2.OvegetaleC)
T1_vs_T3 = montest_var(T1.OvegetaleC,T3.OvegetaleC)
T2_vs_T3 = montest_var(T2.OvegetaleC,T3.OvegetaleC)
```

```
var_veg = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_veg)[nrow(var_veg)]="OvegetaleC"

# Tableau récapitulatif

tab_olfactif = rbind(var_fruit,var_amer,var_epice,var_veg)
colnames(tab_olfactif)=c("T1 vs T2","T1 vs T3","T2 vs T3")
kable(tab_olfactif)
```

	T1 vs T2	T1 vs T3	T2 vs T3
OfruitC	0.8645847	0.7578460	0.6322406
OamerC	0.7920666	0.7615939	0.5710406
OepiceC	0.8883277	0.3078481	0.2467145
OvegetaleC	0.3277795	0.2233570	0.8070778

```
#write.table(tab_olfactif,file = "D:/Projet4/Partie_R/Olfactif_égalité_Var.txt")
```

3.3 Caractéristique gustative

```
# Dureté texture

T1_vs_T2 = montest_var(T1.GdureteC,T2.GdureteC)
T1_vs_T3 = montest_var(T1.GdureteC,T3.GdureteC)
T2_vs_T3 = montest_var(T2.GdureteC,T3.GdureteC)
var_dur = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_dur)[nrow(var_dur)]="GdureteC"

# Intensité du gout

T1_vs_T2 = montest_var(T1.GintenseC,T2.GintenseC)
T1_vs_T3 = montest_var(T1.GintenseC,T3.GintenseC)
T2_vs_T3 = montest_var(T2.GintenseC,T3.GintenseC)
var_int = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_int)[nrow(var_int)]="GintenseC"

#Gout Végétal

T1_vs_T2 = montest_var(T1.GvegetalC,T2.GvegetalC)
T1_vs_T3 = montest_var(T1.GvegetalC,T3.GvegetalC)
T2_vs_T3 = montest_var(T2.GvegetalC,T3.GvegetalC)
var_veg = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_veg)[nrow(var_veg)]="GvegetalC"

# Gout iodé

T1_vs_T2 = montest_var(T1.GiodeC,T2.GiodeC)
T1_vs_T3 = montest_var(T1.GiodeC,T3.GiodeC)
T2_vs_T3 = montest_var(T2.GiodeC,T3.GiodeC)
var_iod = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_iod)[nrow(var_iod)]="GiodeC"

# Gout salé

T1_vs_T2 = montest_var(T1.GsaleC,T2.GsaleC)
T1_vs_T3 = montest_var(T1.GsaleC,T3.GsaleC)
T2_vs_T3 = montest_var(T2.GsaleC,T3.GsaleC)
```

```
var_sale = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_sale)[nrow(var_sale)]="GsaleC"

# Gout fruité

T1_vs_T2 = montest_var(T1.GfruiteC,T2.GfruiteC)
T1_vs_T3 = montest_var(T1.GfruiteC,T3.GfruiteC)
T2_vs_T3 = montest_var(T2.GfruiteC,T3.GfruiteC)
var_fruit = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_fruit)[nrow(var_fruit)]="GfruiteC"

# Gout épicé

T1_vs_T2 = montest_var(T1.GepiceC,T2.GepiceC)
T1_vs_T3 = montest_var(T1.GepiceC,T3.GepiceC)
T2_vs_T3 = montest_var(T2.GepiceC,T3.GepiceC)
var_epice = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_epice)[nrow(var_epice)]="GepiceC"

# Gout sucré

T1_vs_T2 = montest_var(T1.GsucreC,T2.GsucreC)
T1_vs_T3 = montest_var(T1.GsucreC,T3.GsucreC)
T2_vs_T3 = montest_var(T2.GsucreC,T3.GsucreC)
var_sucre = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_sucre)[nrow(var_sucre)]="GsucreC"


# Gout acide

T1_vs_T2 = montest_var(T1.GacideC,T2.GacideC)
T1_vs_T3 = montest_var(T1.GacideC,T3.GacideC)
T2_vs_T3 = montest_var(T2.GacideC,T3.GacideC)
var_acide = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_acide)[nrow(var_acide)]="GacideC"

# Gout amer

T1_vs_T2 = montest_var(T1.GamerC,T2.GamerC)
T1_vs_T3 = montest_var(T1.GamerC,T3.GamerC)
T2_vs_T3 = montest_var(T2.GamerC,T3.GamerC)
var_amer = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_amer)[nrow(var_amer)]="GamerC"

# Tableau récapitulatif

tab_gustatif = rbind(var_dur,var_int,var_veg,var_iod,var_sale,var_fruit,var_epice,var_s
ucre,var_acide,var_amer)
colnames(tab_gustatif)=c("T1 vs T2","T1 vs T3","T2 vs T3")
kable(tab_gustatif)
```

	T1 vs T2	T1 vs T3	T2 vs T3
GdureteC	0.7204846	0.3694238	0.2170326
GintenseC	0.3984965	0.1541809	0.5608280

GvegetalC	0.9672023	0.9637321	0.9969431
GiodeC	0.5652768	0.5115979	0.2222130
GsaleC	0.6891310	0.3437869	0.1825405
GfruiteC	0.8524015	0.8100544	0.9544701
GepiceC	0.0587135	0.0085203	0.4348459
GsucreC	0.0984493	0.7226878	0.0460607
GacideC	0.9295879	0.0800968	0.0951201
GamerC	0.4899163	0.5760957	0.8950615

```
#write.table(tab_gustatif,file = "D:/Projet4/Partie_R/Gustatif_égalité_Var.txt")
```

3.4 Finalité en bouche

```
# Agréable

T1_vs_T2 = montest_var(T1.FagreableC,T2.FagreableC)
T1_vs_T3 = montest_var(T1.FagreableC,T3.FagreableC)
T2_vs_T3 = montest_var(T2.FagreableC,T3.FagreableC)
var_agre = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_agre)[nrow(var_agre)]="FagreableC"

# Intensité du gout

T1_vs_T2 = montest_var(T1FintensiteC,T2.FintensiteC)
T1_vs_T3 = montest_var(T1FintensiteC,T3.FintensiteC)
T2_vs_T3 = montest_var(T2.FintensiteC,T3.FintensiteC)
var_intens = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_intens)[nrow(var_intens)]="FintensiteC"

# Persistence

T1_vs_T2 = montest_var(T1.FpersistanceC,T2.FpersistanceC)
T1_vs_T3 = montest_var(T1.FpersistanceC,T3.FpersistanceC)
T2_vs_T3 = montest_var(T2.FpersistanceC,T3.FpersistanceC)
var_pers = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_pers)[nrow(var_pers)]="FpersistanceC"

# Note globale

T1_vs_T2 = montest_var(T1.FnoteC,T2.FnoteC)
T1_vs_T3 = montest_var(T1.FnoteC,T3.FnoteC)
T2_vs_T3 = montest_var(T2.FnoteC,T3.FnoteC)
var_note = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_note)[nrow(var_note)]="FnoteC"

# Harmonie en bouche

T1_vs_T2 = montest_var(T1.FharmonieC,T2.FharmonieC)
T1_vs_T3 = montest_var(T1.FharmonieC,T3.FharmonieC)
T2_vs_T3 = montest_var(T2.FharmonieC,T3.FharmonieC)
var_harm = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_harm)[nrow(var_harm)]="FharmonieC"

# Riche en arome
```

```r
T1_vs_T2 = montest_var(T1.FaromeC,T2.FaromeC)
T1_vs_T3 = montest_var(T1.FaromeC,T3.FaromeC)
T2_vs_T3 = montest_var(T2.FaromeC,T3.FaromeC)
var_arom = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_arom)[nrow(var_arom)]="FaromeC"

# Tableau récapitulatif

tab_fin_bouche = rbind(var_agre,var_intens,var_pers,var_note,var_harm,var_arom)
colnames(tab_fin_bouche)=c("T1 vs T2","T1 vs T3","T2 vs T3")
kable(tab_fin_bouche)
```

	T1 vs T2	T1 vs T3	T2 vs T3
FagreableC	0.8625934	0.6704832	0.8019253
FintensiteC	0.0925959	0.7577068	0.1605000
FpersistanceC	0.2775852	0.9314236	0.3101299
FnoteC	0.0573556	0.2840128	0.3965889
FharmonieC	0.3031299	0.9353624	0.2670692
FaromeC	0.1786381	0.8188646	0.2628465

```r
#write.table(tab_fin_bouche,file = "D:/Projet4/Partie_R/Fin_bouche_égalité_Var.txt")
```

4 Test de student d egalité des moyennes

```r
# Fonction pour le test des égalité des moyennes

## Hypothéses

# H0: il y'a égalité de moyenne
# H1: pas d'égalité de moyenne

## Régle de décision

# Rejet de H0 <-> p.value < 5% ou 1%
#Acceptation de H0 <-> p.value > 5% ou 1%

montest_var = function(A,B){


test_moy = t.test(A,B,conf.level=0.05)$p.value


return(test_moy)

}

# Hypothése

  ## Hypothèse nulle H0 : les moyennes sont égales.(rouge)

  ## Hypothèse alternative : les moyennes sont différentes.(vert)
```

```
# Règle de decision : rejet de H0 si et seulement si la p-value est inférieure au seuil alpha de 5%.
```

4.1 Caractéristique visuel

```
 # Intencité de la couleur

T1_vs_T2 = montest_var(T1.VintensiteC,T2.VintensiteC)
T1_vs_T3 = montest_var(T1.VintensiteC,T3.VintensiteC)
T2_vs_T3 = montest_var(T2.VintensiteC,T3.VintensiteC)
var_int = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_int)[nrow(var_int)]="VintensiteC"

# copacité de la couleur

T1_vs_T2 = montest_var(T1.VcompactC,T2.VcompactC)
T1_vs_T3 = montest_var(T1.VcompactC,T3.VcompactC)
T2_vs_T3 = montest_var(T2.VcompactC,T3.VcompactC)
var_comp = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_comp)[nrow(var_comp)]="VcompactC"

# Granulosité texture

T1_vs_T2 = montest_var(T1.VtextureC,T2.VtextureC)
T1_vs_T3 = montest_var(T1.VtextureC,T3.VtextureC)
T2_vs_T3 = montest_var(T2.VtextureC,T3.VtextureC)
var_text = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_text)[nrow(var_text)]="VtextureC"

# Variété de tons

T1_vs_T2 = montest_var(T1.VtonsC,T2.VtonsC)
T1_vs_T3 = montest_var(T1.VtonsC,T3.VtonsC)
T2_vs_T3 = montest_var(T2.VtonsC,T3.VtonsC)
var_tons = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_tons)[nrow(var_tons)]="VtonsC"

# Brillance

T1_vs_T2 = montest_var(T1.VbrillanceC,T2.VbrillanceC)
T1_vs_T3 = montest_var(T1.VbrillanceC,T3.VbrillanceC)
T2_vs_T3 = montest_var(T2.VbrillanceC,T3.VbrillanceC)
var_brill = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_brill)[nrow(var_brill)]="VbrillanceC"

# Attirance

T1_vs_T2 = montest_var(T1.VattiranceC,T2.VattiranceC)
T1_vs_T3 = montest_var(T1.VattiranceC,T3.VattiranceC)
T2_vs_T3 = montest_var(T2.VattiranceC,T3.VattiranceC)
var_att = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_att)[nrow(var_att)]="VattiranceC"

# Tableau récapitulatif

tab_visuel = rbind(var_int,var_comp,var_text,var_tons,var_brill,var_att)
```

```
colnames(tab_visuel)=c("T1 vs T2","T1 vs T3","T2 vs T3")
kable(tab_visuel)
```

	T1 vs T2	T1 vs T3	T2 vs T3
VintensiteC	0.3956438	0.0028927	0.0318967
VcompactC	0.5561335	0.0002187	0.0008851
VtextureC	0.5240857	0.7790506	0.7292601
VtonsC	0.0093354	0.7403064	0.0059877
VbrillanceC	0.0117133	0.0050061	1.0000000
VattiranceC	0.0404819	0.6202301	0.0076793

```
#write.table(tab_visuel,file = "D:/Projet4/Partie_R/VIsuel_égalité_Moy.txt")
```

4.2 Caractéristiques olfactives

```
# Odeur fruité

T1_vs_T2 = montest_var(T1.OfruitC,T2.OfruitC)
T1_vs_T3 = montest_var(T1.OfruitC,T3.OfruitC)
T2_vs_T3 = montest_var(T2.OfruitC,T3.OfruitC)
var_fruit = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_fruit)[nrow(var_fruit)]="OfruitC"

# Odeur amer

T1_vs_T2 = montest_var(T1.OamerC,T2.OamerC)
T1_vs_T3 = montest_var(T1.OamerC,T3.OamerC)
T2_vs_T3 = montest_var(T2.OamerC,T3.OamerC)
var_amer = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_amer)[nrow(var_amer)]="OamerC"

# Odeur épicée

T1_vs_T2 = montest_var(T1.OepiceC,T2.OepiceC)
T1_vs_T3 = montest_var(T1.OepiceC,T3.OepiceC)
T2_vs_T3 = montest_var(T2.OepiceC,T3.OepiceC)
var_epice = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_epice)[nrow(var_epice)]="OepiceC"

# Odeur végétale

T1_vs_T2 = montest_var(T1.OvegetaleC,T2.OvegetaleC)
T1_vs_T3 = montest_var(T1.OvegetaleC,T3.OvegetaleC)
T2_vs_T3 = montest_var(T2.OvegetaleC,T3.OvegetaleC)
var_veg = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_veg)[nrow(var_veg)]="OvegetaleC"

# Tableau récapitulatif

tab_olfactif = rbind(var_fruit,var_amer,var_epice,var_veg)
colnames(tab_olfactif)=c("T1 vs T2","T1 vs T3","T2 vs T3")
kable(tab_olfactif)
```

	T1 vs T2	T1 vs T3	T2 vs T3

OfruitC	0.0000160	0.0024312	0.0749891
OamerC	0.0291162	0.0755637	0.0002039
OepiceC	0.2076318	0.4884650	0.6736576
OvegetaleC	0.1347023	0.1276445	1.0000000

```
#write.table(tab_olfactif,file = "D:/Projet4/Partie_R/Olfactif_égalité_Moy.txt")
```

4.3 Caractéristique gustative

```
# Dureté texture

T1_vs_T2 = montest_var(T1.GdureteC,T2.GdureteC)
T1_vs_T3 = montest_var(T1.GdureteC,T3.GdureteC)
T2_vs_T3 = montest_var(T2.GdureteC,T3.GdureteC)
var_dur = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_dur)[nrow(var_dur)]="GdureteC"

# Intensité du gout

T1_vs_T2 = montest_var(T1.GintenseC,T2.GintenseC)
T1_vs_T3 = montest_var(T1.GintenseC,T3.GintenseC)
T2_vs_T3 = montest_var(T2.GintenseC,T3.GintenseC)
var_int = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_int)[nrow(var_int)]="GintenseC"

#Gout Végétal

T1_vs_T2 = montest_var(T1.GvegetalC,T2.GvegetalC)
T1_vs_T3 = montest_var(T1.GvegetalC,T3.GvegetalC)
T2_vs_T3 = montest_var(T2.GvegetalC,T3.GvegetalC)
var_veg = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_veg)[nrow(var_veg)]="GvegetalC"

# Gout iodé

T1_vs_T2 = montest_var(T1.GiodeC,T2.GiodeC)
T1_vs_T3 = montest_var(T1.GiodeC,T3.GiodeC)
T2_vs_T3 = montest_var(T2.GiodeC,T3.GiodeC)
var_iod = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_iod)[nrow(var_iod)]="GiodeC"

# Gout salé

T1_vs_T2 = montest_var(T1.GsaleC,T2.GsaleC)
T1_vs_T3 = montest_var(T1.GsaleC,T3.GsaleC)
T2_vs_T3 = montest_var(T2.GsaleC,T3.GsaleC)
var_sale = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_sale)[nrow(var_sale)]="GsaleC"

# Gout fruité

T1_vs_T2 = montest_var(T1.GfruiteC,T2.GfruiteC)
T1_vs_T3 = montest_var(T1.GfruiteC,T3.GfruiteC)
T2_vs_T3 = montest_var(T2.GfruiteC,T3.GfruiteC)
var_fruit = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_fruit)[nrow(var_fruit)]="GfruiteC"
```

```r
# Gout épicé

T1_vs_T2 = montest_var(T1.GepiceC,T2.GepiceC)
T1_vs_T3 = montest_var(T1.GepiceC,T3.GepiceC)
T2_vs_T3 = montest_var(T2.GepiceC,T3.GepiceC)
var_epice = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_epice)[nrow(var_epice)]="GepiceC"

# Gout sucré

T1_vs_T2 = montest_var(T1.GsucreC,T2.GsucreC)
T1_vs_T3 = montest_var(T1.GsucreC,T3.GsucreC)
T2_vs_T3 = montest_var(T2.GsucreC,T3.GsucreC)
var_sucre = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_sucre)[nrow(var_sucre)]="GsucreC"


# Gout acide

T1_vs_T2 = montest_var(T1.GacideC,T2.GacideC)
T1_vs_T3 = montest_var(T1.GacideC,T3.GacideC)
T2_vs_T3 = montest_var(T2.GacideC,T3.GacideC)
var_acide = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_acide)[nrow(var_acide)]="GacideC"

# Gout amer

T1_vs_T2 = montest_var(T1.GamerC,T2.GamerC)
T1_vs_T3 = montest_var(T1.GamerC,T3.GamerC)
T2_vs_T3 = montest_var(T2.GamerC,T3.GamerC)
var_amer = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_amer)[nrow(var_amer)]="GamerC"

# Tableau récapitulatif

tab_gustatif = rbind(var_dur,var_int,var_veg,var_iod,var_sale,var_fruit,var_epice,var_s
ucre,var_acide,var_amer)
colnames(tab_gustatif)=c("T1 vs T2","T1 vs T3","T2 vs T3")
kable(tab_gustatif)
```

	T1 vs T2	T1 vs T3	T2 vs T3
GdureteC	0.0104851	0.0248859	0.0000108
GintenseC	0.0156131	0.5026443	0.1241435
GvegetalC	0.0177910	0.1106848	0.3969710
GiodeC	0.2454332	0.0417492	0.5012248
GsaleC	0.0635786	0.1984909	0.0021107
GfruiteC	0.6161846	0.8266686	0.7721369
GepiceC	0.5175034	0.3905428	0.2108153
GsucreC	0.4006308	0.4836117	0.1145540
GacideC	0.8698191	0.2255954	0.1577063

```
GamerC      0.6792402   0.0976603   0.0546664
#write.table(tab_gustatif,file = "D:/Projet4/Partie_R/Gustatif_égalité_Moy.txt")
```

4.4 Finalité en bouche

```
# Agréable

T1_vs_T2 = montest_var(T1.FagreableC,T2.FagreableC)
T1_vs_T3 = montest_var(T1.FagreableC,T3.FagreableC)
T2_vs_T3 = montest_var(T2.FagreableC,T3.FagreableC)
var_agre = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_agre)[nrow(var_agre)]="FagreableC"

# Intensité du gout

T1_vs_T2 = montest_var(T1FintensiteC,T2.FintensiteC)
T1_vs_T3 = montest_var(T1FintensiteC,T3.FintensiteC)
T2_vs_T3 = montest_var(T2.FintensiteC,T3.FintensiteC)
var_intens = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_intens)[nrow(var_intens)]="FintensiteC"

# Persistence

T1_vs_T2 = montest_var(T1.FpersistanceC,T2.FpersistanceC)
T1_vs_T3 = montest_var(T1.FpersistanceC,T3.FpersistanceC)
T2_vs_T3 = montest_var(T2.FpersistanceC,T3.FpersistanceC)
var_pers = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_pers)[nrow(var_pers)]="FpersistanceC"

# Note globale

T1_vs_T2 = montest_var(T1.FnoteC,T2.FnoteC)
T1_vs_T3 = montest_var(T1.FnoteC,T3.FnoteC)
T2_vs_T3 = montest_var(T2.FnoteC,T3.FnoteC)
var_note = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_note)[nrow(var_note)]="FnoteC"

# Harmonie en bouche

T1_vs_T2 = montest_var(T1.FharmonieC,T2.FharmonieC)
T1_vs_T3 = montest_var(T1.FharmonieC,T3.FharmonieC)
T2_vs_T3 = montest_var(T2.FharmonieC,T3.FharmonieC)
var_harm = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_harm)[nrow(var_harm)]="FharmonieC"

# Riche en arome

T1_vs_T2 = montest_var(T1.FaromeC,T2.FaromeC)
T1_vs_T3 = montest_var(T1.FaromeC,T3.FaromeC)
T2_vs_T3 = montest_var(T2.FaromeC,T3.FaromeC)
var_arom = cbind(T1_vs_T2,T1_vs_T3,T2_vs_T3)
rownames(var_arom)[nrow(var_arom)]="FaromeC"

# Tableau récapitulatif

tab_fin_bouche = rbind(var_agre,var_intens,var_pers,var_note,var_harm,var_arom)
```

```
colnames(tab_fin_bouche)=c("T1 vs T2","T1 vs T3","T2 vs T3")
kable(tab_fin_bouche)
```

	T1 vs T2	T1 vs T3	T2 vs T3
FagreableC	0.1135408	0.5943863	0.3075122
FintensiteC	0.1217509	0.5606522	0.2856797
FpersistanceC	0.0909009	0.7032300	0.1710171
FnoteC	0.1223897	0.0225078	0.6300485
FharmonieC	0.0602521	0.0157293	0.7828199
FaromeC	0.0177446	0.0515889	0.4799714

```
#write.table(tab_fin_bouche,file = "D:/Projet4/Partie_R/Fin_bouche_égalité_Moy.txt")
```

5 ANOVA 1 facteur+tuckey

```
library(tidyr)
library(ggplot2)
library(multcomp)

library(car)

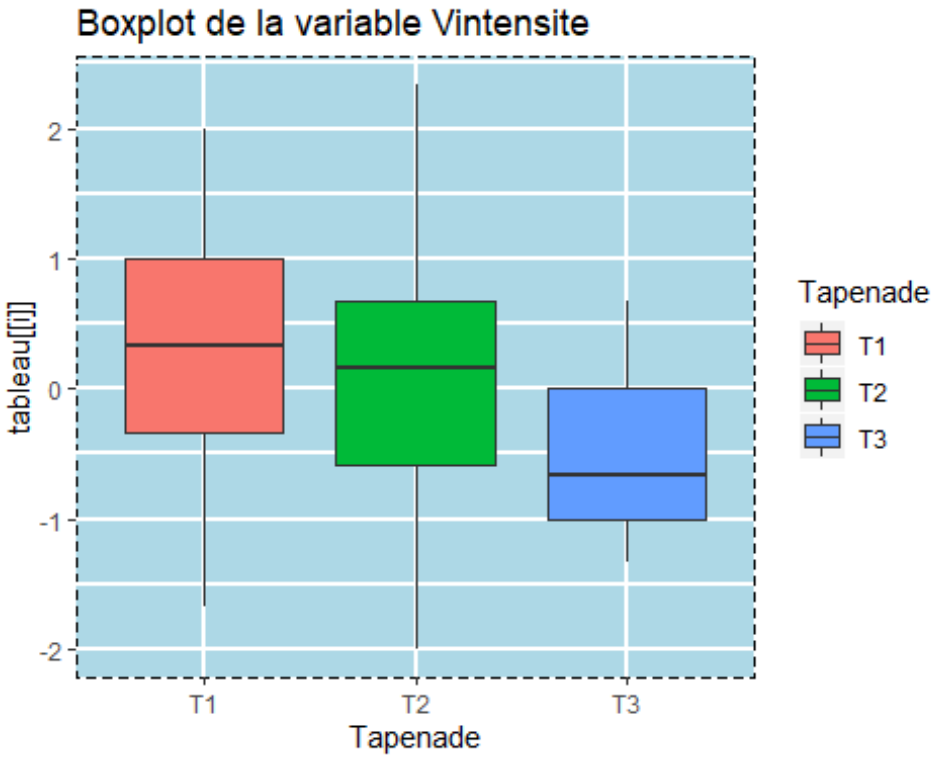
# Boite a moustache des différente tapenades

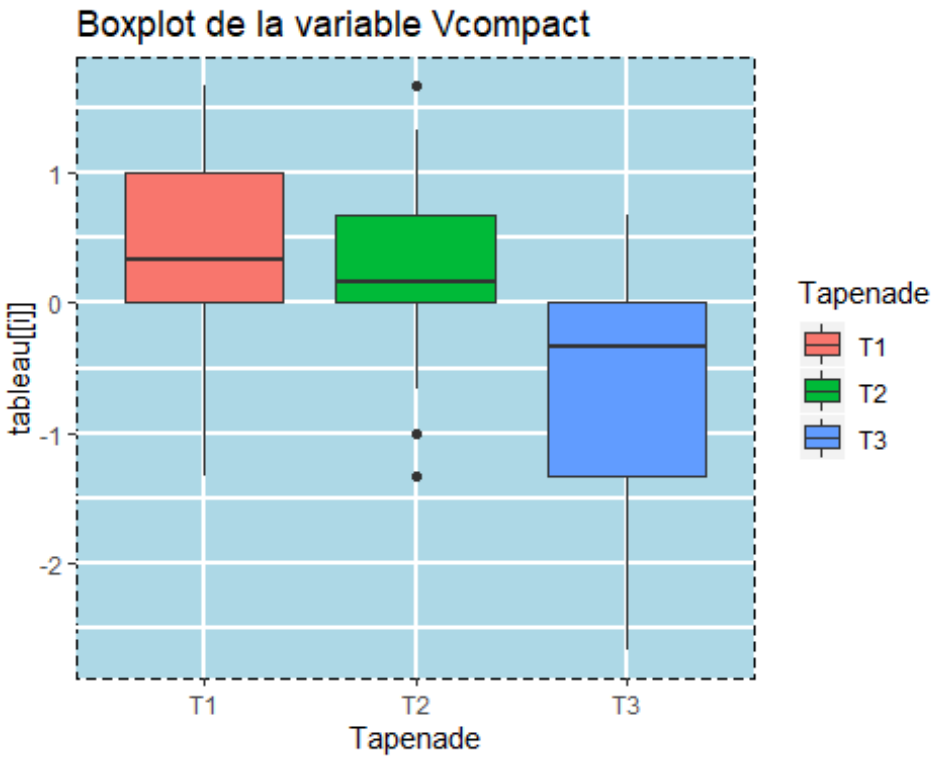
## Permet de voir la tapenade la mieux noté au niveau de chaque variable

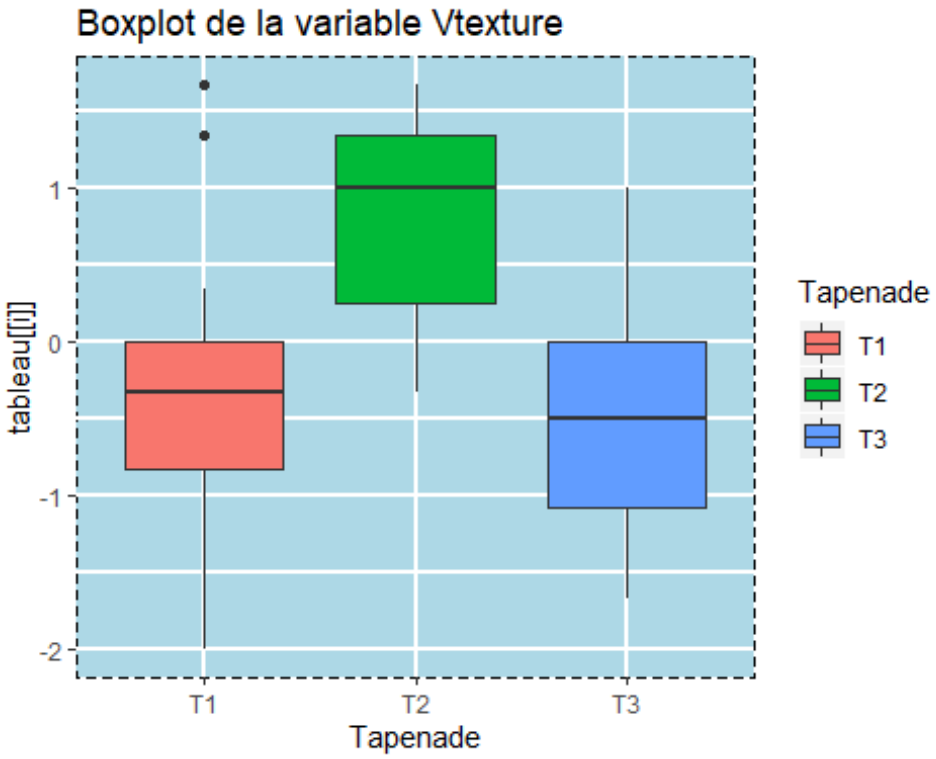

for(i in 12:37){

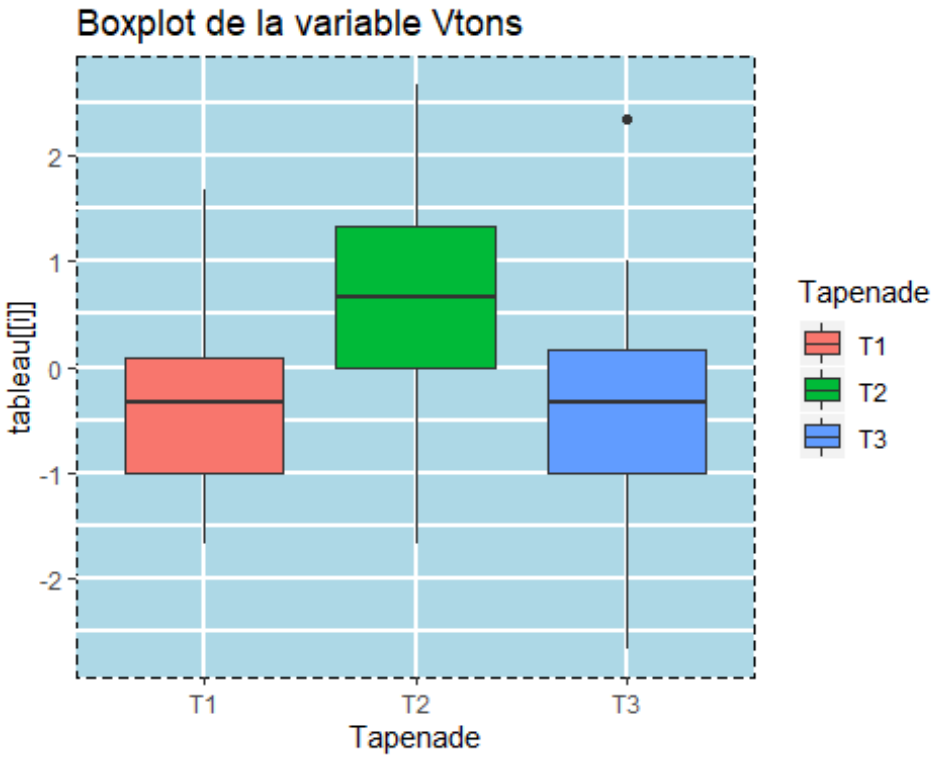
 b = ggplot(data =tableau , aes(x=tableau$Tapenade, y=tableau[[i]], fill=Tapenade)) +
    geom_boxplot() +
    xlab("") +
    theme(legend.position="right") +
    xlab("") +
ggtitle(paste("Boxplot de la variable",colnames(tableau[i]))) +
    xlab("Tapenade") +
  theme(panel.background = element_rect(fill = "lightblue", colour = "lightblue", size
= 0,25,
  linetype = 2), panel.grid.major = element_line(size = 0.9, linetype = 1,colour = "whi
te"),
  panel.grid.minor = element_line(size = 0.9, linetype = 'solid',colour = "white"))
 print(b)
}
```

```
## Warning: Removed 5 rows containing non-finite values (stat_boxplot).
```


Boxplot de la variable Vintensite
tableau[[i]]
2
1
0
-1
-2
T1
T2
T3
Tapenade
Tapenade
T1
T2
T3


Boxplot de la variable Vcompact
tableau[[i]]
1
0
-1
-2
T1
T2
T3
Tapenade
Tapenade
T1
T2
T3


Boxplot de la variable Vtexture
tableau[[i]]
1
0
-1
-2
T1
T2
T3
Tapenade
Tapenade
T1
T2
T3


Boxplot de la variable Vtons
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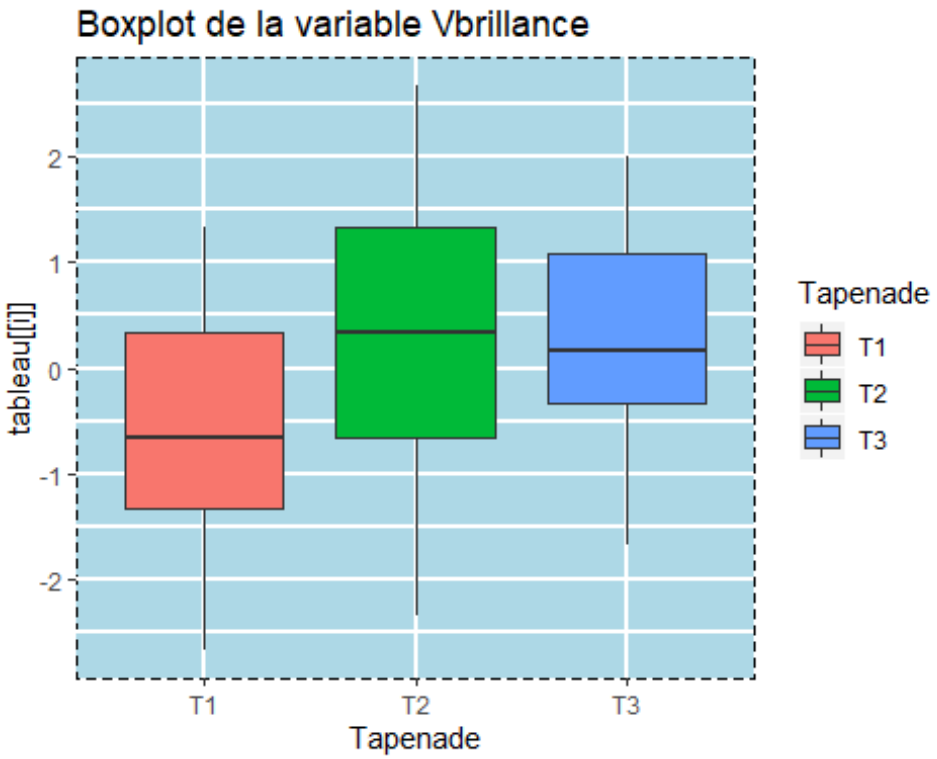
-1
-2
T1
T2
T3
Tapenade
Tapenade
T1
T2
T3


Boxplot de la variable Vbrillance
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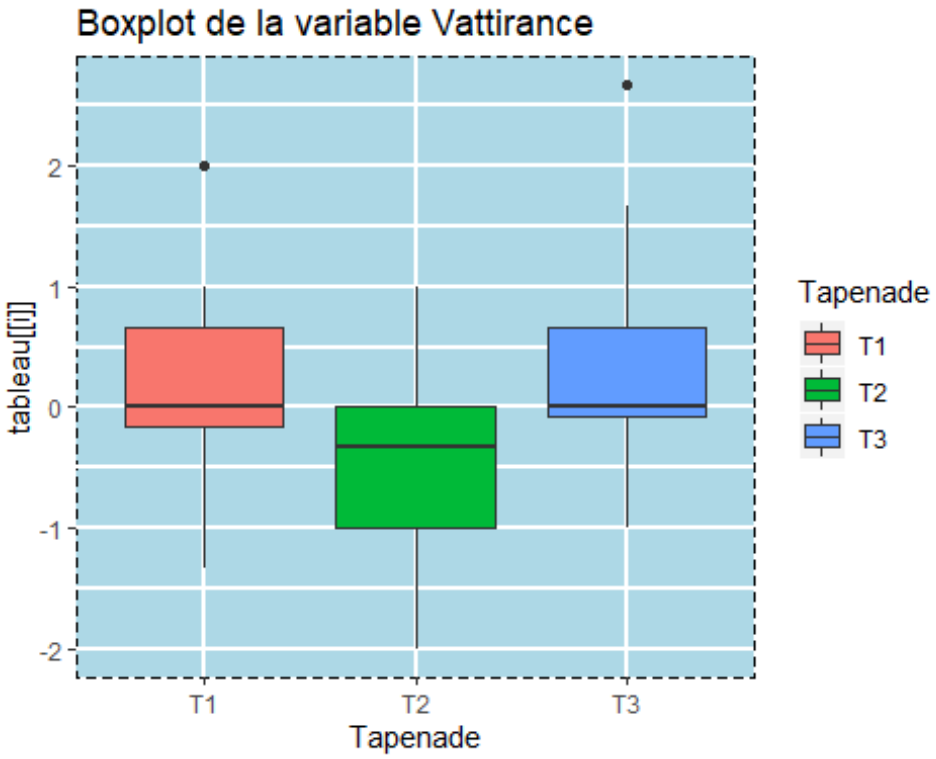
0
-1
-2
T1
T2
T3
Tapenade
Tapenade
T1
T2
T3


Boxplot de la variable Vattirance
tableau[[i]]
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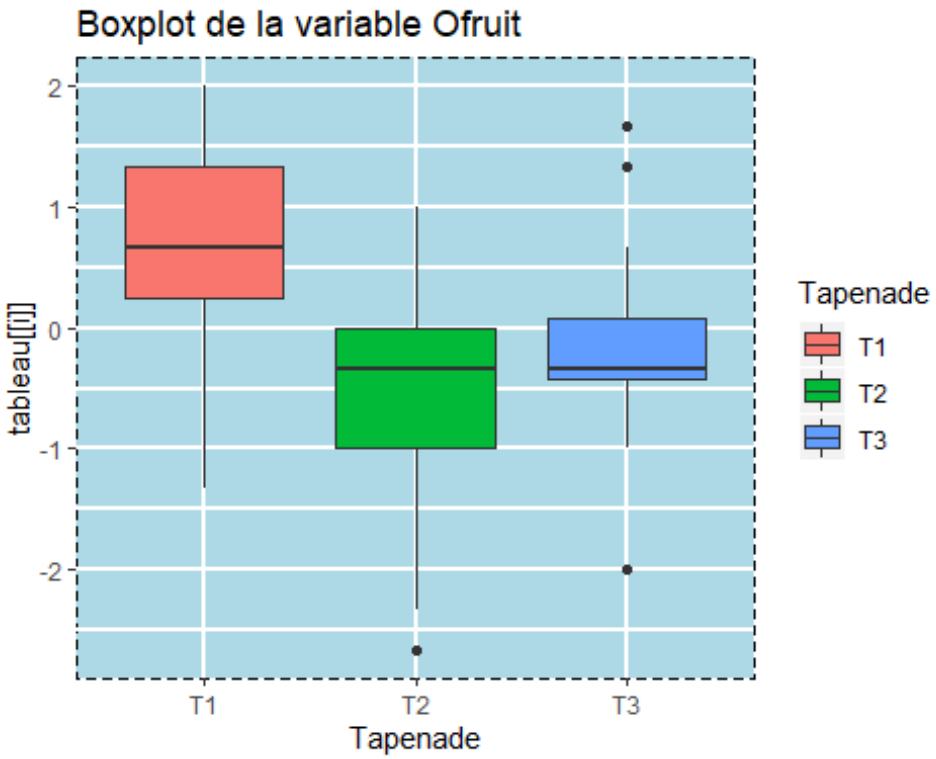
-1
-2
T1
T2
T3
Tapenade
Tapenade
T1
T2
T3


Boxplot de la variable Ofruit
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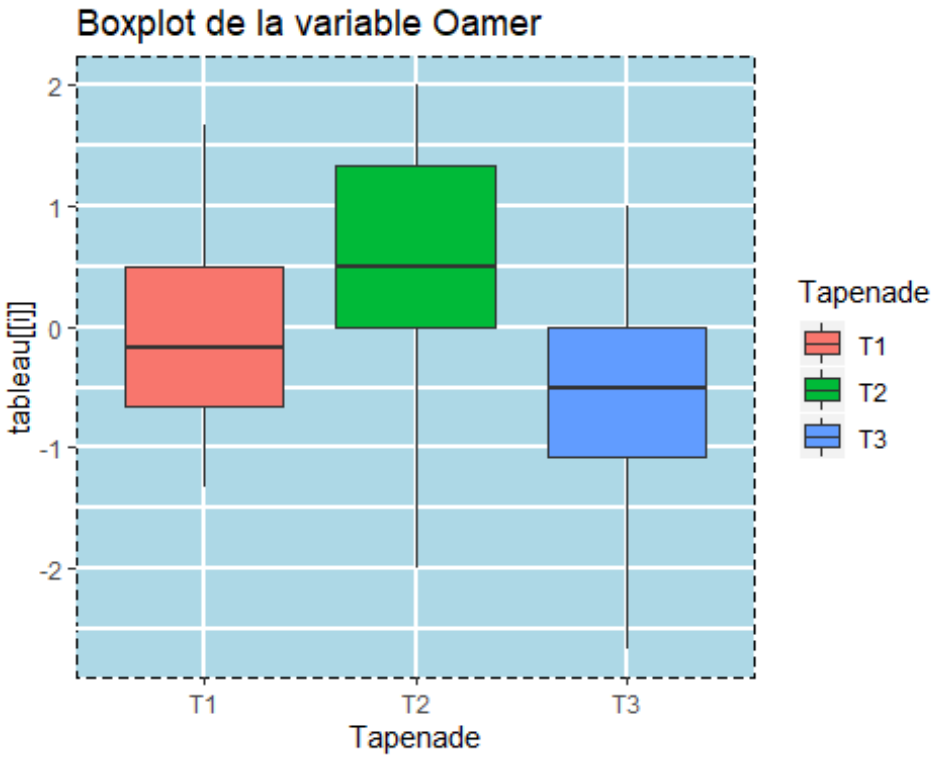
-1
-2
T1
T2
T3
Tapenade
Tapenade
T1
T2
T3


Boxplot de la variable Oamer
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T1
T2
T3
Tapenade
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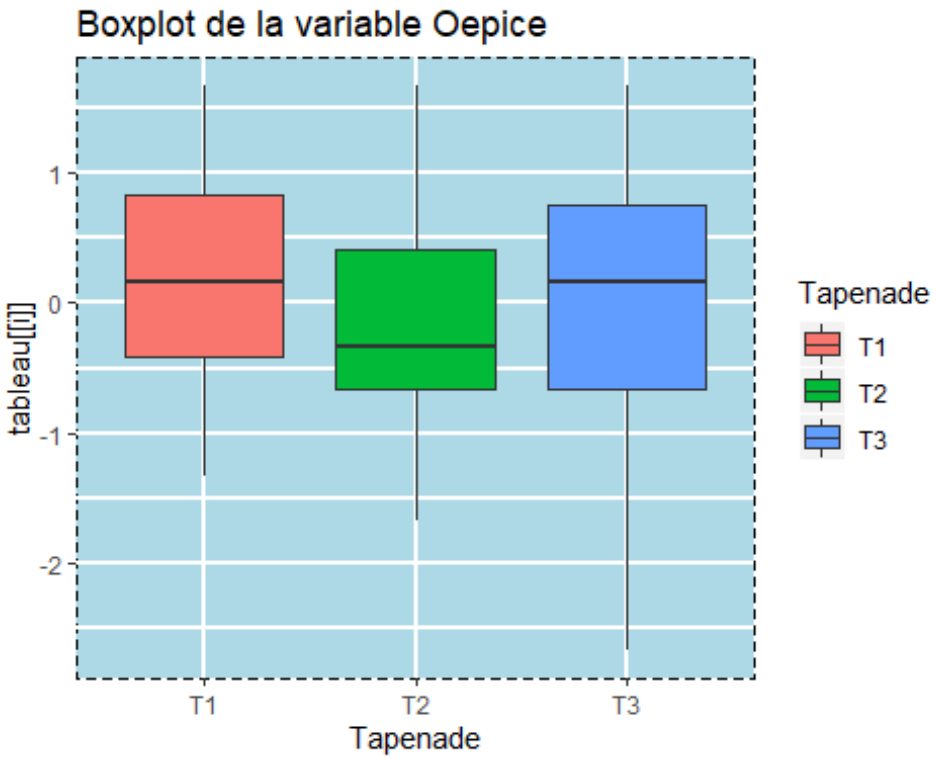
T2
T3


Boxplot de la variable Oepice
tableau[[i]]
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T1
T2
T3
Tapenade
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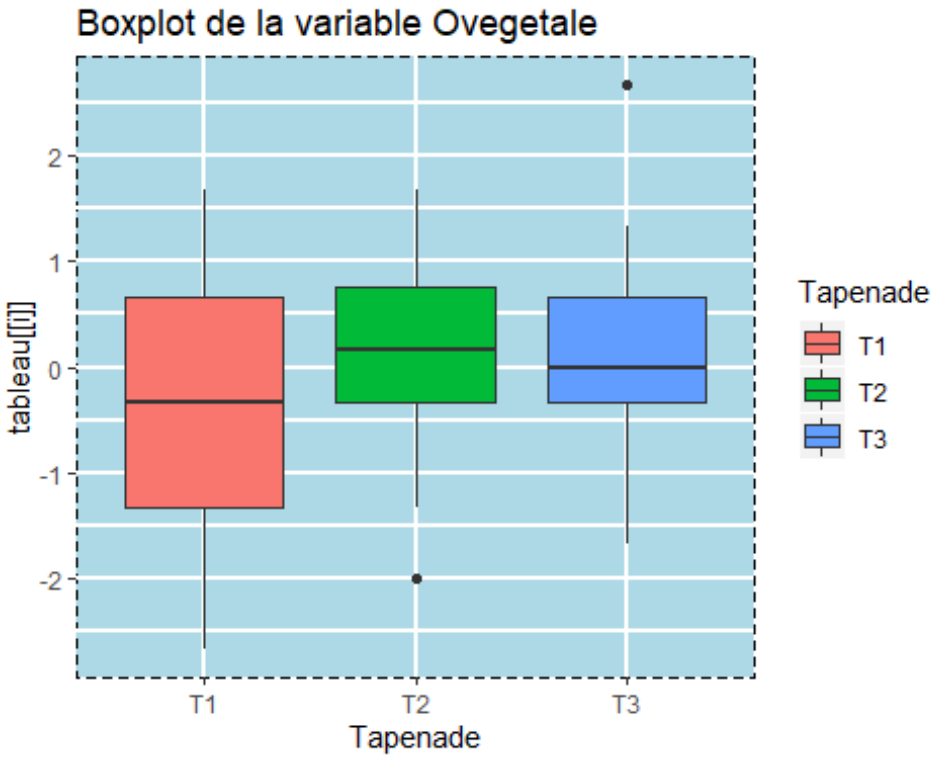
T1
T2
T3


Boxplot de la variable Ovegetale
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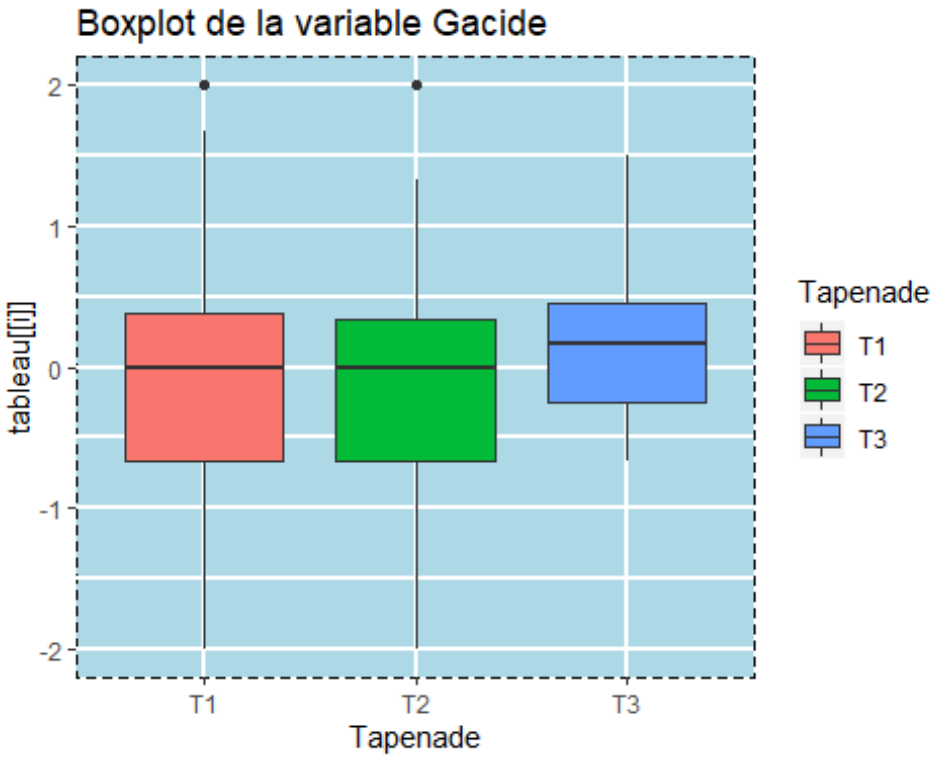
-1
-2
T1
T2
T3
Tapenade
Tapenade
T1
T2
T3


Boxplot de la variable Gacide
tableau[[i]]
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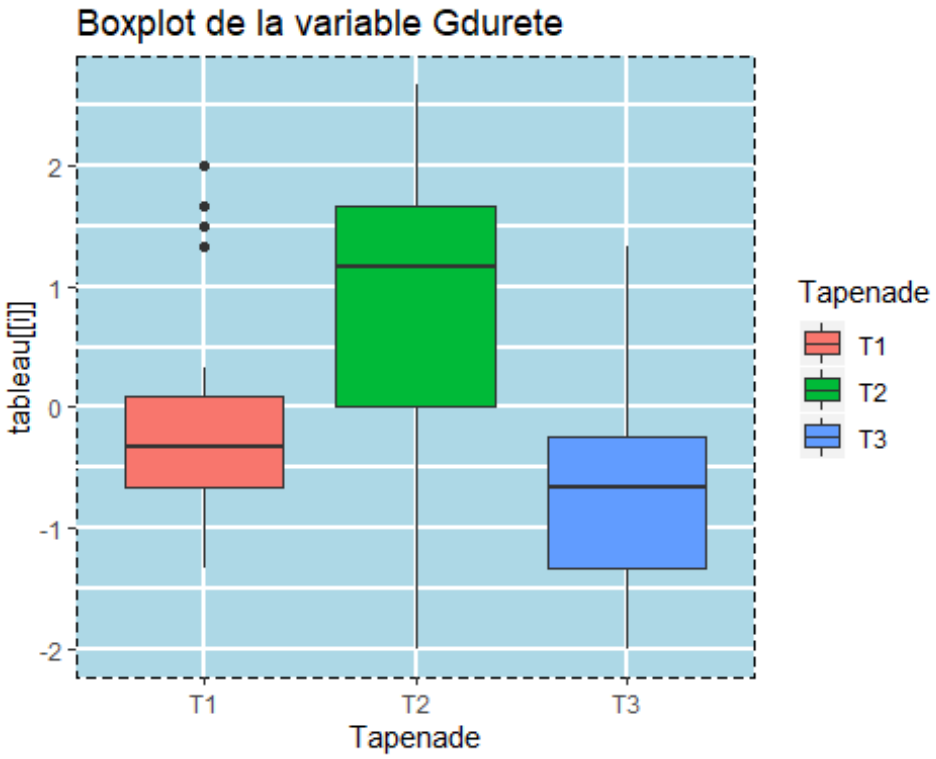
-2
T1
T2
T3
Tapenade
Tapenade
T1
T2
T3


Boxplot de la variable Gdurete
tableau[[i]]
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T1
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T3
Tapenade
Tapenade
T1
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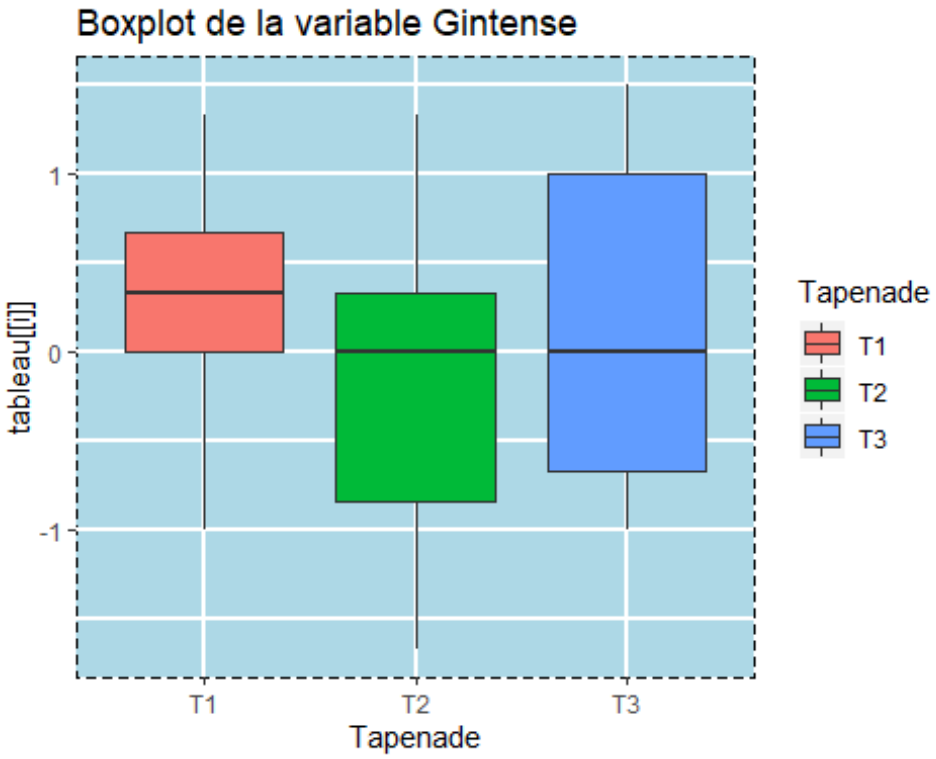
T3


Boxplot de la variable Gintense
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T2
T3
Tapenade
Tapenade
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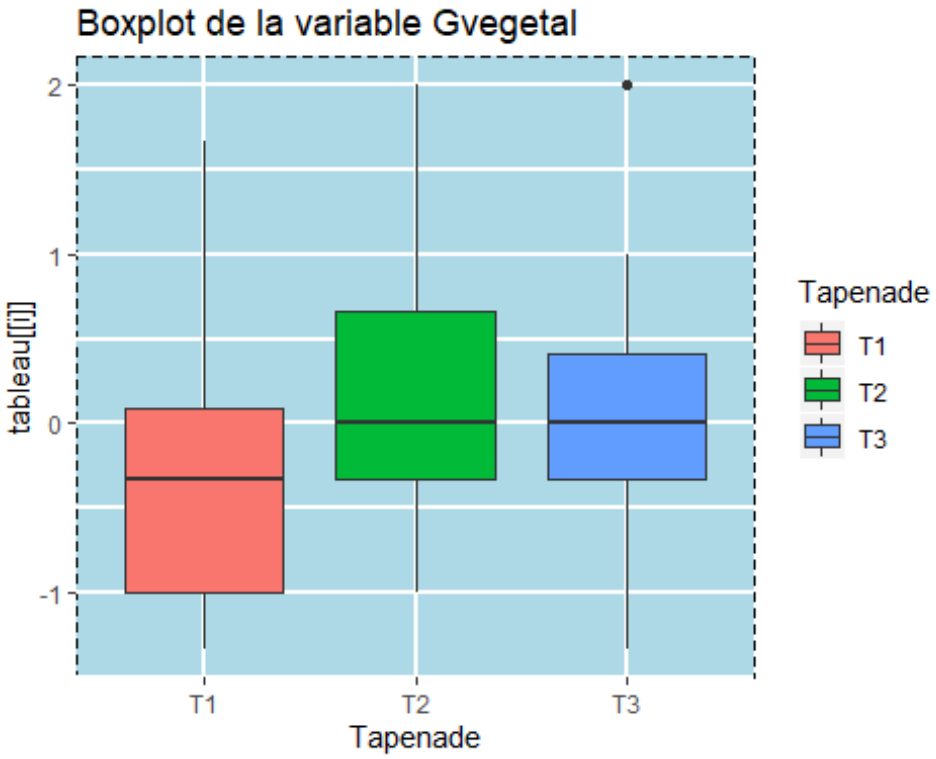
Boxplot de la variable Gvegetal
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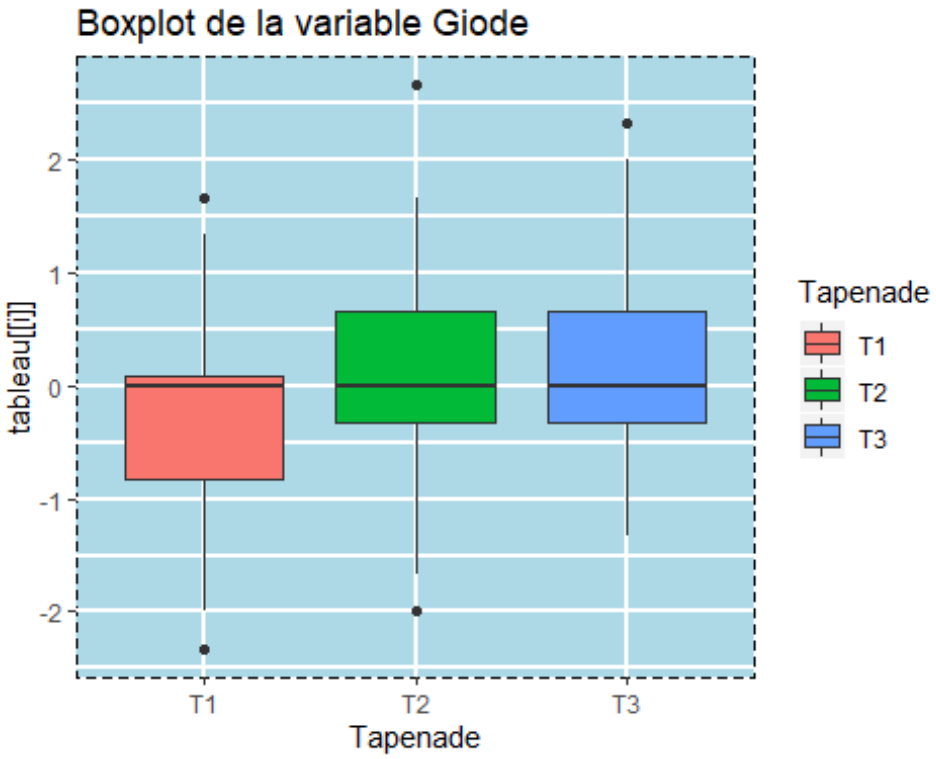
T3


Boxplot de la variable Giode
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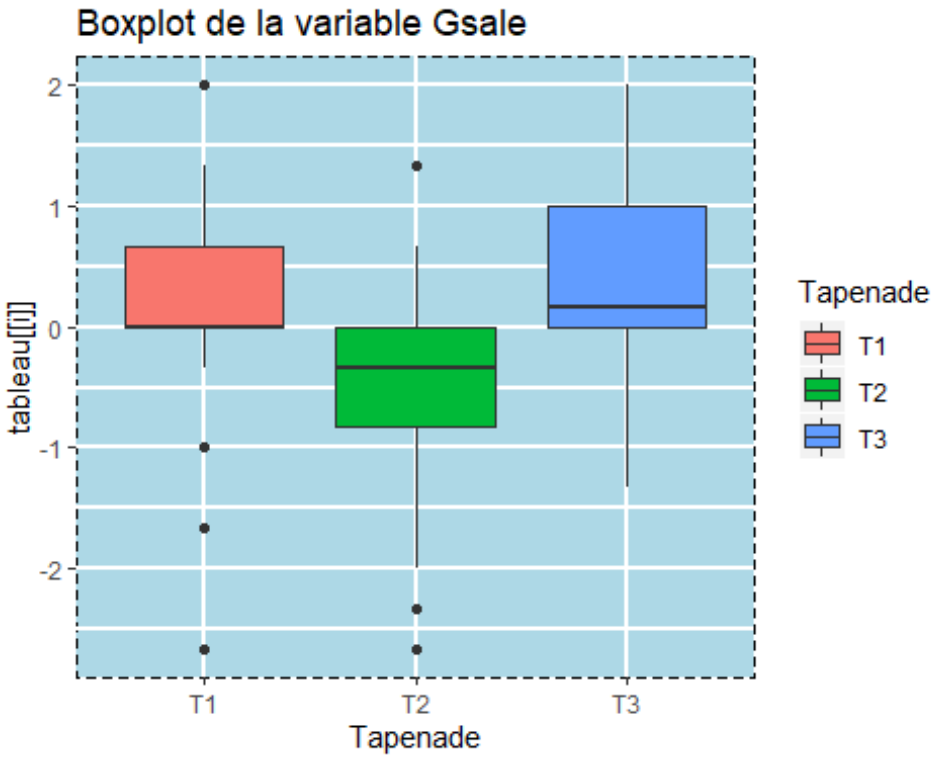
-2
T1
T2
T3
Tapenade
Tapenade
T1
T2
T3


Boxplot de la variable Gsale
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-1
-2
T1
T2
T3
Tapenade
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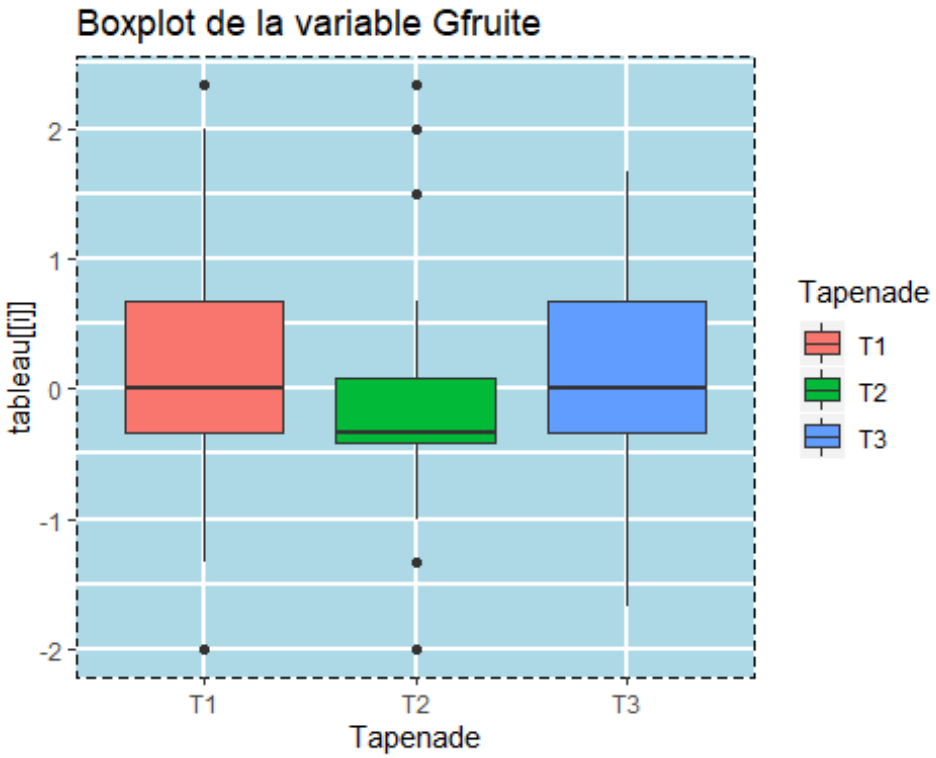
T2
T3


Boxplot de la variable Gfruite
tableau[[i]]
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-1
-2
T1
T2
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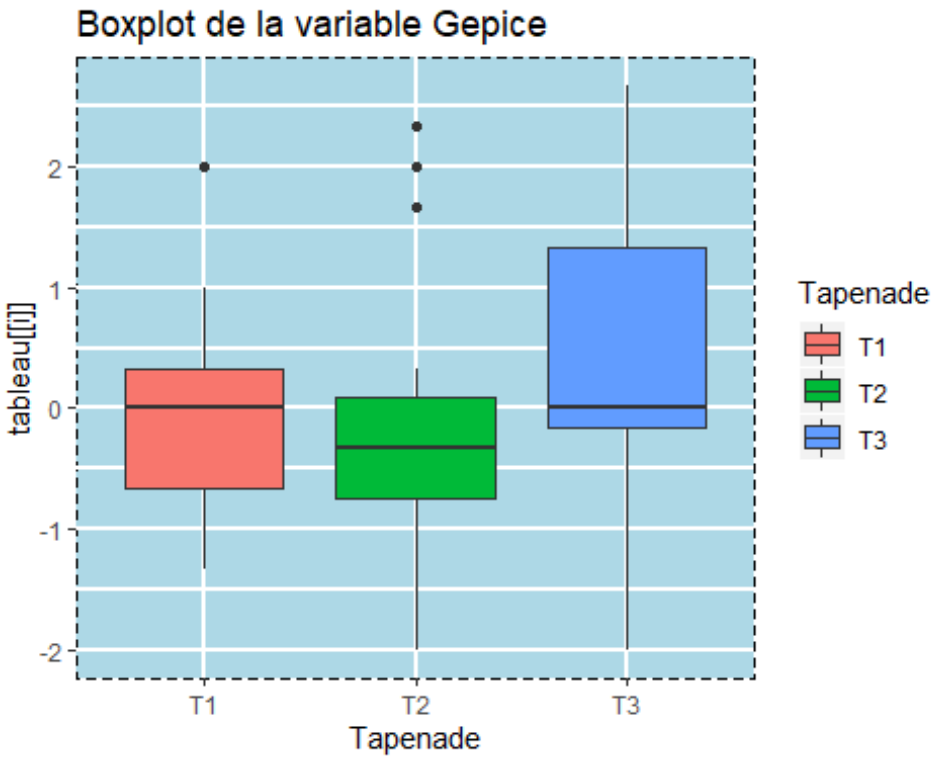
Tapenade
Tapenade
T1
T2
T3


Boxplot de la variable Gepice
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Tapenade
Tapenade
T1
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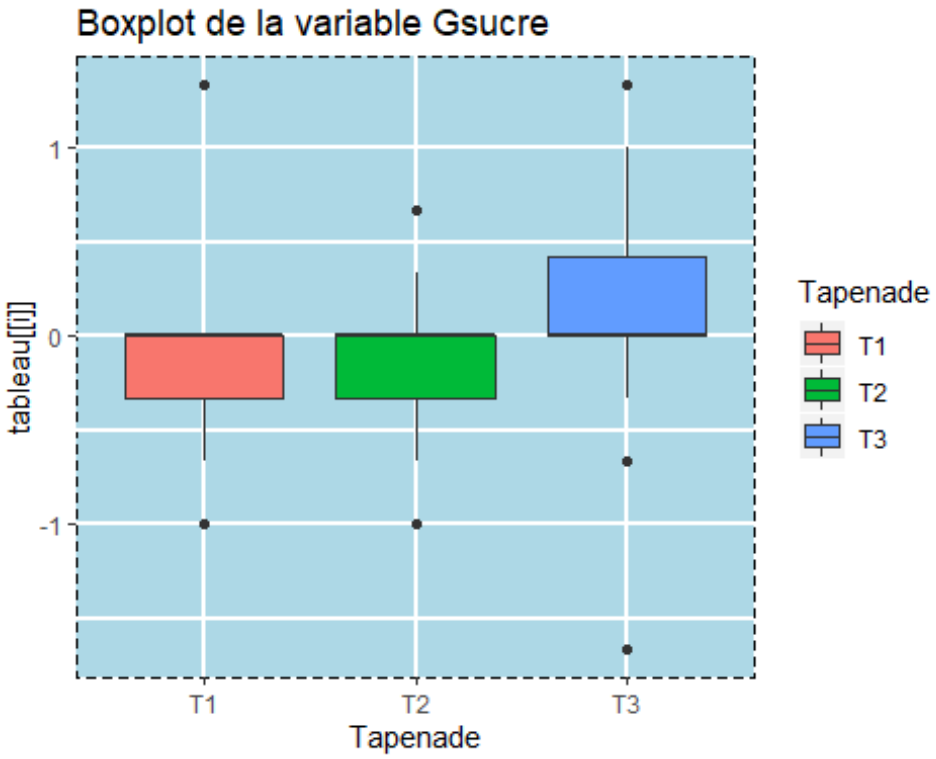
T3


Boxplot de la variable Gsucre
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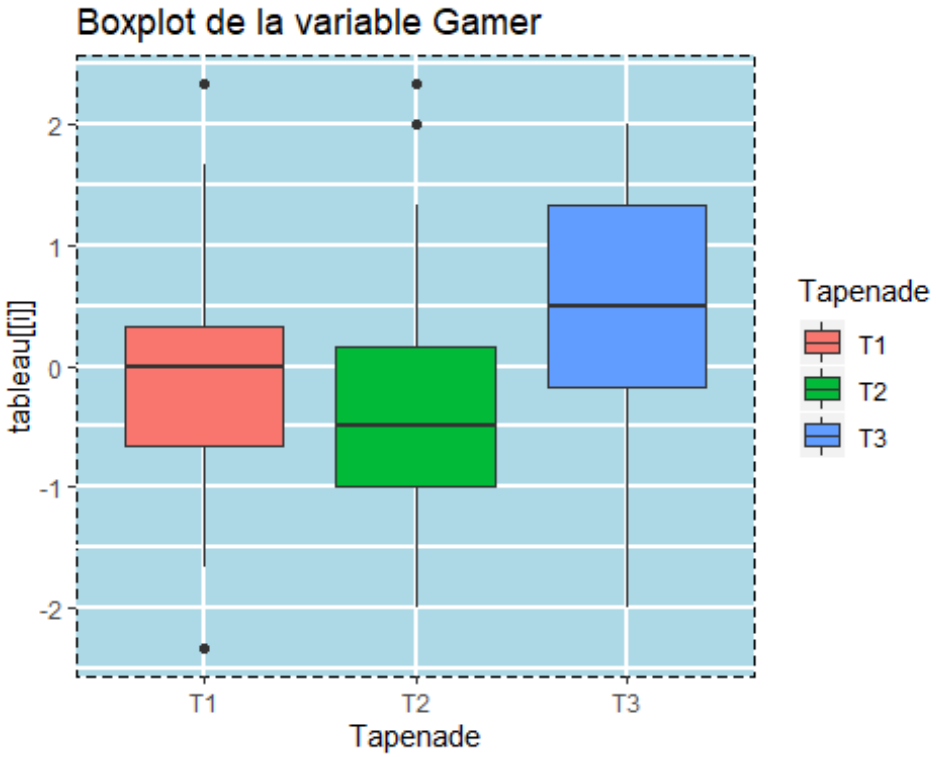
T1
T2
T3
Tapenade
Tapenade
T1
T2
T3


Boxplot de la variable Gamer
tableau[[i]]
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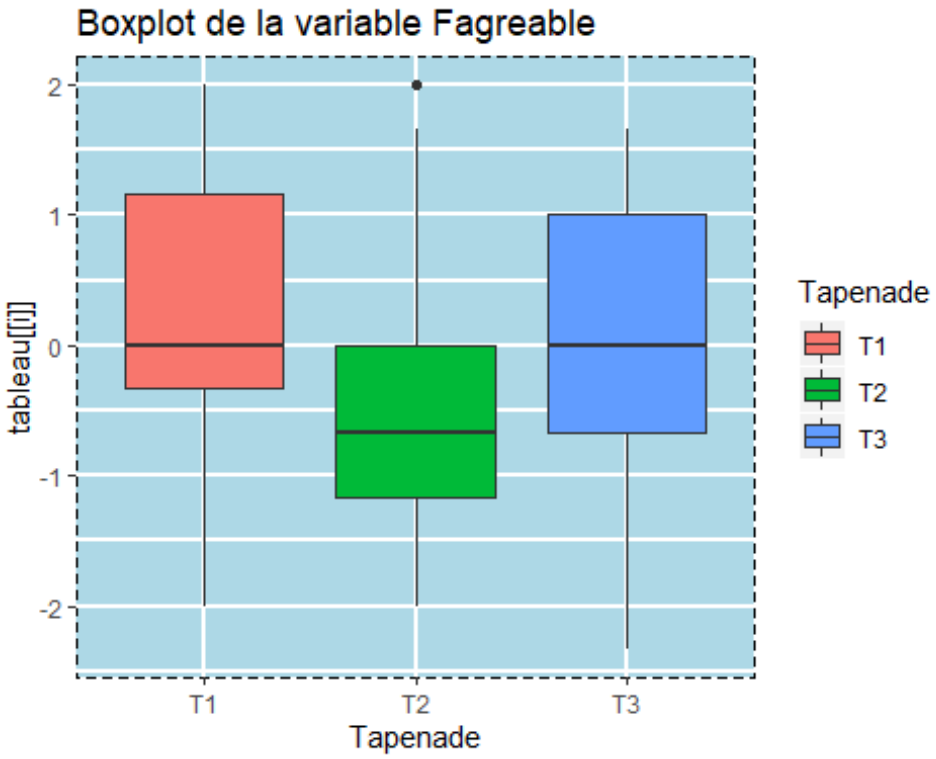
-1
-2
T1
T2
T3
Tapenade
Tapenade
T1
T2
T3


Boxplot de la variable Fagreable
tableau[[i]]
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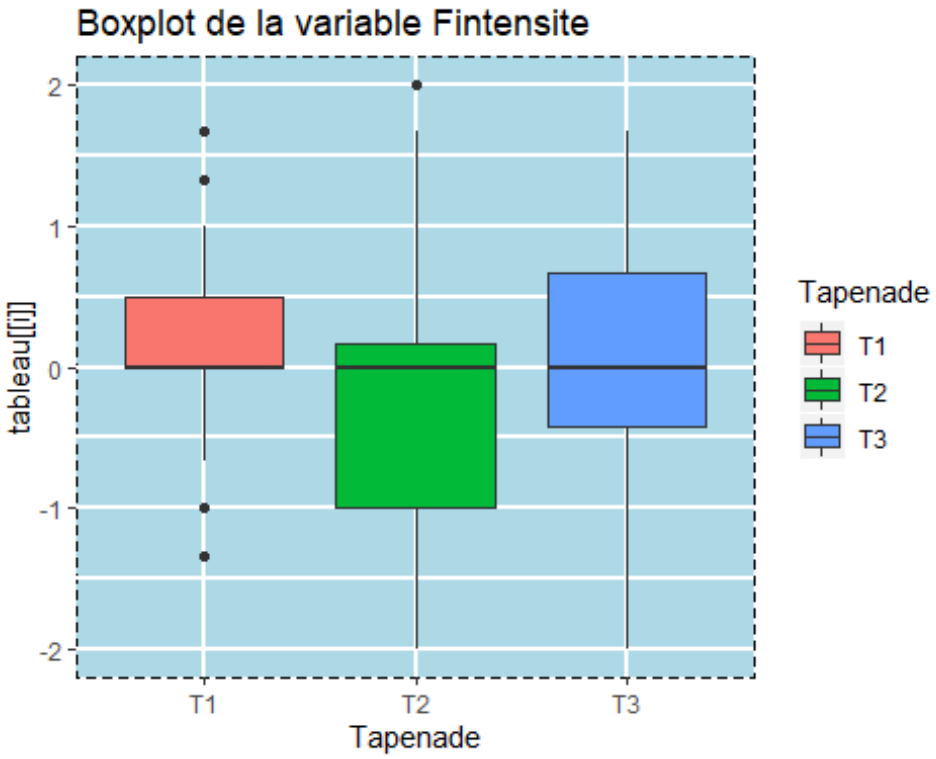
-1
-2
T1
T2
T3
Tapenade
Tapenade
T1
T2
T3


Boxplot de la variable Fintensite
tableau[[i]]
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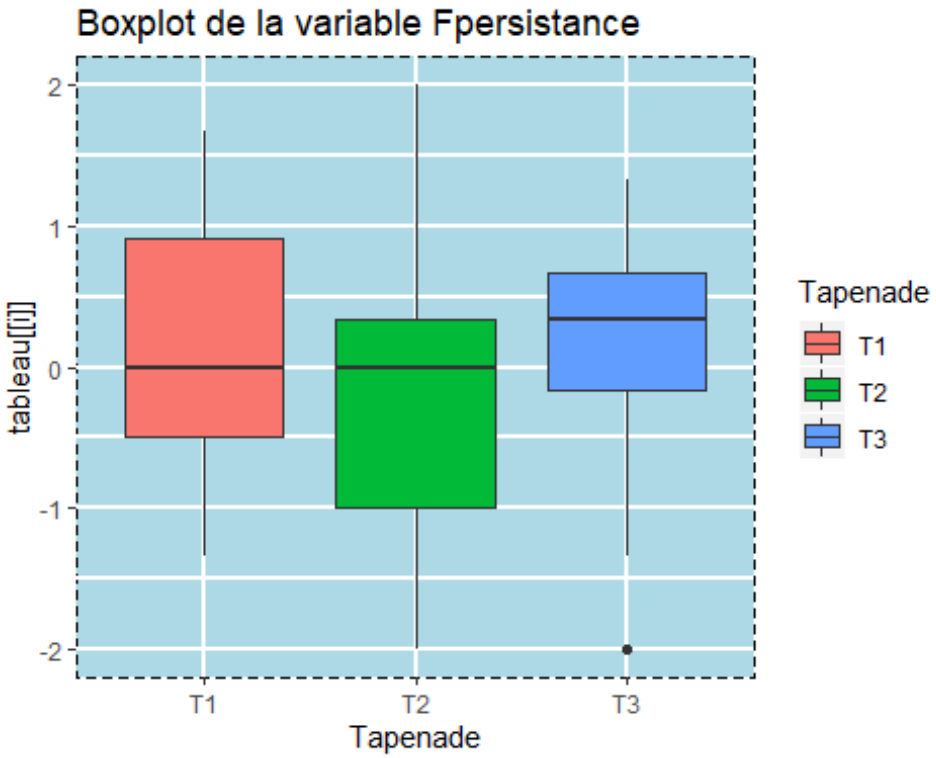
0
-1
-2
T1
T2
T3
Tapenade
Tapenade
T1
T2
T3


Boxplot de la variable Fpersistance
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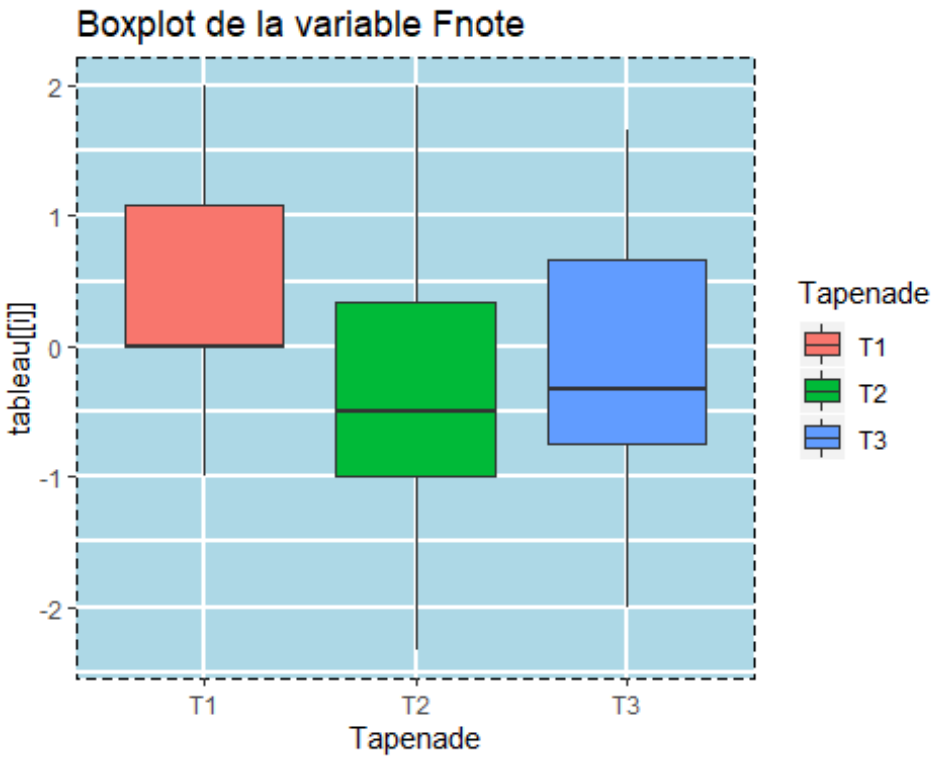
T2
T3
Tapenade
Tapenade
T1
T2
T3


Boxplot de la variable Fnote
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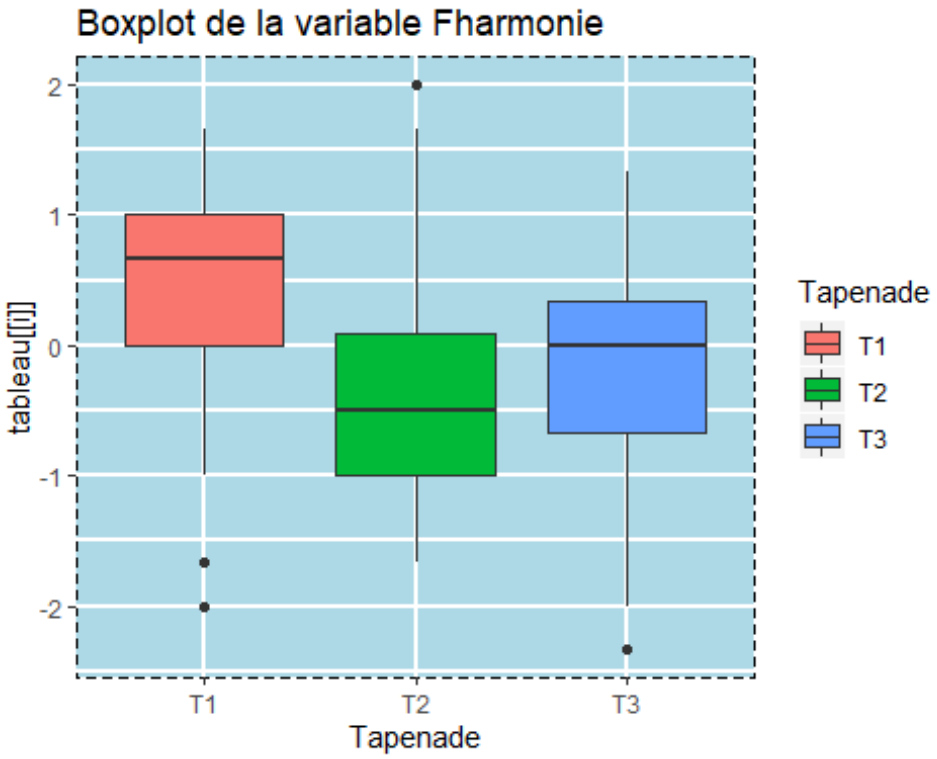
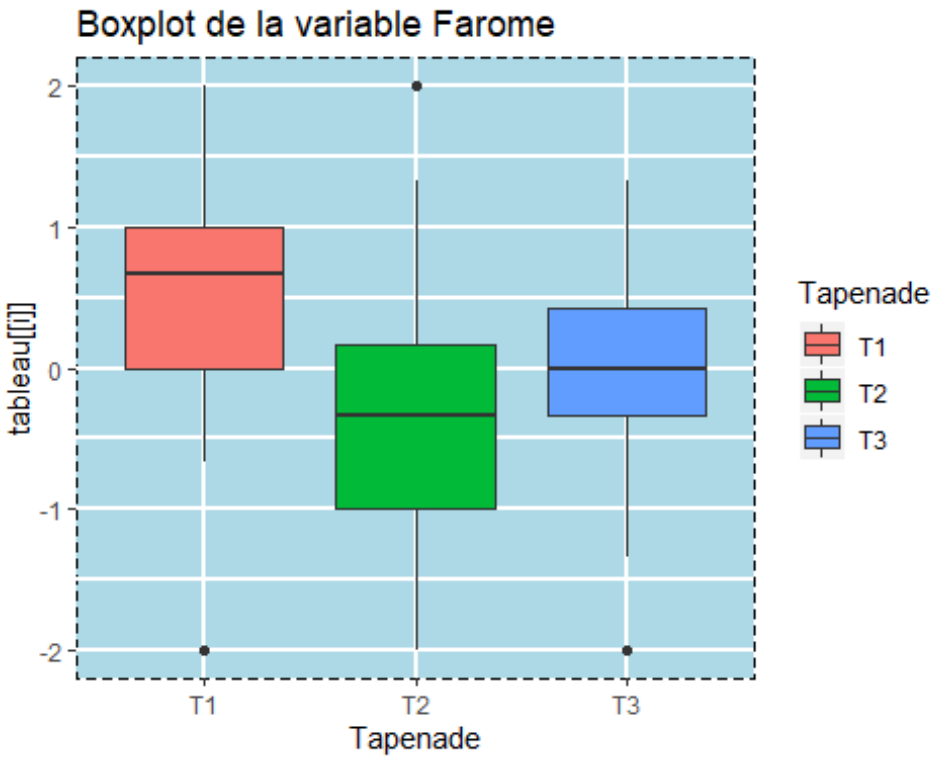
-1
-2
T1
T2
T3
Tapenade
Tapenade
T1
T2
T3

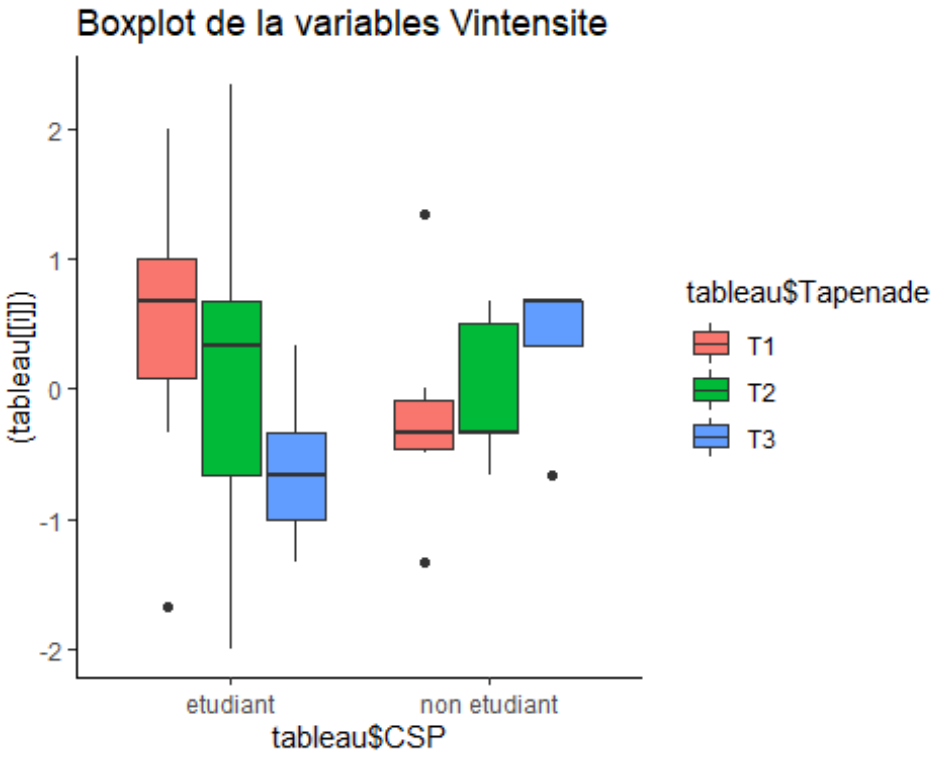





```
# Analyse par goupe

for(i in 12:37){

   p = ggplot(tableau, aes(tableau$CSP, (tableau[[i]]))) +
    geom_boxplot(aes(fill = tableau$Tapenade)) +
    ggtitle(paste("Boxplot de la variables",colnames(tableau[i]))) +
    theme_classic()
   print(p)
}
```


Boxplot de la variables Vintensite
(tableau[[i]])
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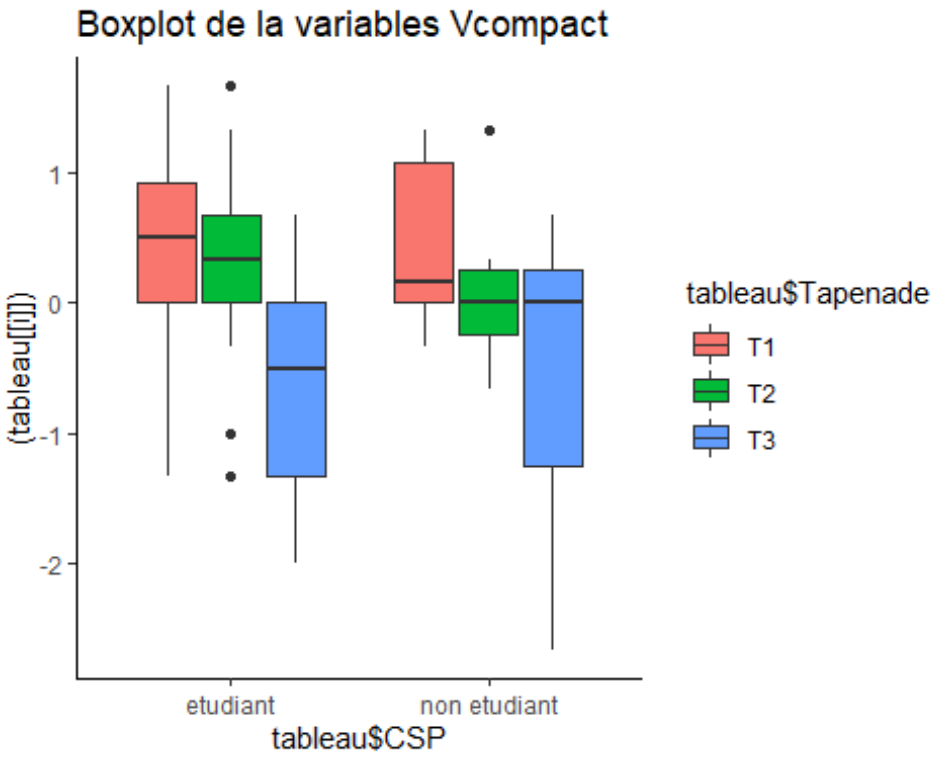
0
-1
-2
etudiant
non etudiant
tableau$CSP
tableau$Tapenade
T1
T2
T3


Boxplot de la variables Vcompact
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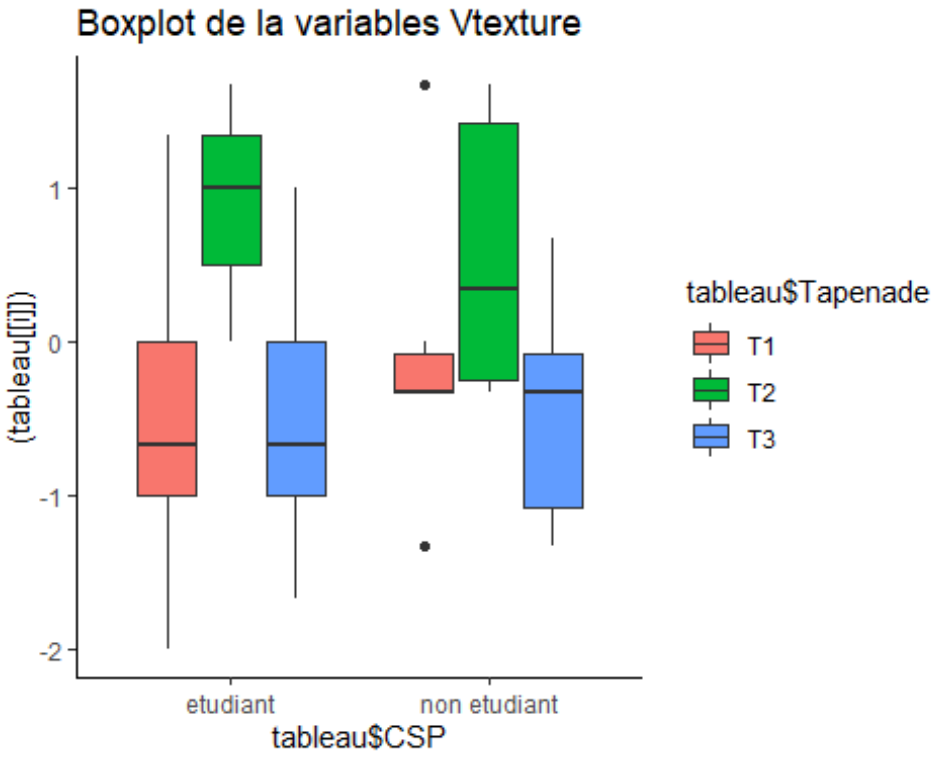
-1
-2
etudiant
non etudiant
tableau$CSP
tableau$Tapenade
T1
T2
T3


Boxplot de la variables Vtexture
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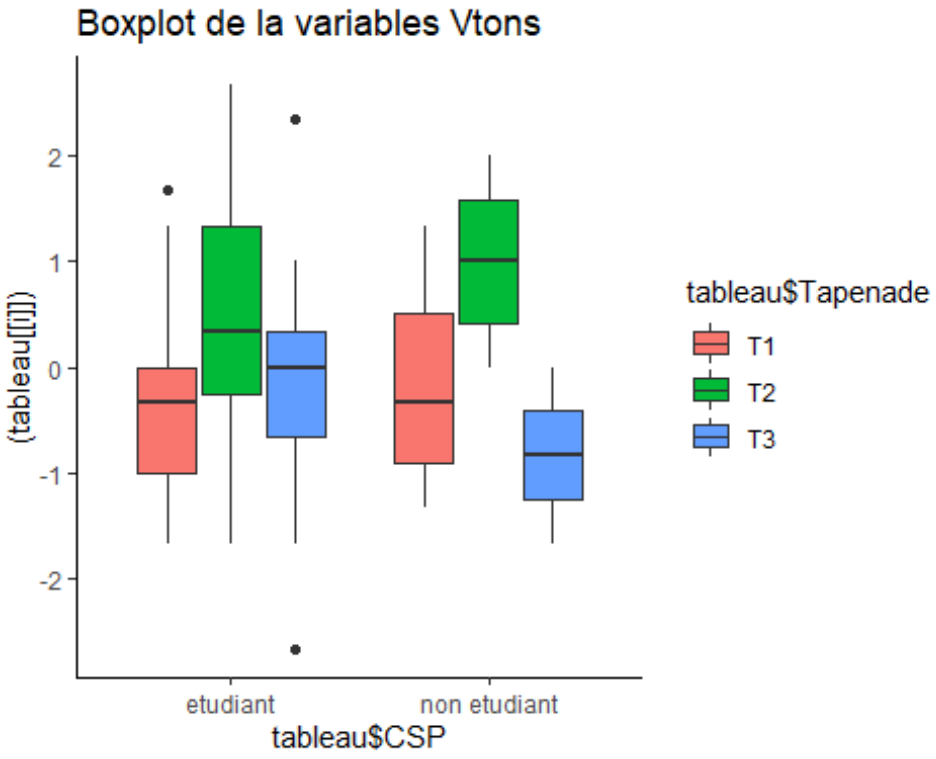
-1
-2
etudiant
non etudiant
tableau$CSP
tableau$Tapenade
T1
T2
T3


Boxplot de la variables Vtons
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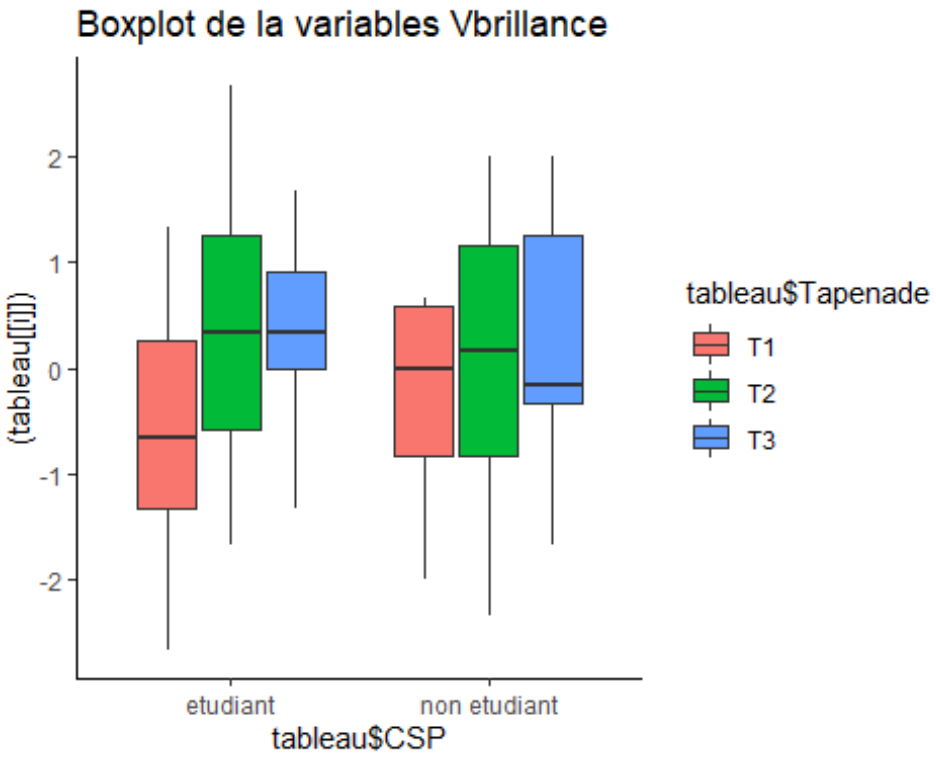
-1
-2
etudiant
non etudiant
tableau$CSP
tableau$Tapenade
T1
T2
T3


Boxplot de la variables Vbrillance
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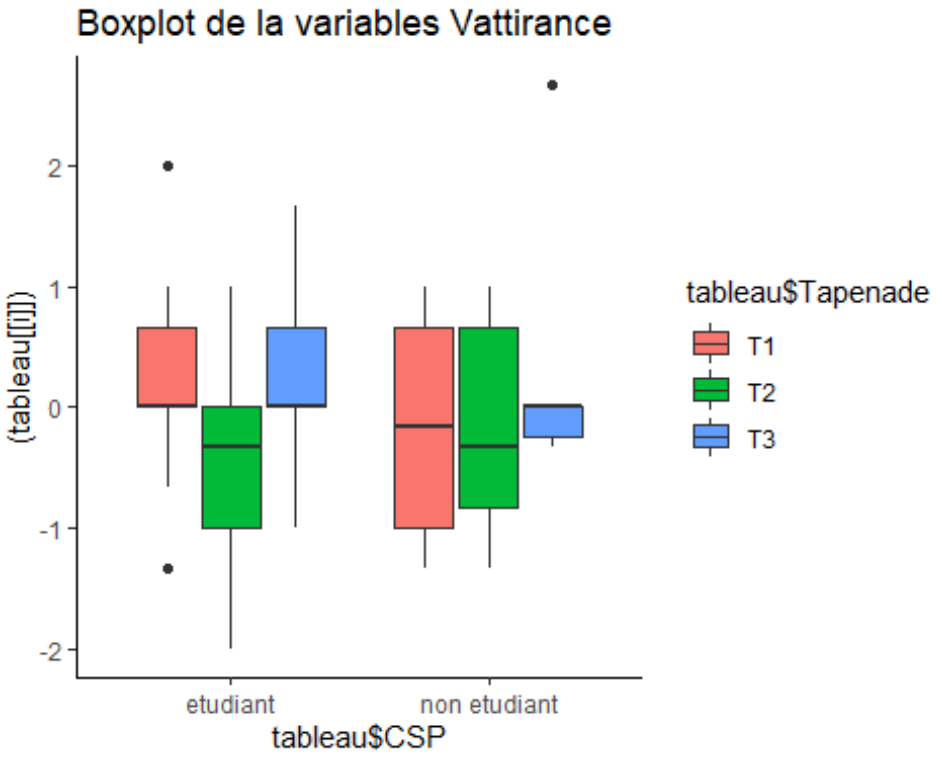
-2
etudiant
non etudiant
tableau$CSP
tableau$Tapenade
T1
T2
T3


Boxplot de la variables Vattirance
(tableau[[i]])
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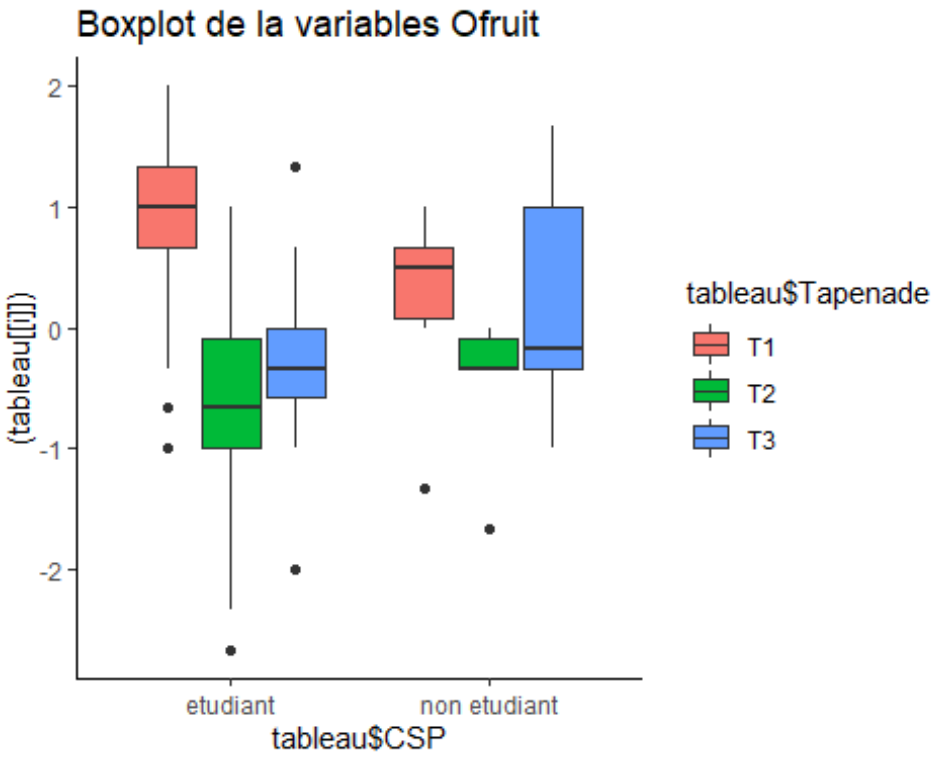
-2
etudiant
non etudiant
tableau$CSP
tableau$Tapenade
T1
T2
T3


Boxplot de la variables Ofruit
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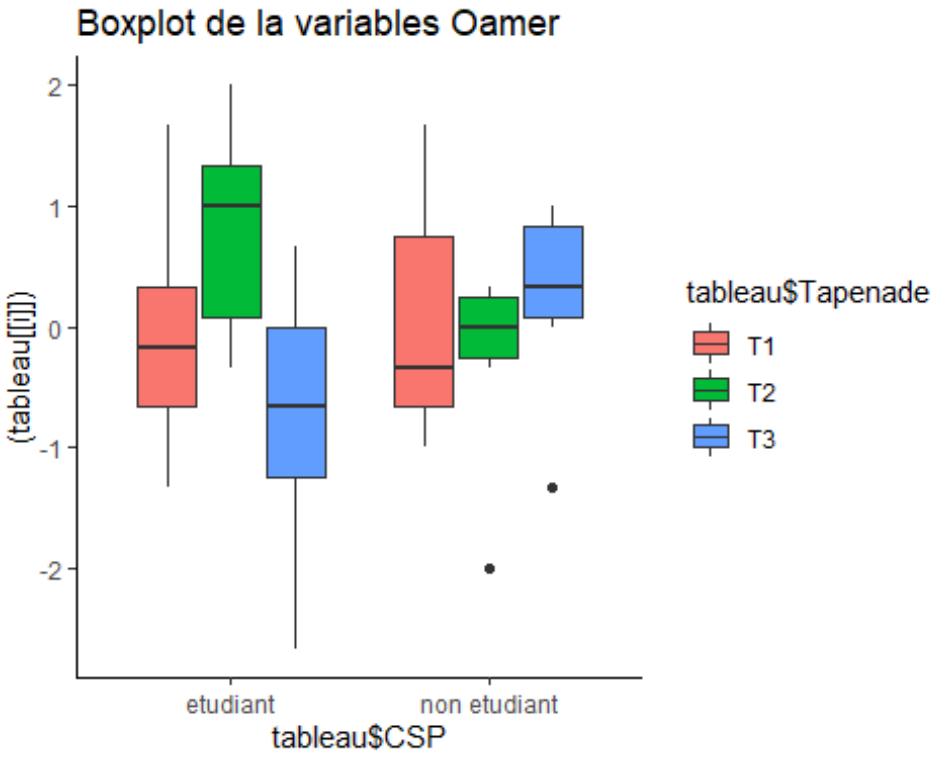
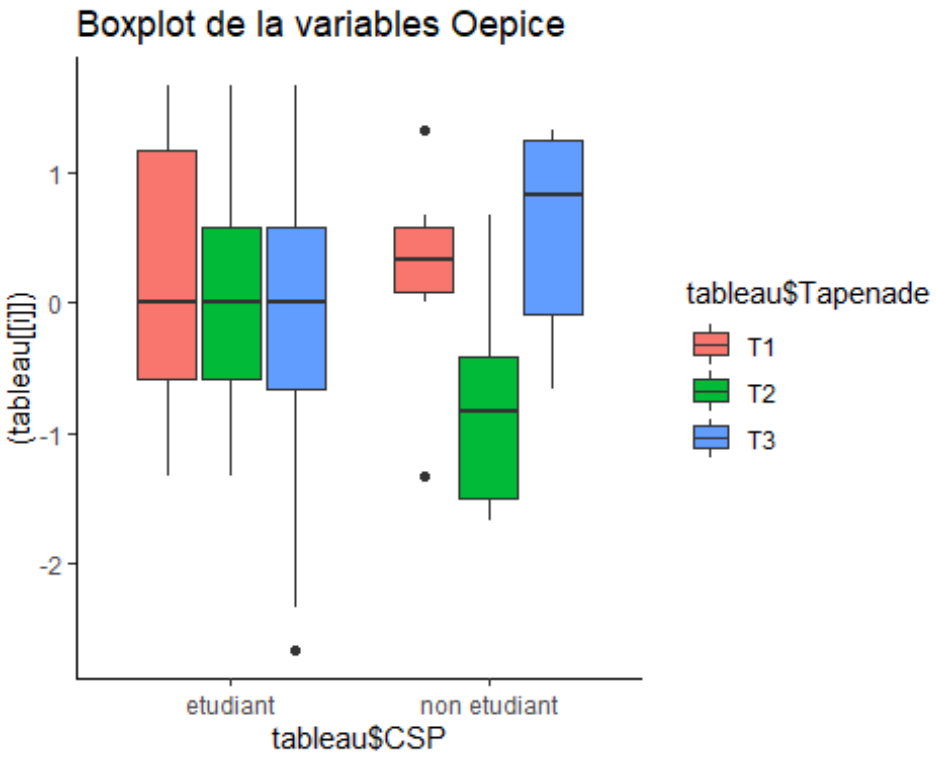
-2
etudiant
non etudiant
tableau$CSP
tableau$Tapenade
T1
T2
T3



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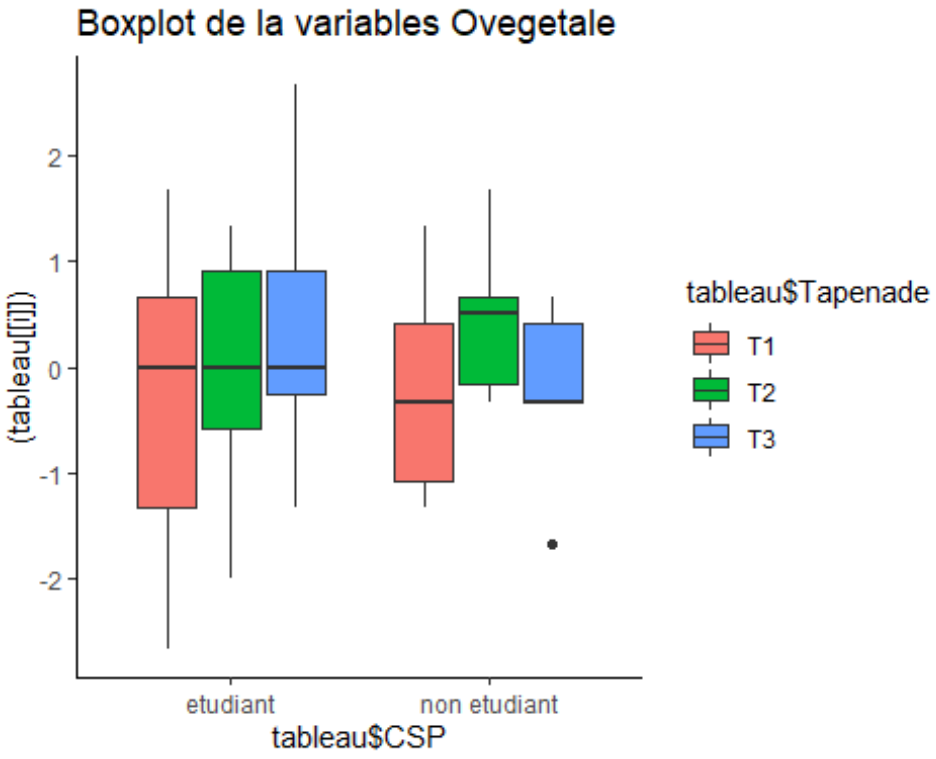
## Warning: Removed 1 rows containing non-finite values (stat_boxplot).
```


Boxplot de la variables Ovegetale
(tableau[[i]])
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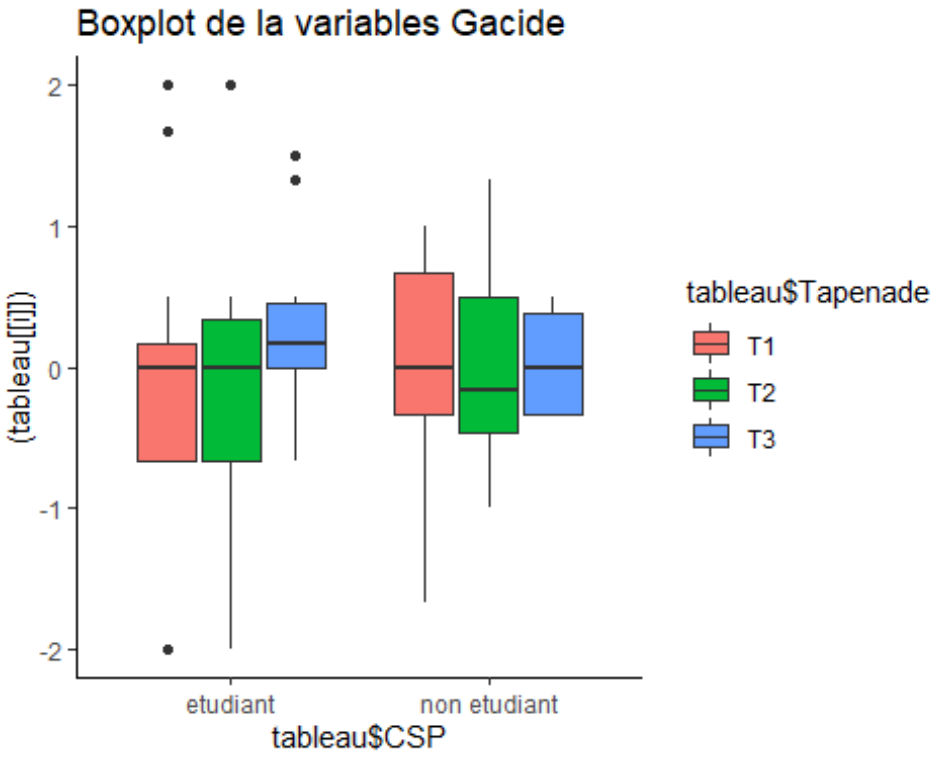
0
-1
-2
etudiant
non etudiant
tableau$CSP
tableau$Tapenade
T1
T2
T3


Boxplot de la variables Gacide
(tableau[[i]])
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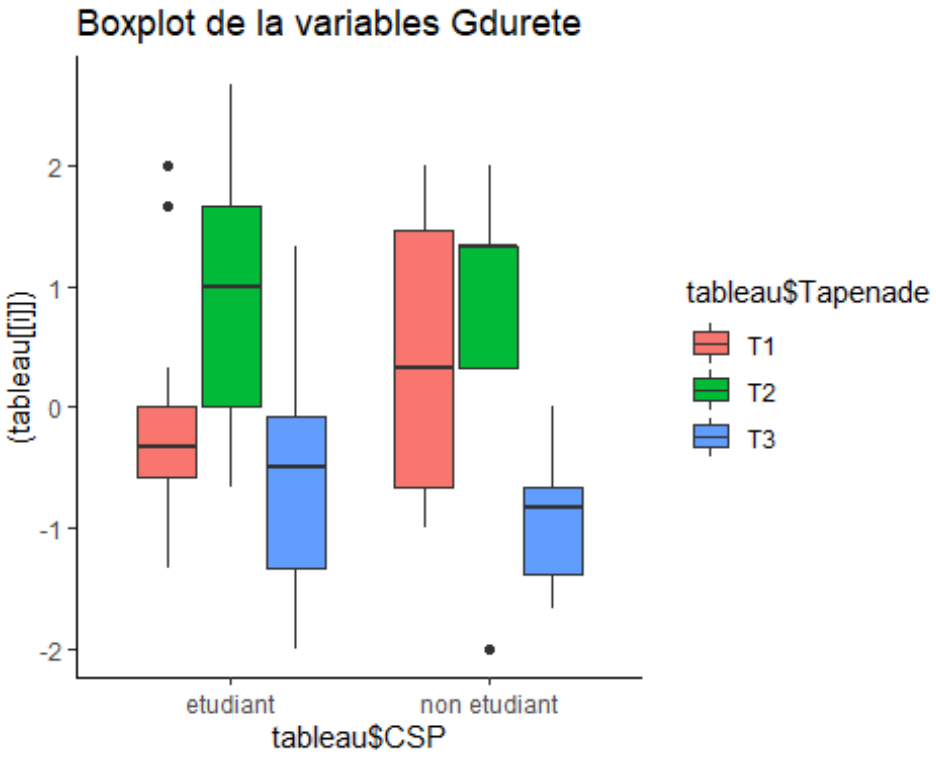
etudiant
non etudiant
tableau$CSP
tableau$Tapenade
T1
T2
T3


Boxplot de la variables Gdurete
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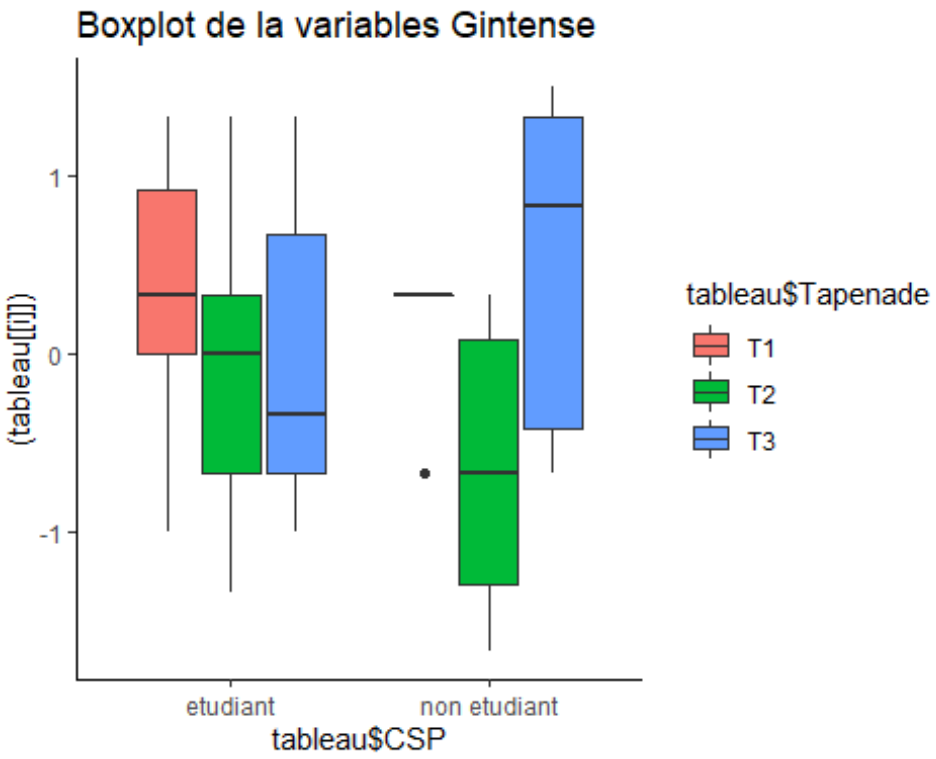
non etudiant
tableau$CSP
tableau$Tapenade
T1
T2
T3


Boxplot de la variables Gintense
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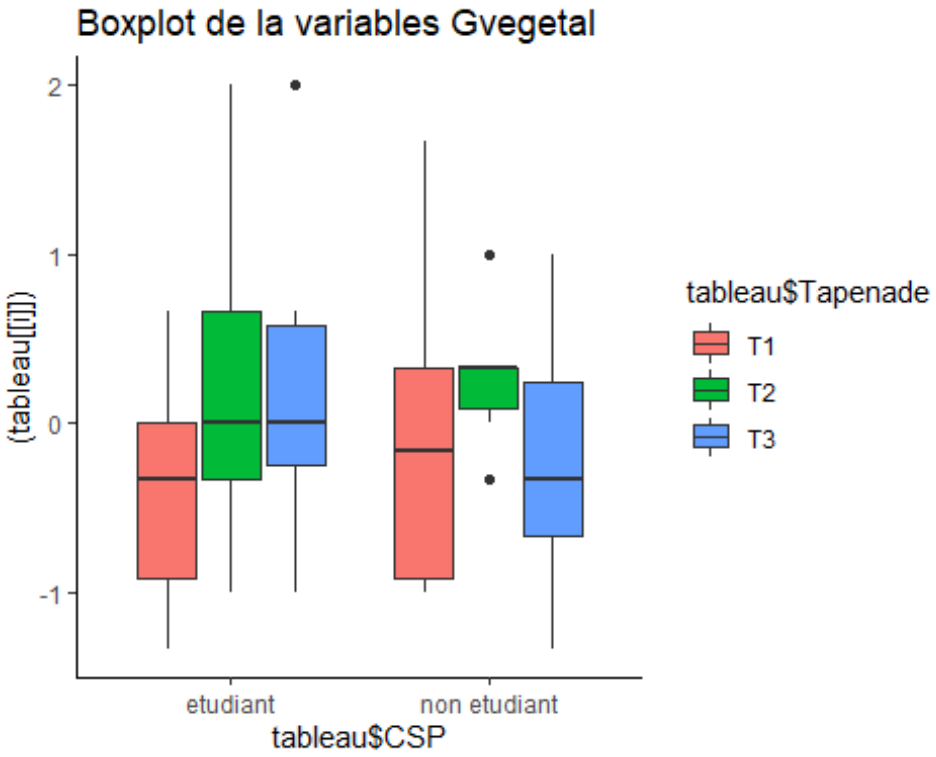
-1
etudiant
non etudiant
tableau$CSP
tableau$Tapenade
T1
T2
T3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etudiant
non etudiant
tableau$CSP
tableau$Tapenade
T1
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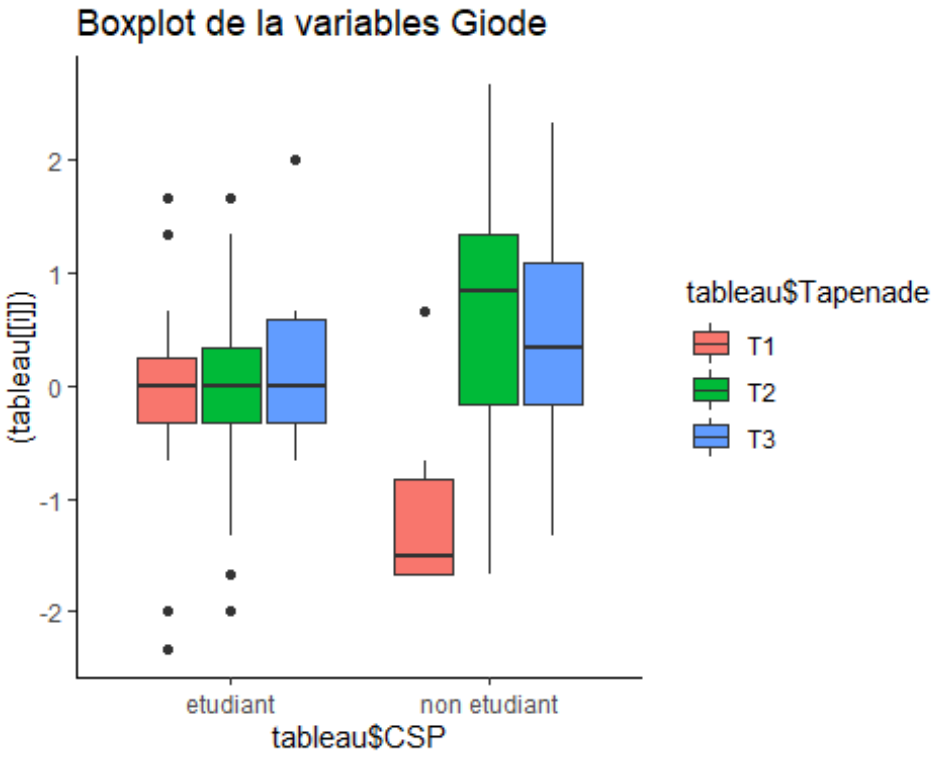
T3


Boxplot de la variables Giode
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non etudiant
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tableau$Tapenade
T1
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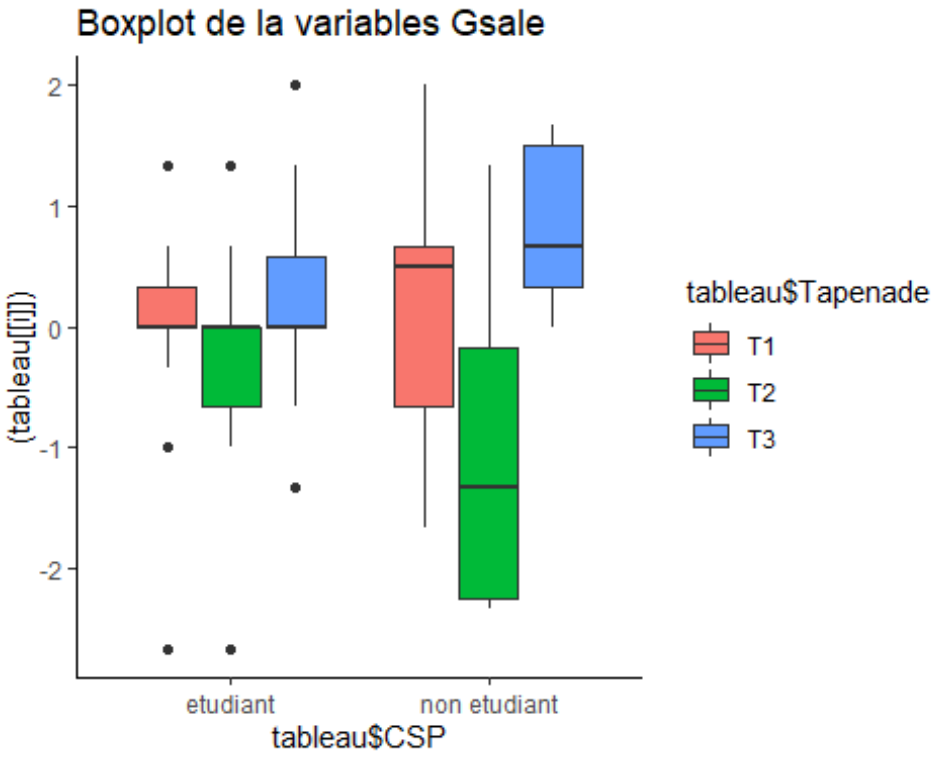
T3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tableau$Tapenade
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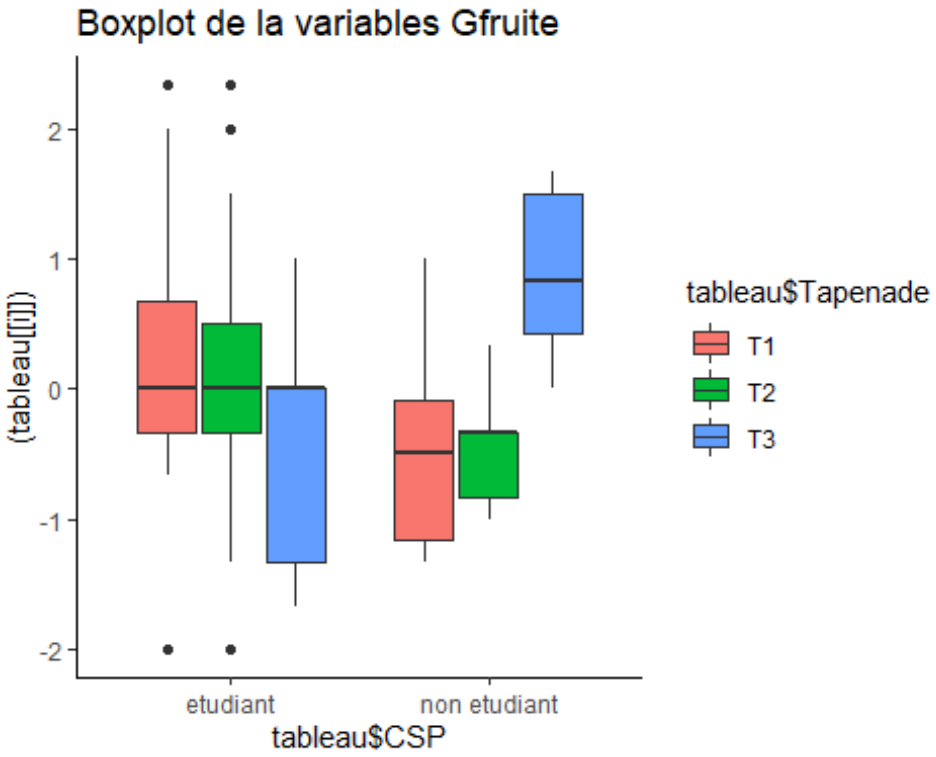
T2
T3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tableau$Tapenade
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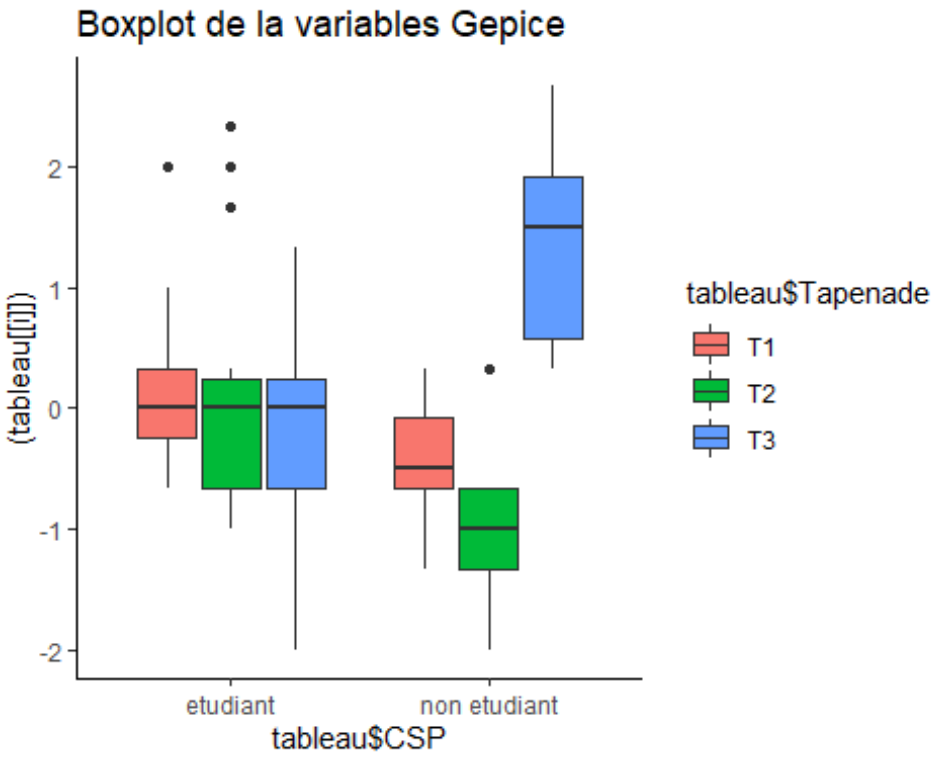
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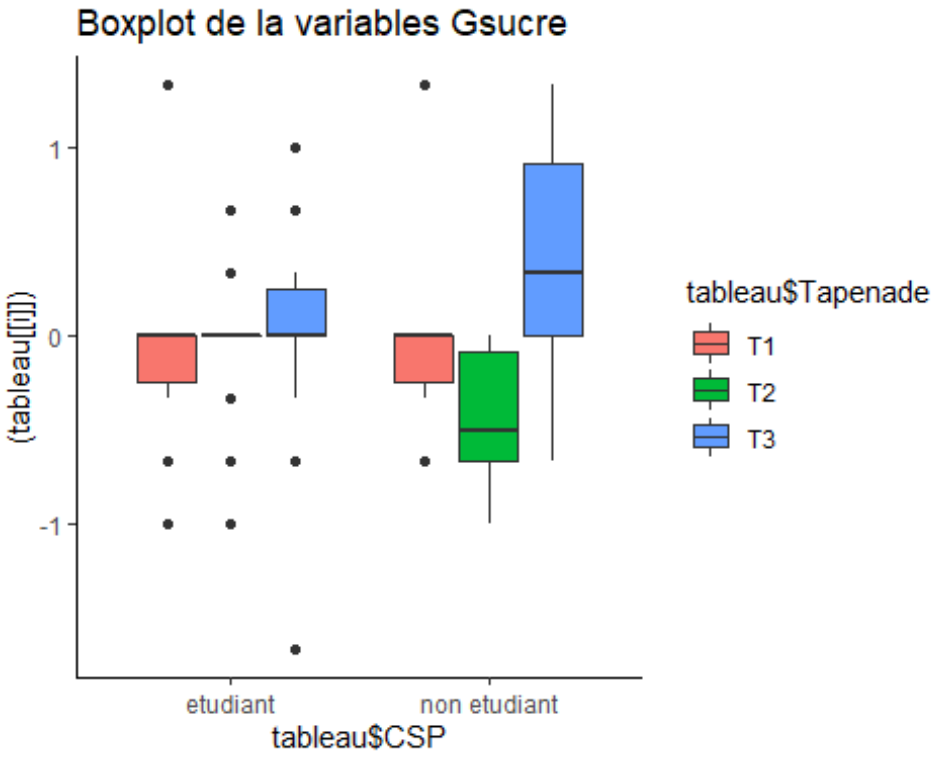
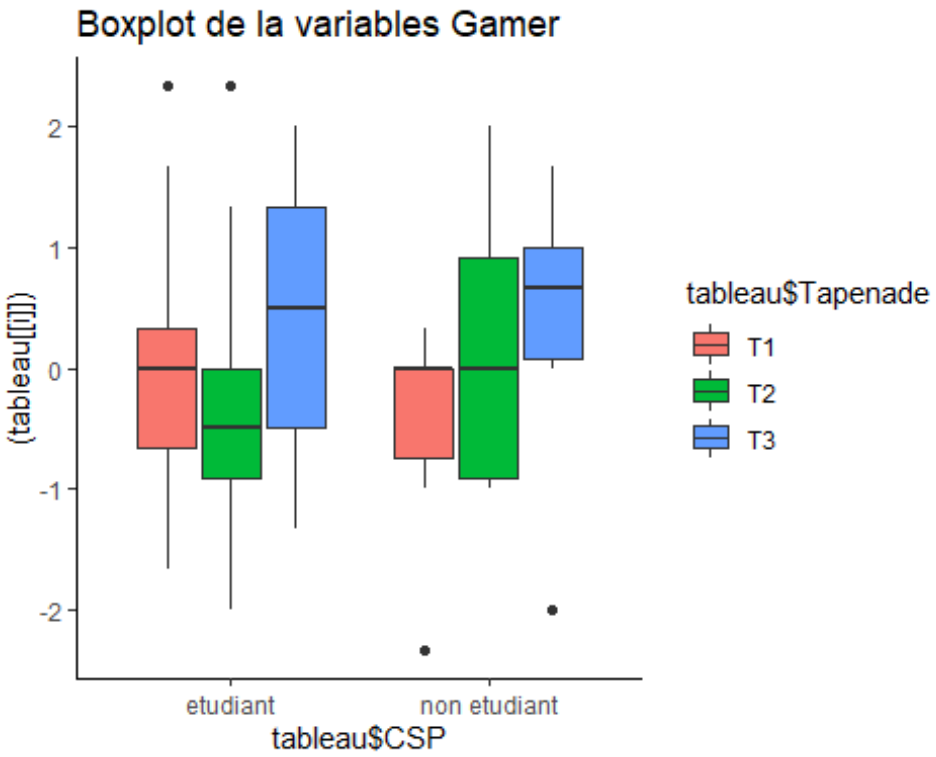
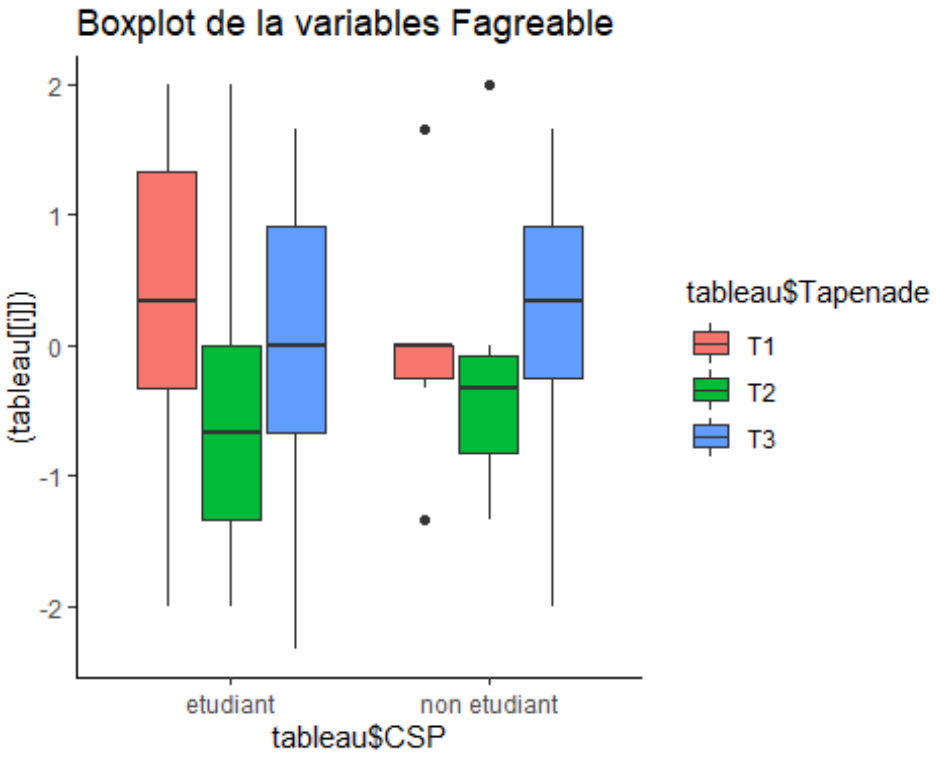
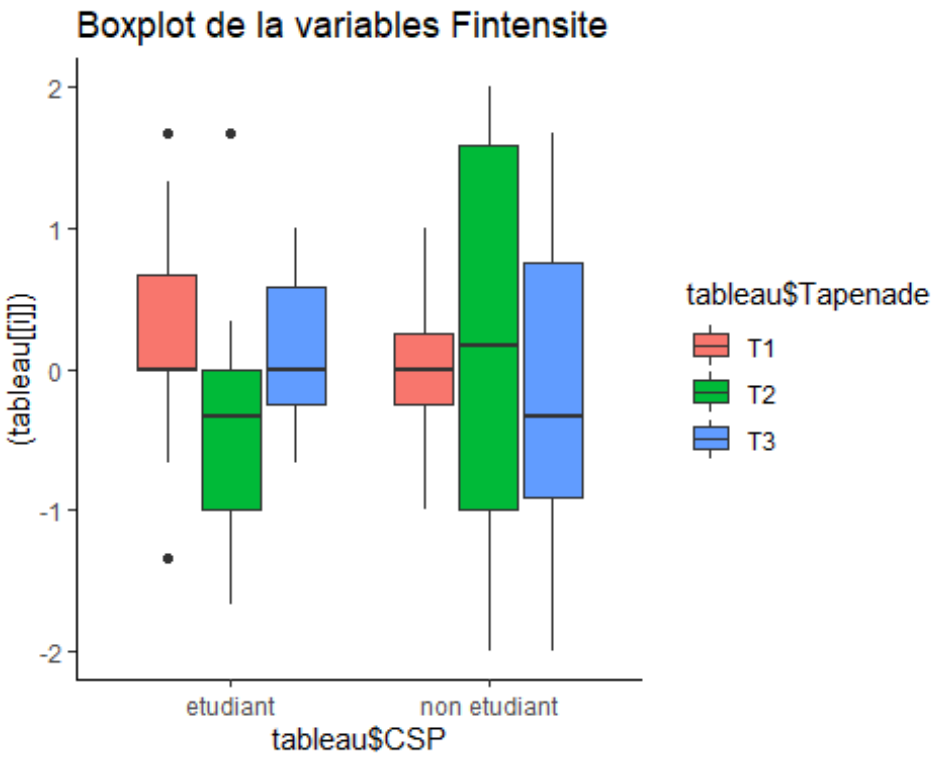
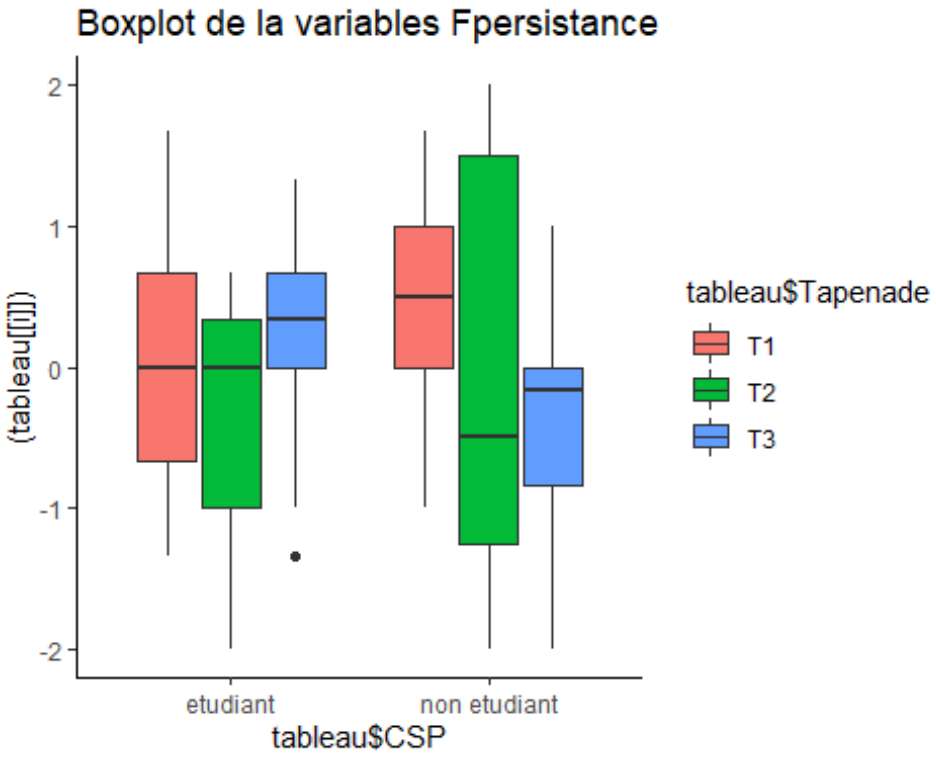
tableau$CSP
tableau$Tapenade
T1
T2
T3

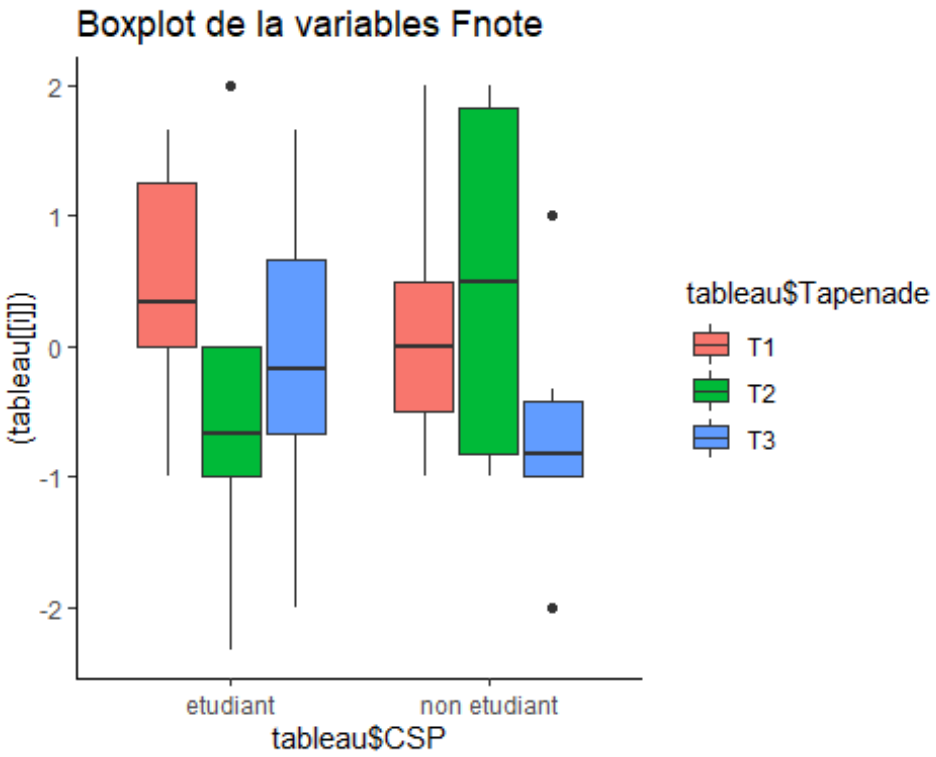

Boxplot de la variables Gsucre
(tableau[[i]])
1
0
-1
etudiant
non etudiant
tableau$CSP
tableau$Tapenade
T1
T2
T3

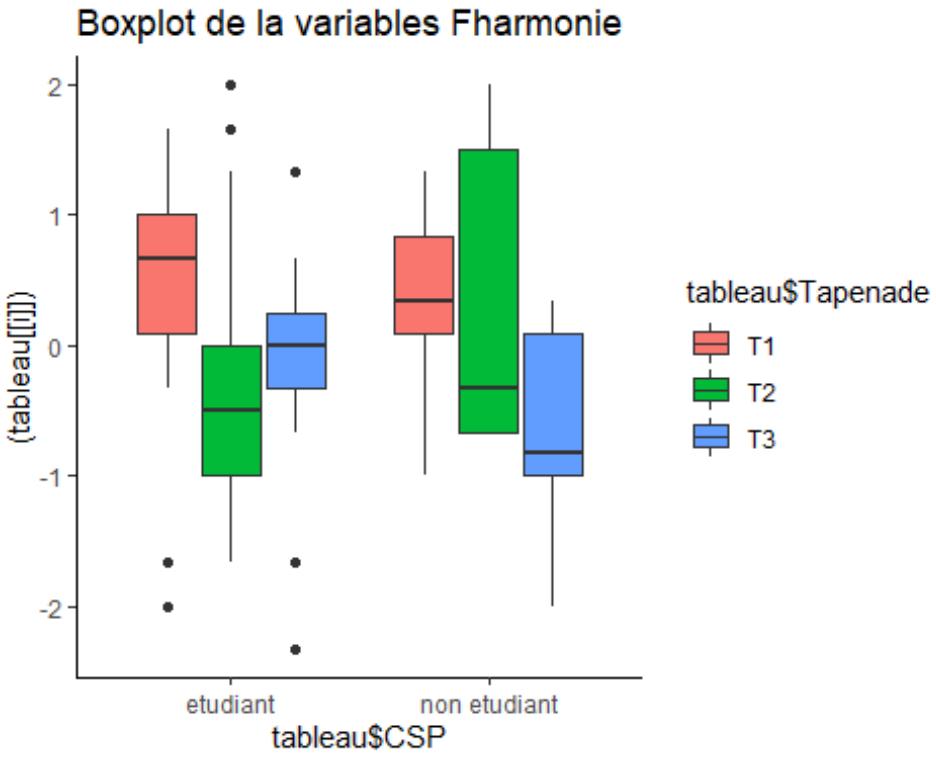

Boxplot de la variables Gamer
(tableau[[i]])
2
1
0
-1
-2
etudiant
non etudiant
tableau$CSP
tableau$Tapenade
T1
T2
T3

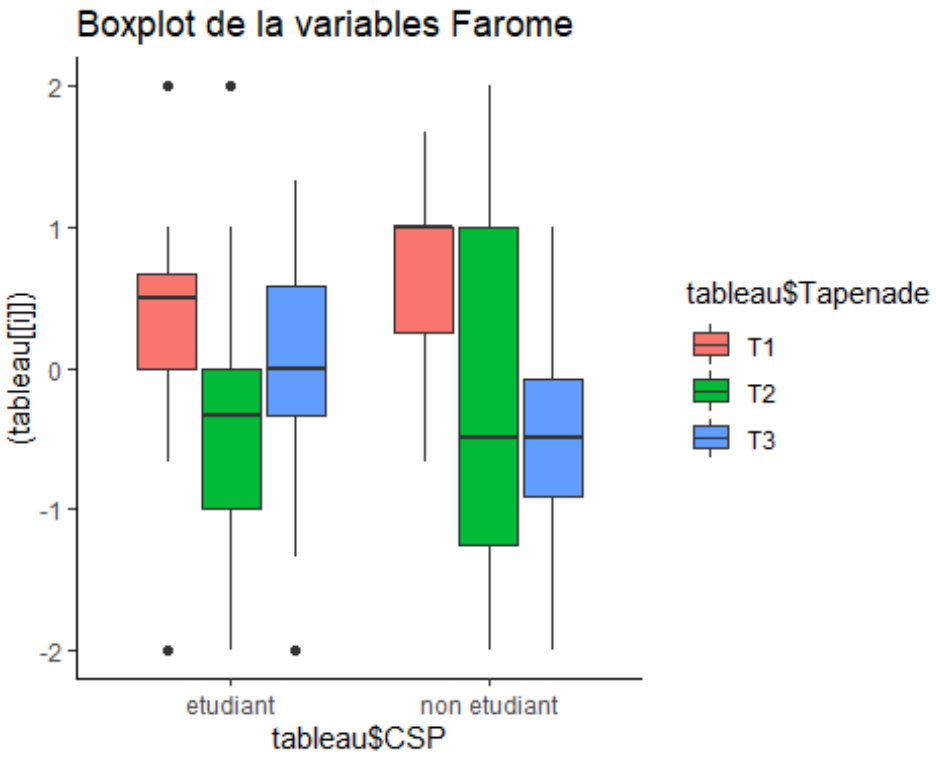

Boxplot de la variables Fagreable
(tableau[[i]])
2
1
0
-1
-2
etudiant
non etudiant
tableau$CSP
tableau$Tapenade
T1
T2
T3


Boxplot de la variables Fintensite
(tableau[[i]])
2
1
0
-1
-2
etudiant
non etudiant
tableau$CSP
tableau$Tapenade
T1
T2
T3


Boxplot de la variables Fpersistance
(tableau[[i]])
2
1
0
-1
-2
etudiant
non etudiant
tableau$CSP
tableau$Tapenade
T1
T2
T3


Boxplot de la variables Fnote
(tableau[[i]])
2
1
0
-1
-2
etudiant
non etudiant
tableau$CSP
tableau$Tapenade
T1
T2
T3






```
# Voir si les moyennes sont statistiquement differentes


for(i in 12:37){

    anov = aov(tableau[[i]]~tableau$Tapenade, data =tableau) # Test ANOVA
## Vérification de la valité des résultats

    verif_indep1 = durbinWatsonTest(anov) # permet de vérifier l'indépendance
    verif_norm1 = shapiro.test(residuals(anov))  # permet de vérifier la normalité
```

```
    #verif_homo1 = leveneTest(residuals(anov)~tableau$Tapenade)# permet de vérifier l'h
omogéneité
print(paste("ANOVA I pour la variable",colnames(tableau)[i]))
   print(summary(anov))

print(paste("Test d'indépendance des residus de la variable",colnames(tableau)[i]))
   print(verif_indep1)
    #x11()
    print(plot(anov,1,main = paste("Indépendance : ",colnames(tableau)[i])))# Visualisa
tion de l'indépendance

print(paste("Test de normalité des residus de la variable",colnames(tableau)[i]))
   print(verif_norm1)
   #x11()
    plot(anov,2,main = paste("Normalité : ",colnames(tableau)[i])) # Visualisation de l
a normalité

print(paste("Test de d'homogéneité des residus de la variable",colnames(tableau)[i]))
   #x11()
    plot(anov,3, main = paste("homogéneité : ",colnames(tableau)[i])) # Visualisation d
e l'homogéneité

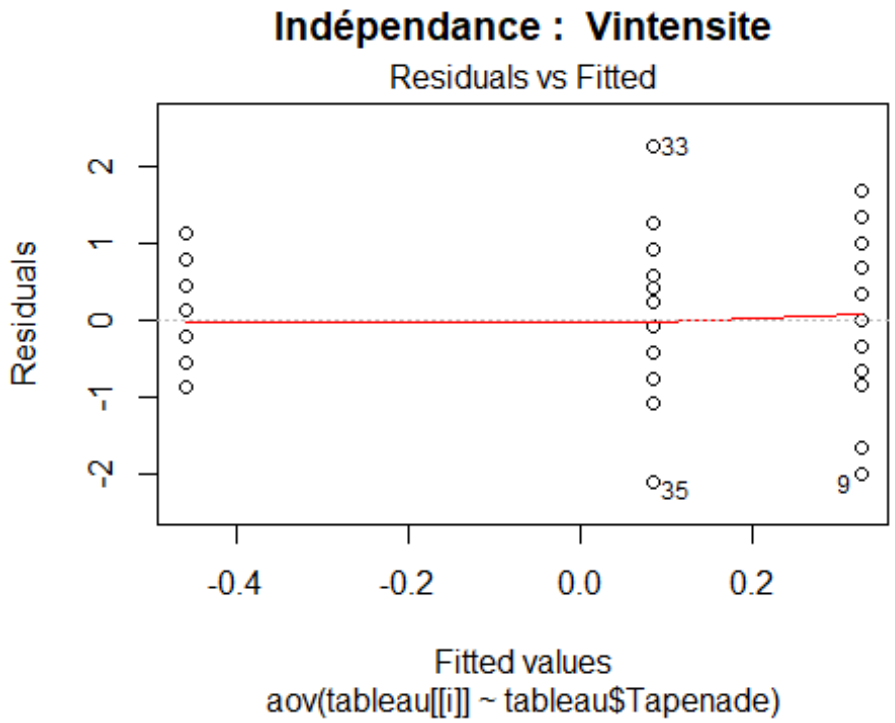

   print(plot(TukeyHSD(anov))) # Test de Tukey et le plot

}
```

```
## "ANOVA I pour la variable Vintensite"
```

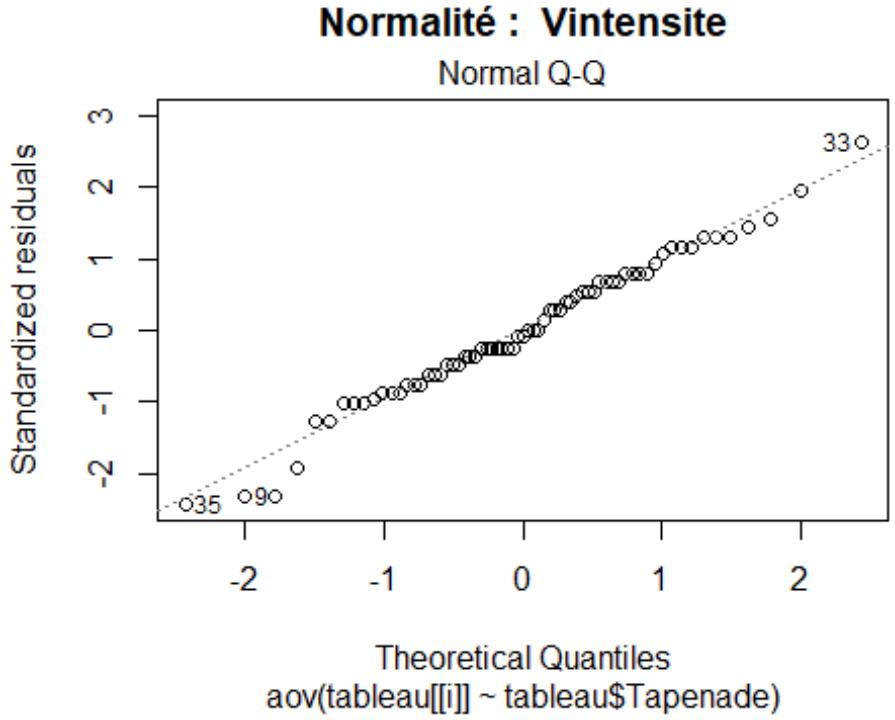
Interprétation : le test est signification à 5% car la pvalue(0.0131) est inférieur à 5%. Donc le f acteur tapenade a un effet significatif sur l'intensité de couleur.

```
##  "Test d'indépendance des residus de la variable Vintensite"
Ici la pvalue(0.916) est supérieur à 5% ,H0 n'est donc pas rejetée donc absence d'autoc
orrélation
```

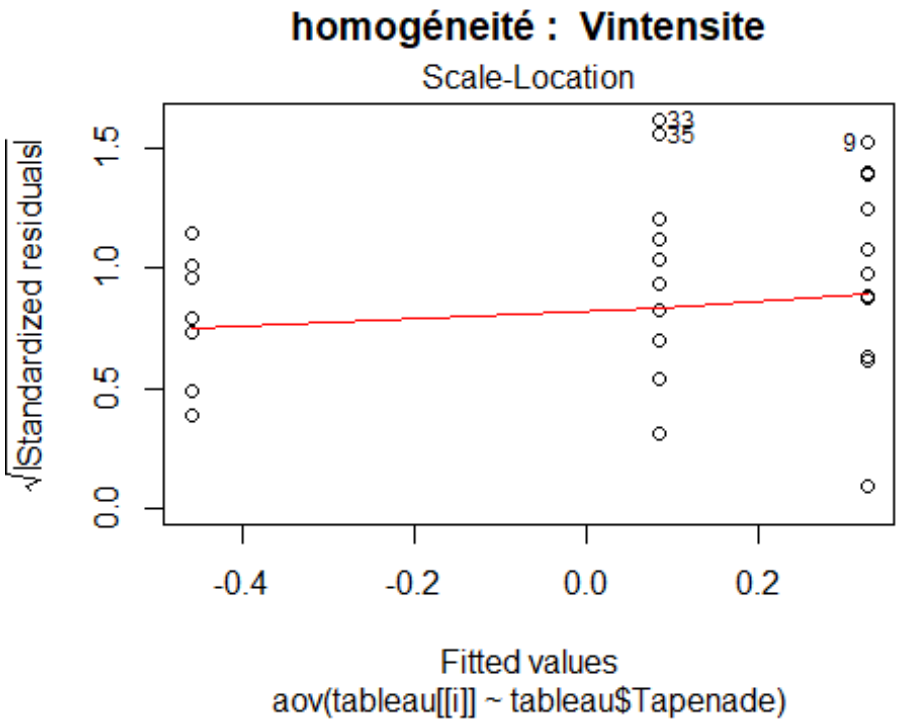


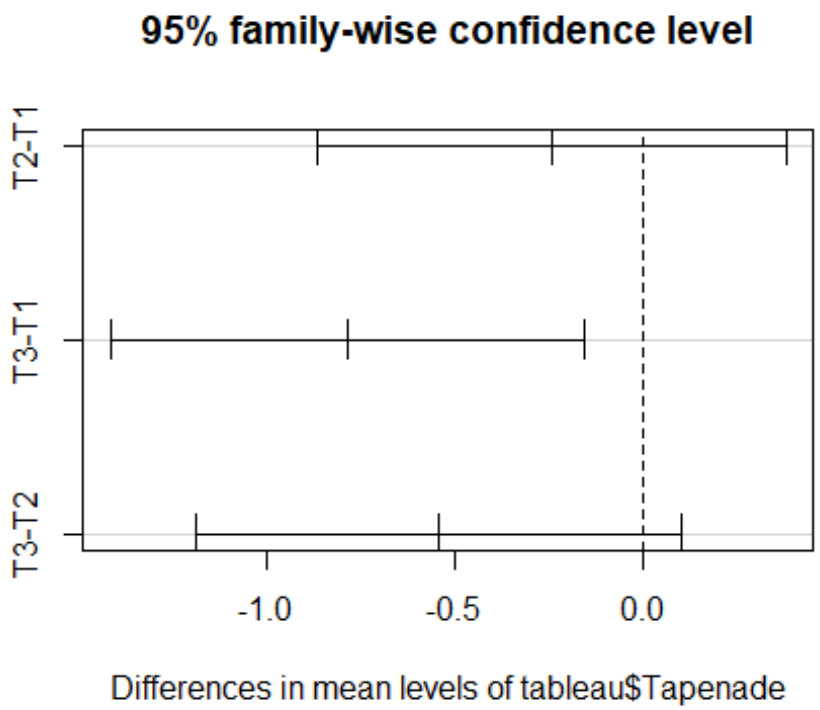
"Test de normalité des residus de la variable Vintensite"

Ici la pvalue(0.5274) est supérieur à 5% ,H0 n'est donc pas rejetée donc normalité des résidus

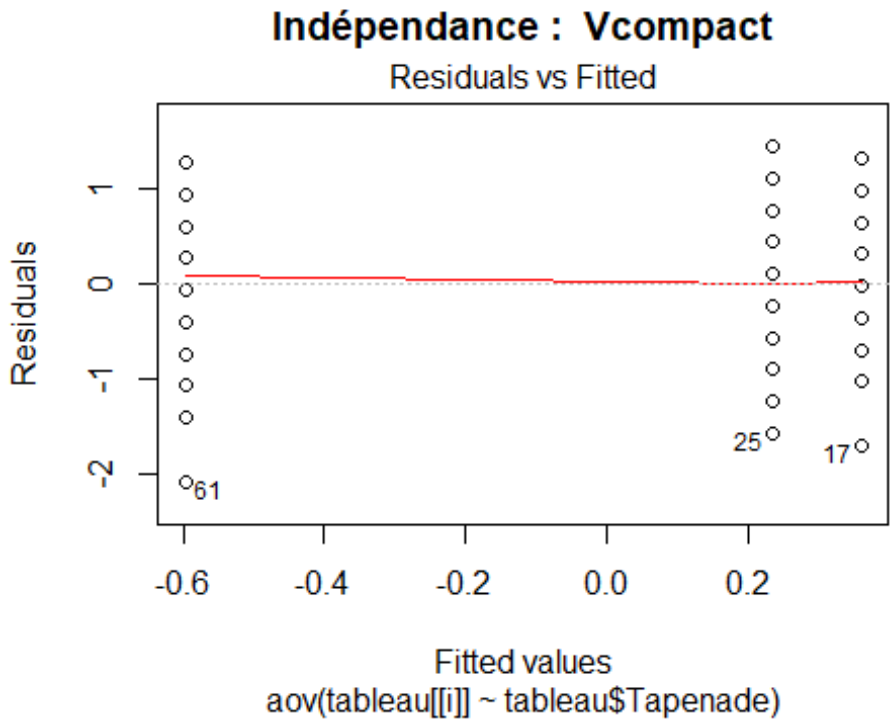


"Test de d'homogéneité des residus de la variable Vintensite"

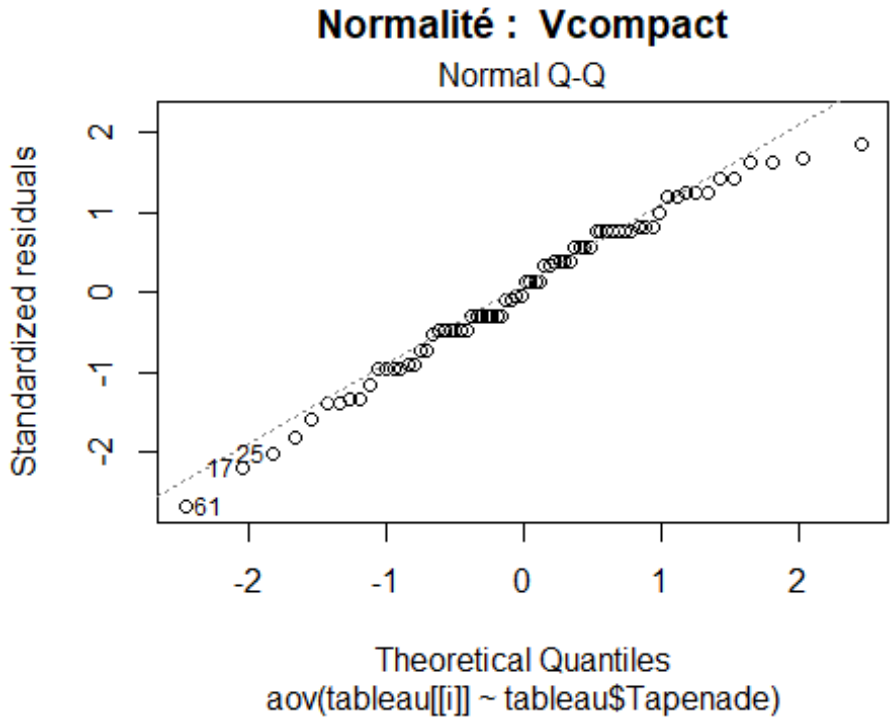




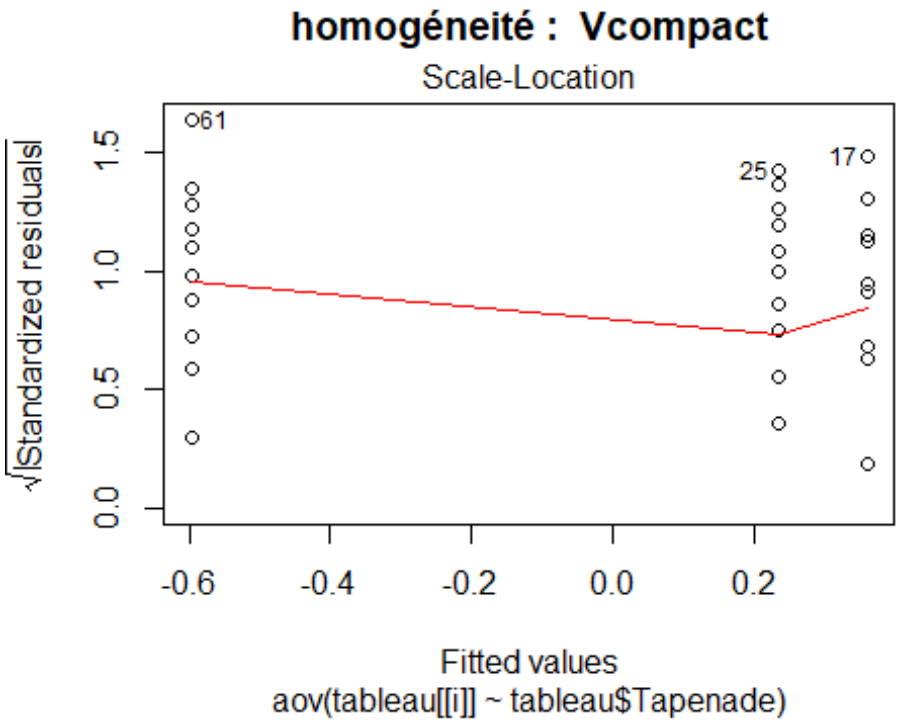

```
## NULL
## [1] "ANOVA I pour la variable Vcompact"
##                  Df Sum Sq Mean Sq F value   Pr(>F)
## tableau$Tapenade  2  13.03   6.514   10.46 0.000108 ***
## Residuals        69  42.97   0.623
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## [1] "Test d'indépendance des residus de la variable Vcompact"
##  lag Autocorrelation D-W Statistic p-value
##    1         0.25347      1.482587    0.01
##  Alternative hypothesis: rho != 0
```

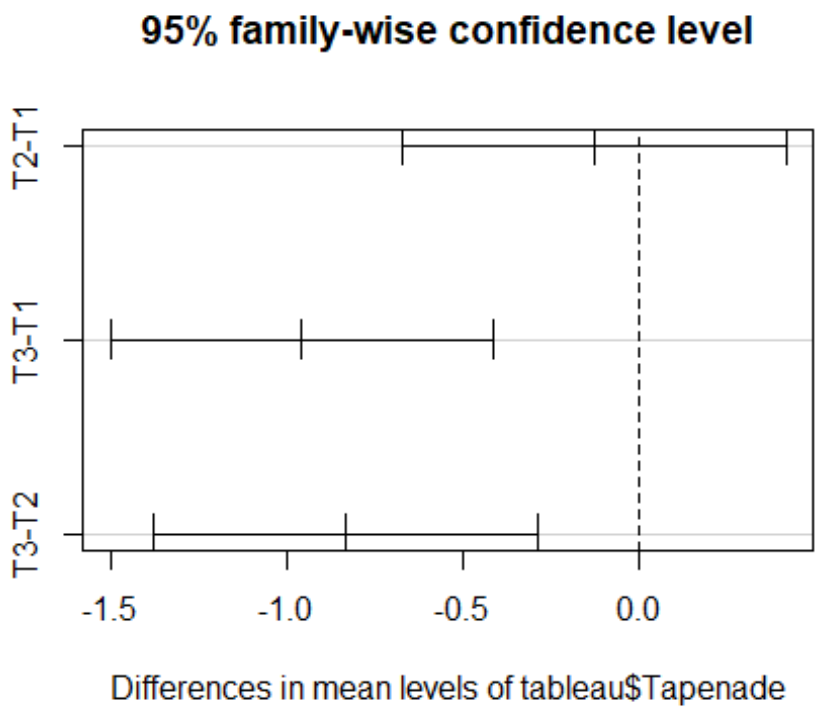



```
## NULL
## [1] "Test de normalité des residus de la variable Vcompact"
##
##  Shapiro-Wilk normality test
##
## data:  residuals(anov)
## W = 0.98009, p-value = 0.3112
```



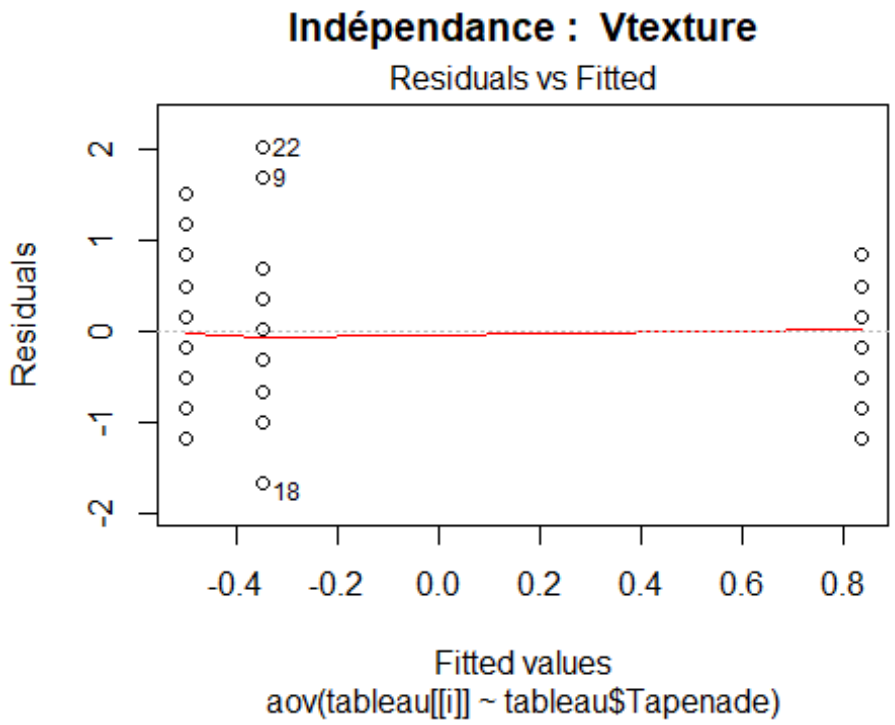

```
## [1] "Test de d'homogéneité des residus de la variable Vcompact"
```



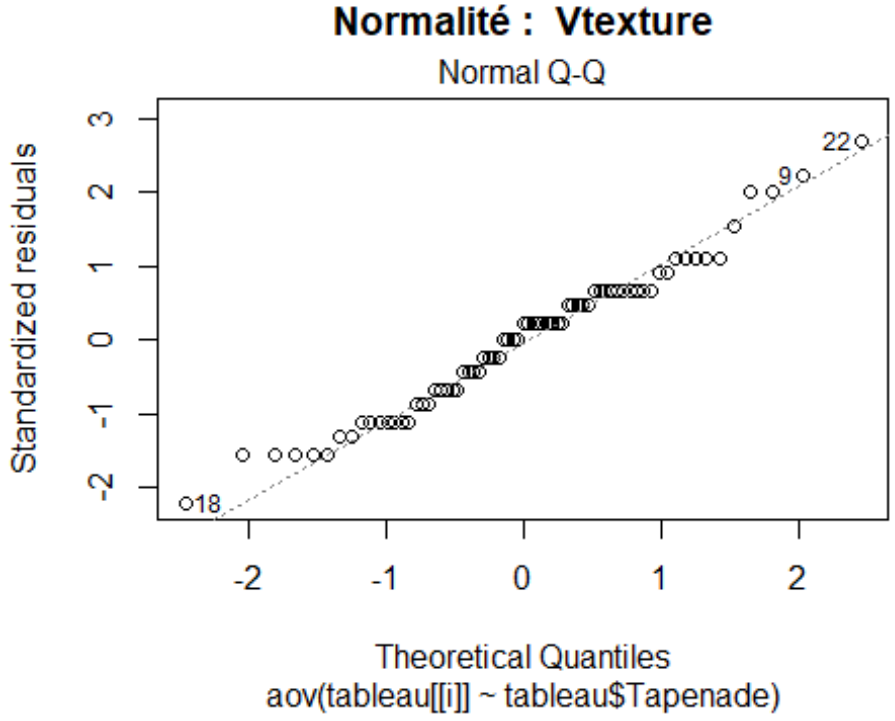



```
## NULL
## [1] "ANOVA I pour la variable Vtexture"
##                  Df Sum Sq Mean Sq F value   Pr(>F)
## tableau$Tapenade  2  25.45  12.725    21.7 5.16e-08 ***
## Residuals        68  39.88   0.587
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## 1 observation deleted due to missingness
## [1] "Test d'indépendance des residus de la variable Vtexture"
##  lag Autocorrelation D-W Statistic p-value
```

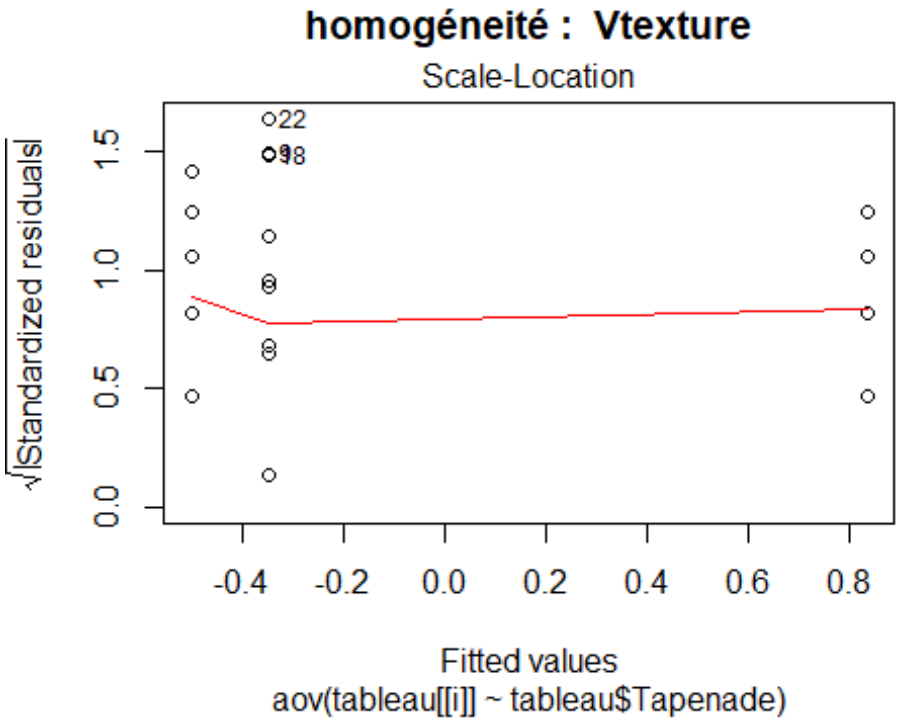
```
##    1      0.09383558      1.806055   0.296
##  Alternative hypothesis: rho != 0
```

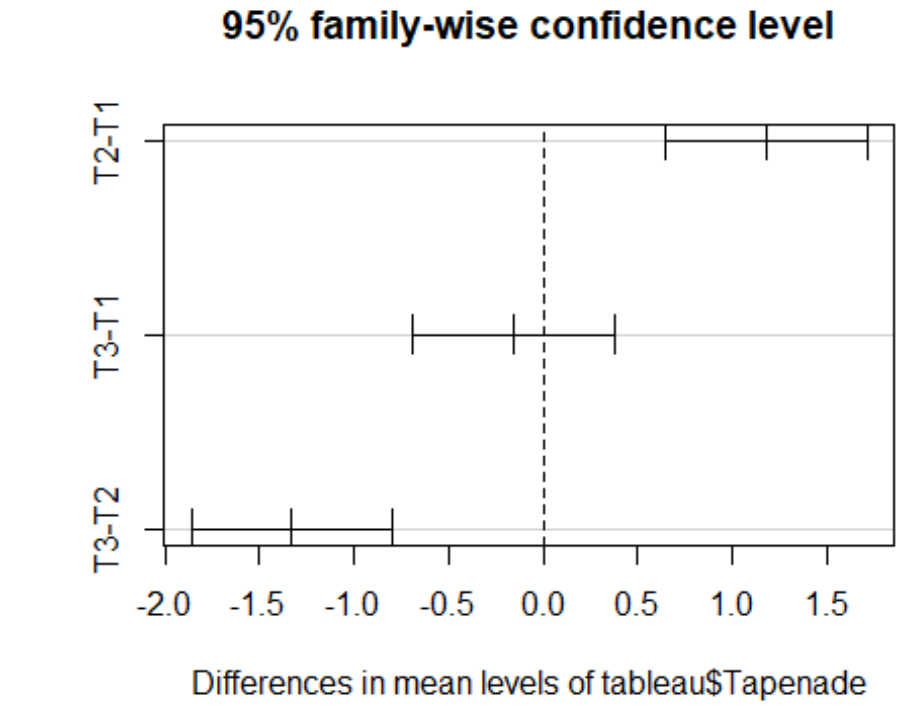



```
## NULL
## [1] "Test de normalité des residus de la variable Vtexture"
##
##  Shapiro-Wilk normality test
##
## data:  residuals(anov)
## W = 0.97672, p-value = 0.2094
```



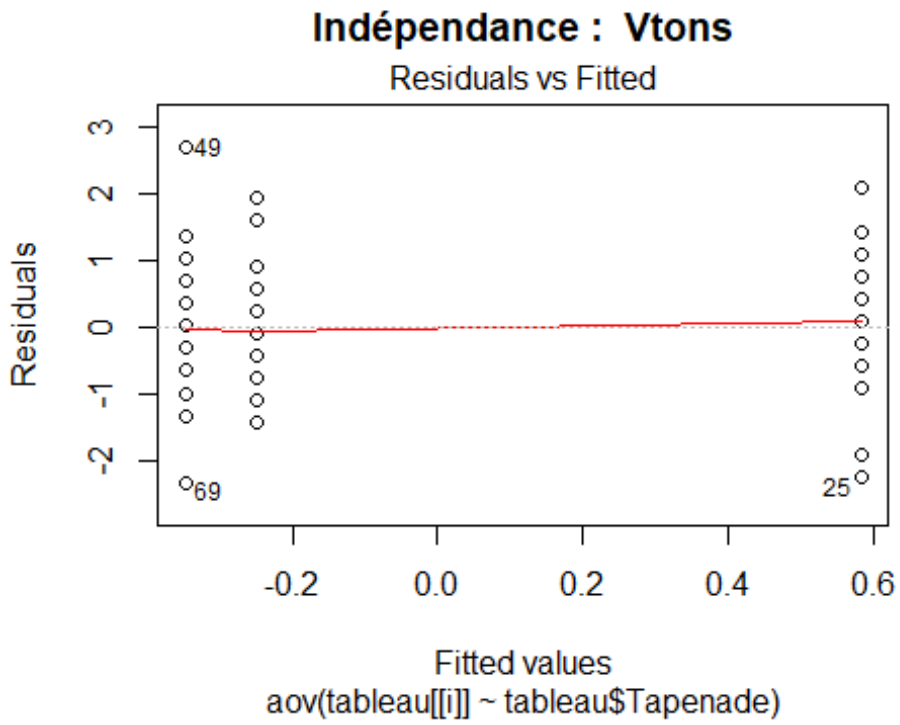
```
## [1] "Test de d'homogéneité des residus de la variable Vtexture"
```



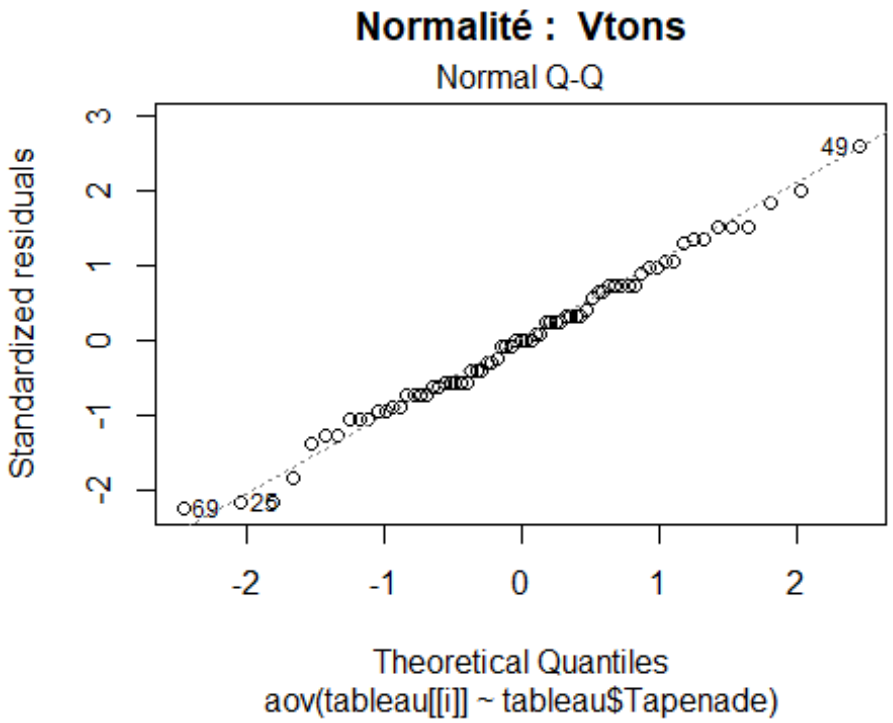



```
## NULL
## [1] "ANOVA I pour la variable Vtons"
##                  Df Sum Sq Mean Sq F value  Pr(>F)
## tableau$Tapenade  2  12.45   6.225   5.554 0.00583 **
## Residuals        68  76.22   1.121
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## 1 observation deleted due to missingness
## [1] "Test d'indépendance des residus de la variable Vtons"
```

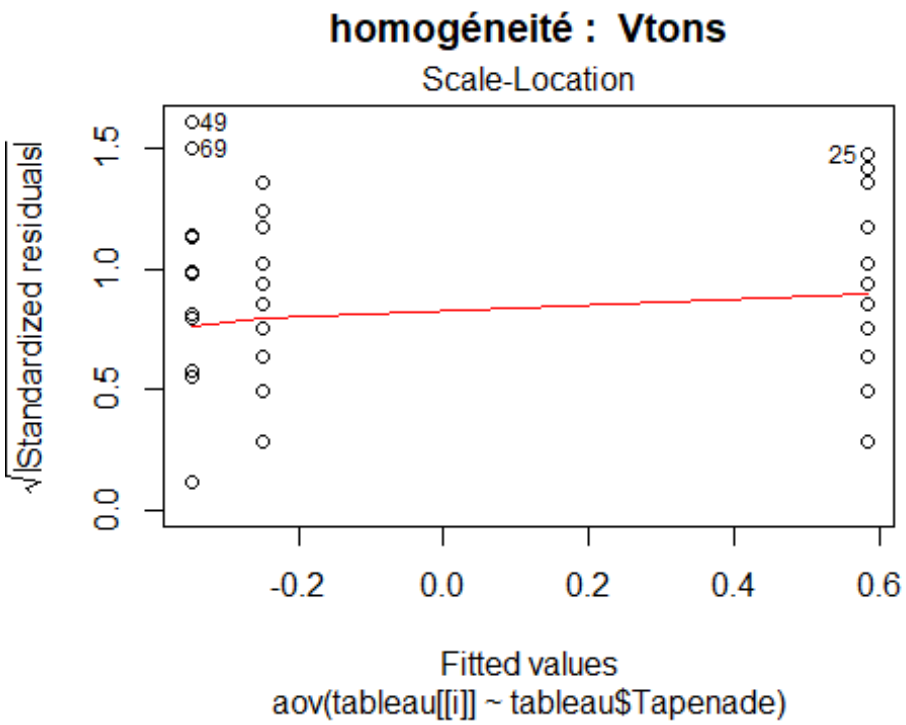
```
##  lag Autocorrelation D-W Statistic p-value
##    1       0.1174269      1.761281   0.226
##  Alternative hypothesis: rho != 0
```

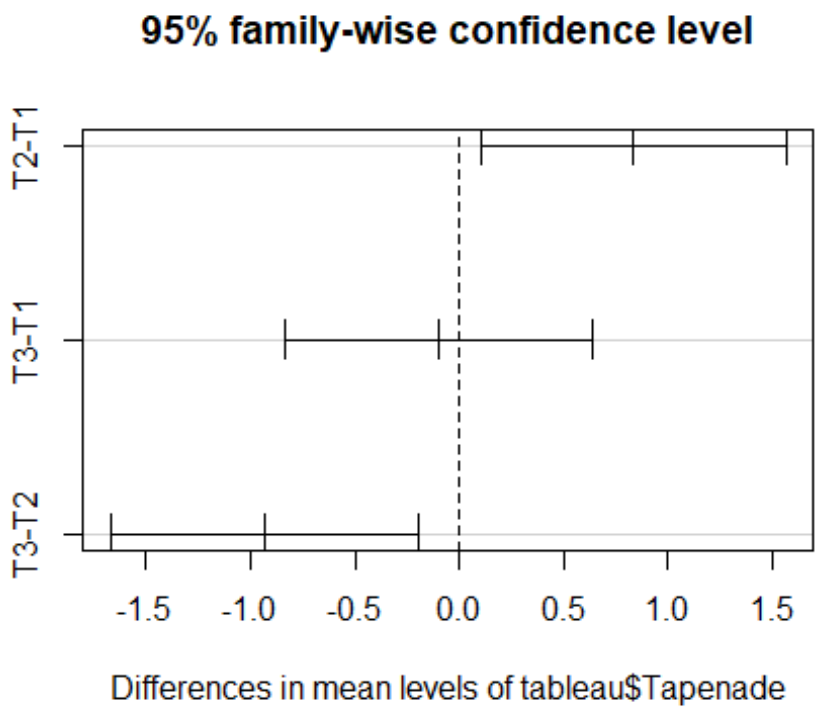



```
## NULL
## [1] "Test de normalité des residus de la variable Vtons"
##
##  Shapiro-Wilk normality test
##
## data:  residuals(anov)
## W = 0.98997, p-value = 0.847
```

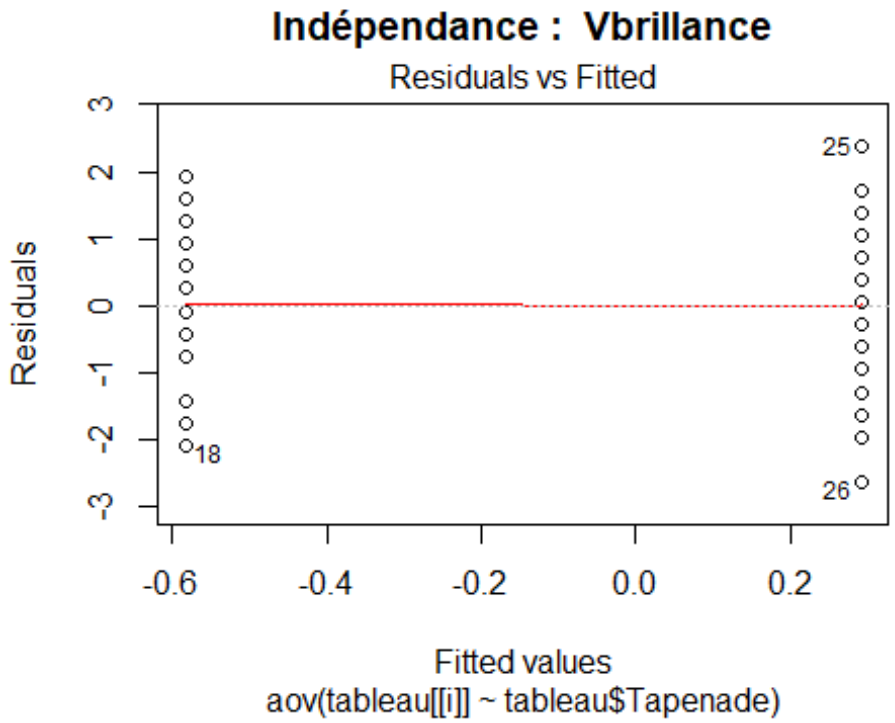



```
## [1] "Test de d'homogéneité des residus de la variable Vtons"
```

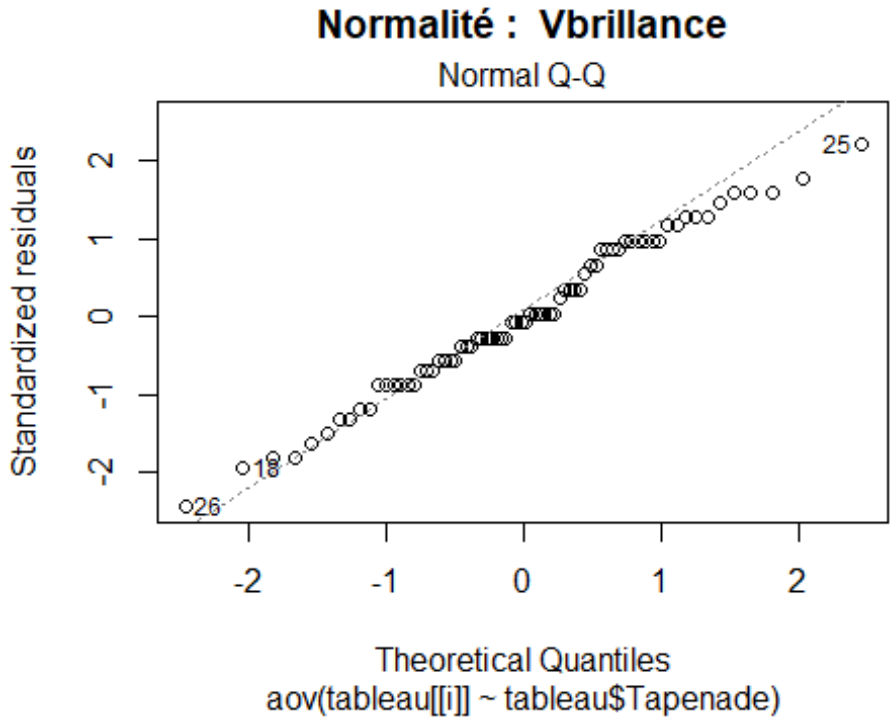




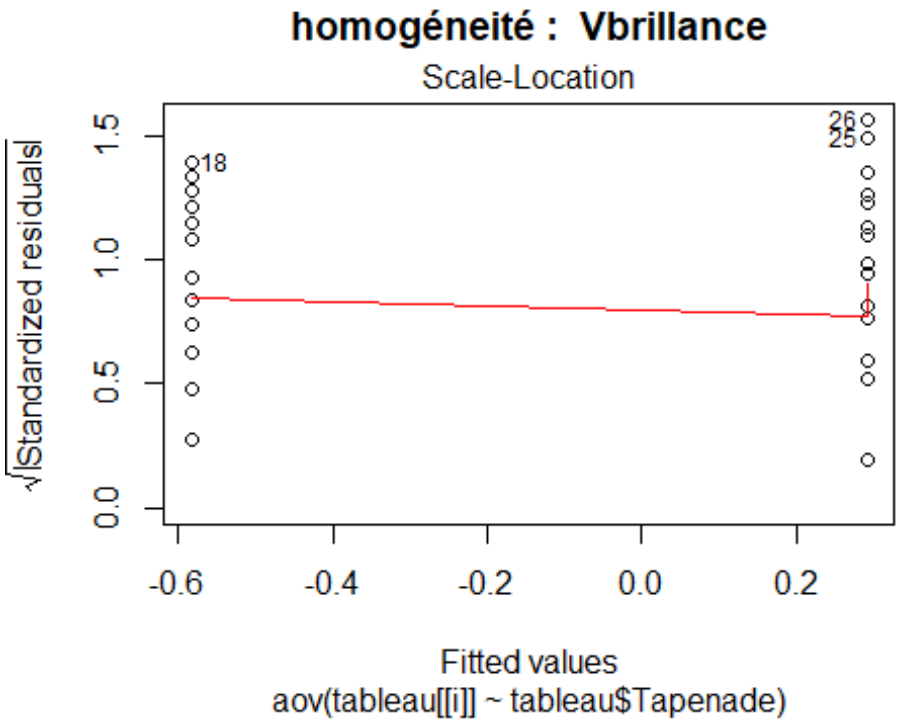

```
## NULL
## [1] "ANOVA I pour la variable Vbrillance"
##                  Df Sum Sq Mean Sq F value Pr(>F)
## tableau$Tapenade  2  12.25   6.125   5.087 0.0087 **
## Residuals        69  83.08   1.204
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## [1] "Test d'indépendance des residus de la variable Vbrillance"
##  lag Autocorrelation D-W Statistic p-value
##    1      -0.1693205      2.330847   0.226
##  Alternative hypothesis: rho != 0
```

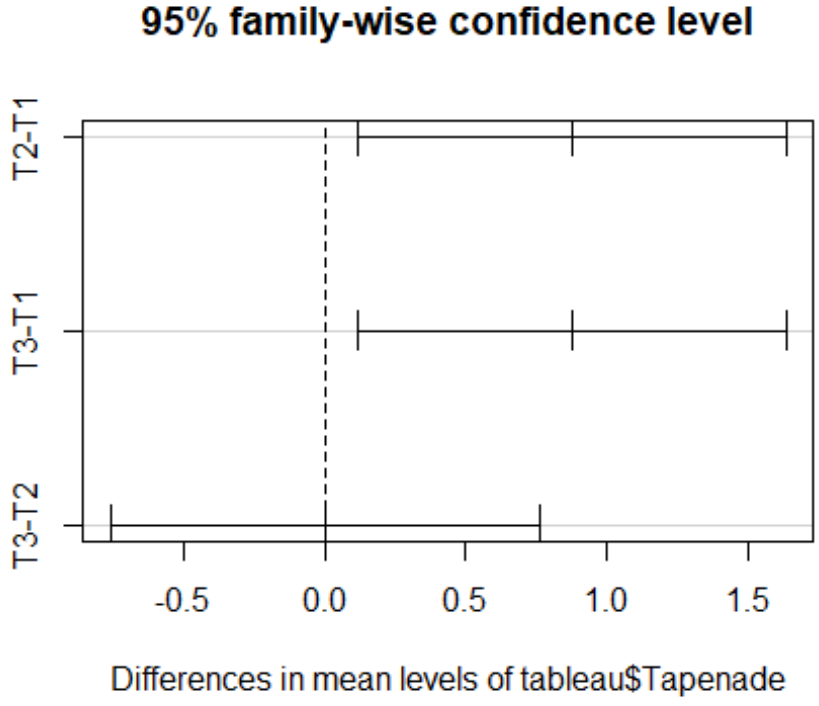



```
## NULL
## [1] "Test de normalité des residus de la variable Vbrillance"
##
##  Shapiro-Wilk normality test
##
## data:  residuals(anov)
## W = 0.98606, p-value = 0.6116
```

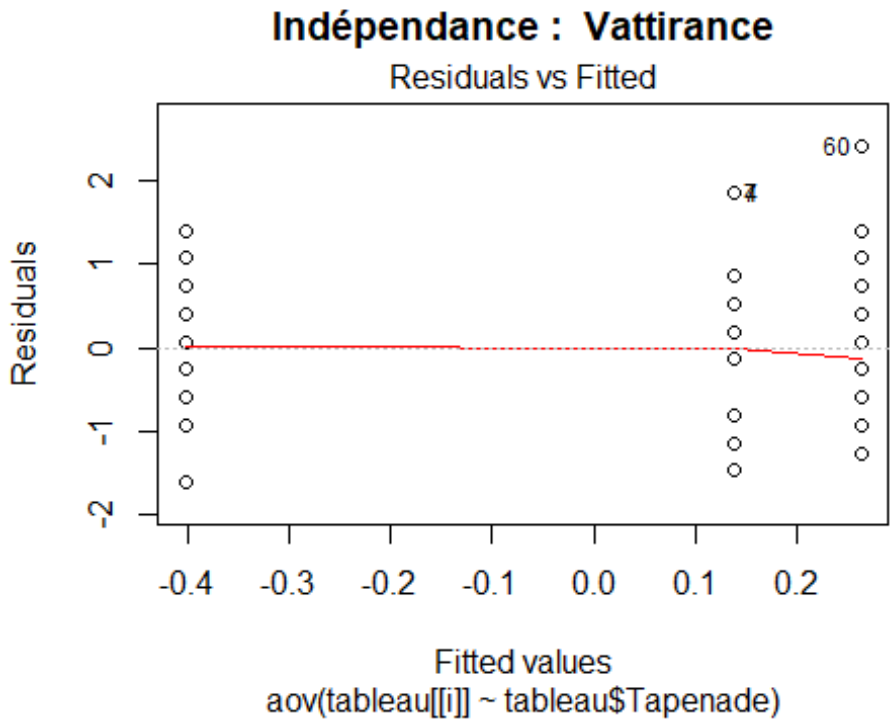



```
## [1] "Test de d'homogéneité des residus de la variable Vbrillance"
```

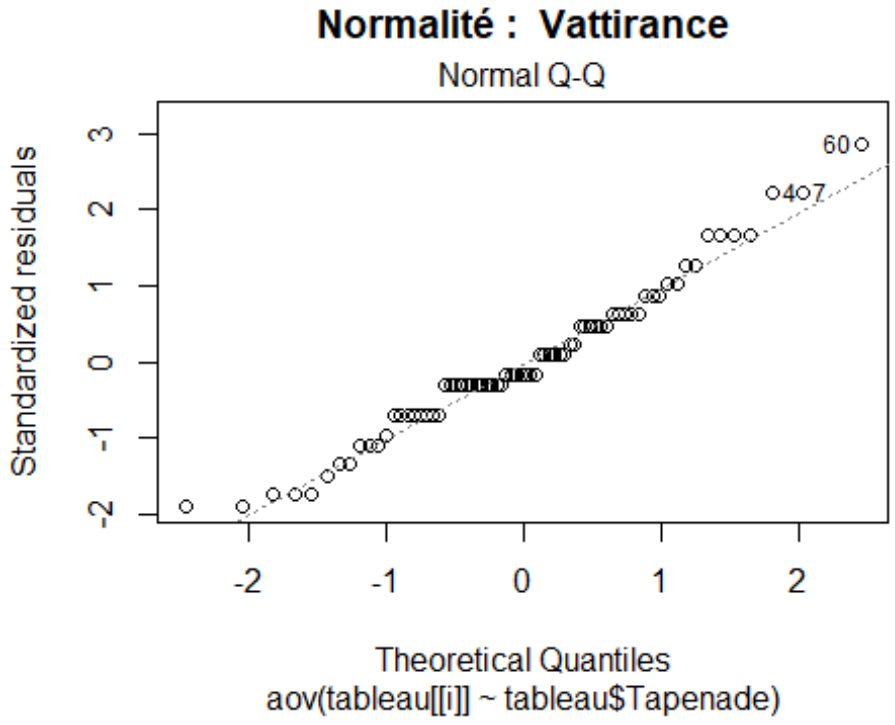




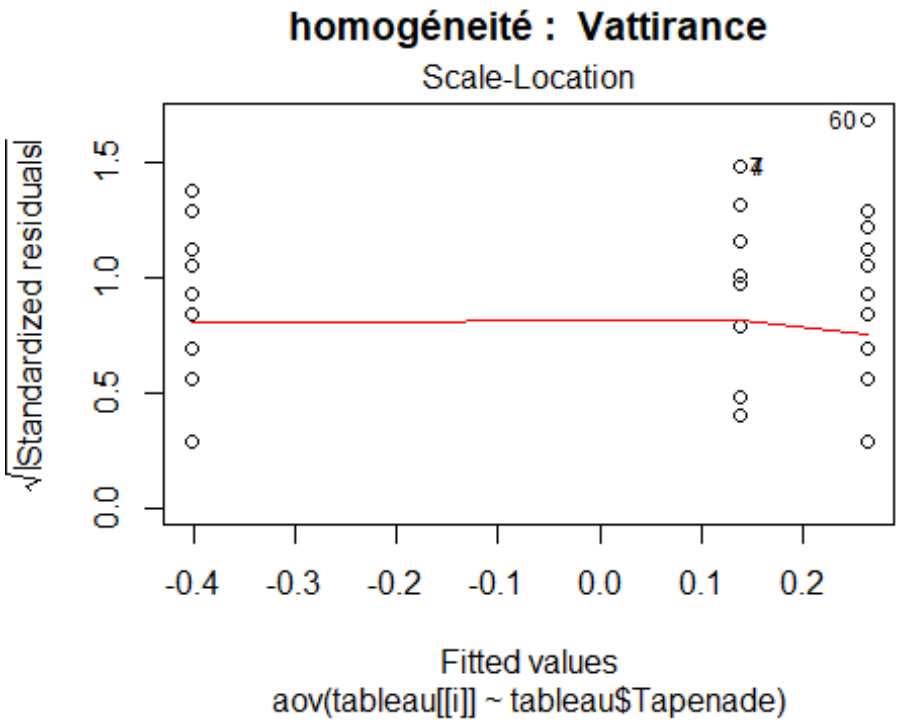

```
## NULL
## [1] "ANOVA I pour la variable Vattirance"
##                  Df Sum Sq Mean Sq F value Pr(>F)
## tableau$Tapenade  2   6.03  3.0139   4.053 0.0217 *
## Residuals        69  51.31  0.7436
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## [1] "Test d'indépendance des residus de la variable Vattirance"
##  lag Autocorrelation D-W Statistic p-value
##    1      0.02839815      1.899601    0.53
##  Alternative hypothesis: rho != 0
```

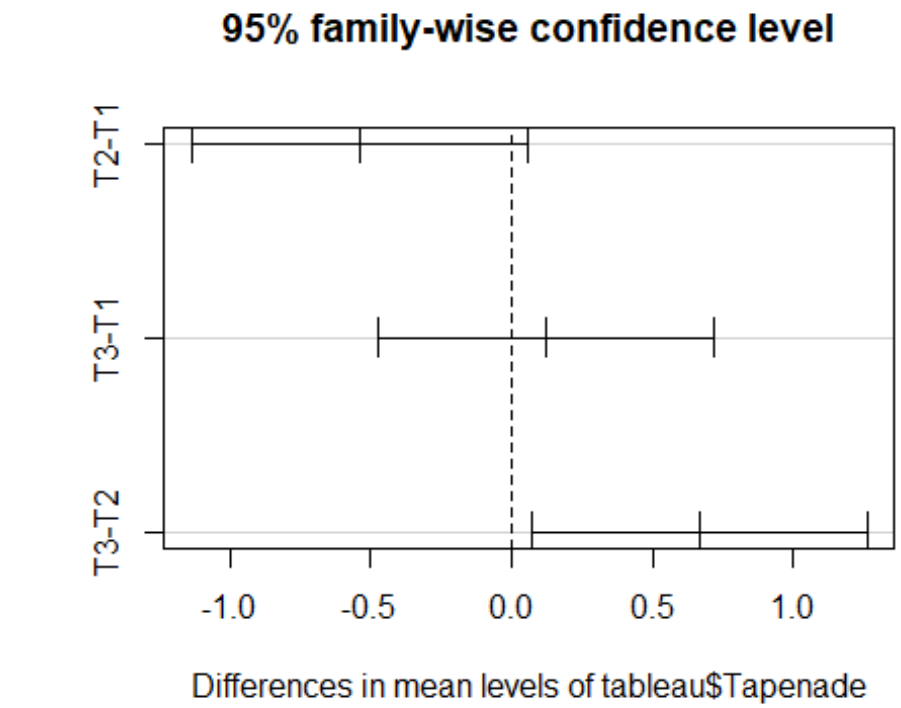



```
## NULL
## [1] "Test de normalité des residus de la variable Vattirance"
##
##  Shapiro-Wilk normality test
##
## data:  residuals(anov)
## W = 0.97383, p-value = 0.1382
```

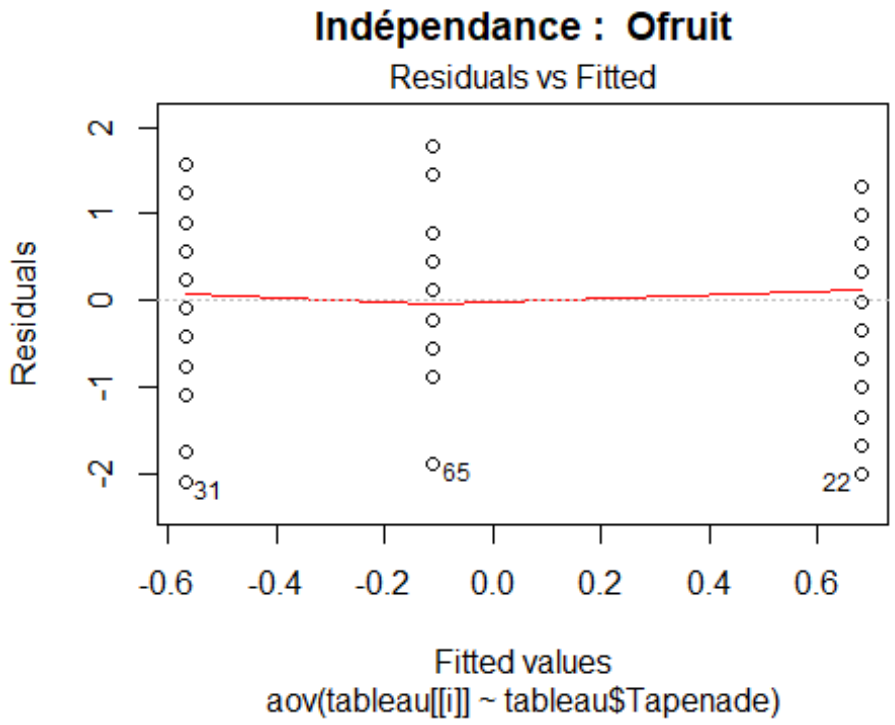



```
## [1] "Test de d'homogéneité des residus de la variable Vattirance"
```

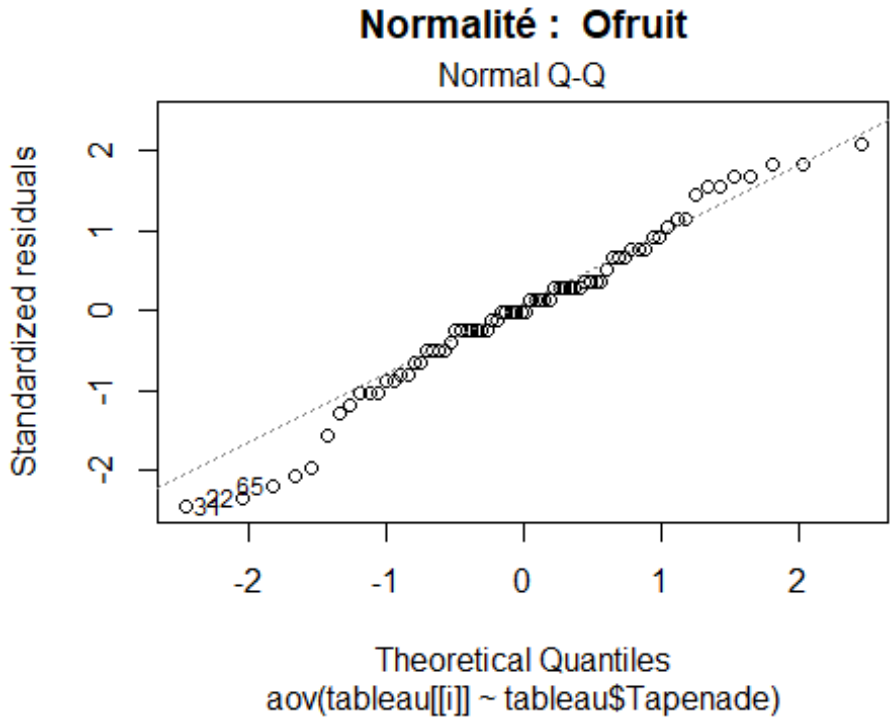




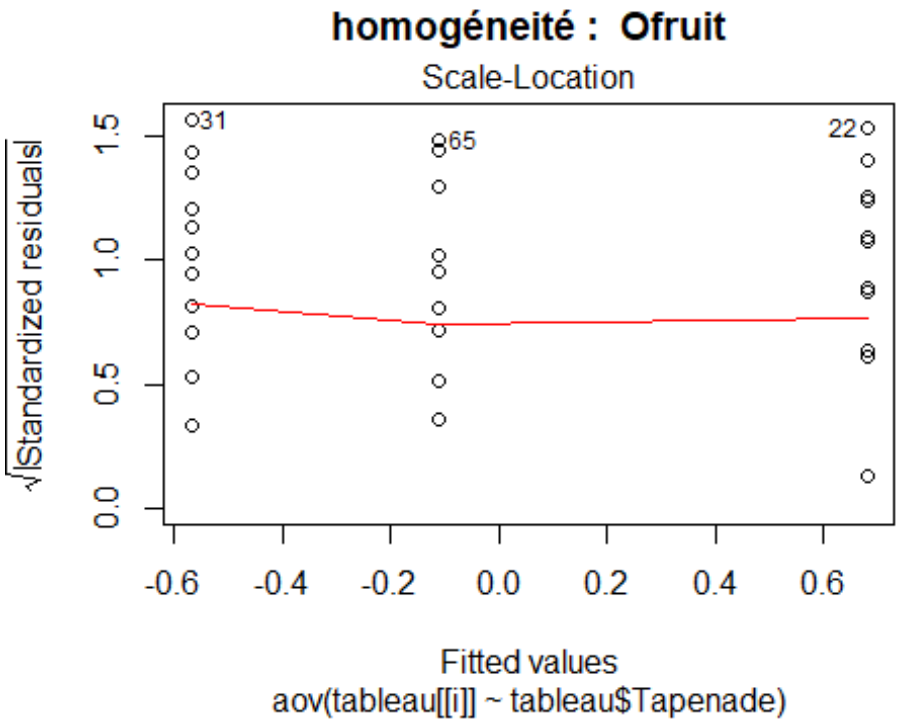

```
## NULL
## [1] "ANOVA I pour la variable Ofruit"
##                   Df Sum Sq Mean Sq F value   Pr(>F)
## tableau$Tapenade  2  19.19   9.597   12.54 2.26e-05 ***
## Residuals        69  52.81   0.765
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## [1] "Test d'indépendance des residus de la variable Ofruit"
##  lag Autocorrelation D-W Statistic p-value
##    1     -0.09633453      2.148244   0.684
##  Alternative hypothesis: rho != 0
```

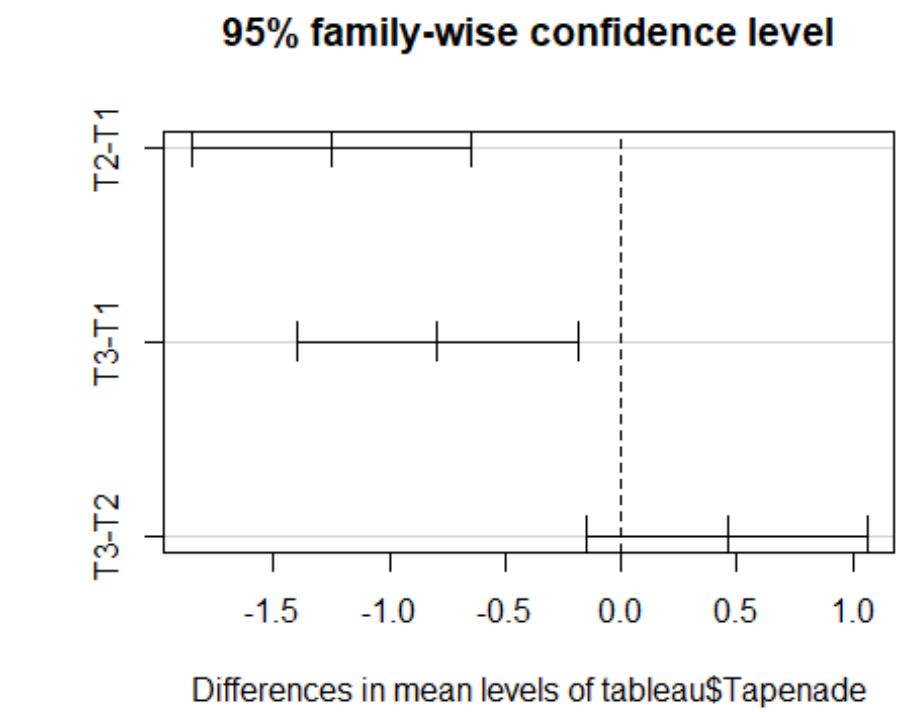



```
## NULL
## [1] "Test de normalité des residus de la variable Ofruit"
##
##  Shapiro-Wilk normality test
##
## data:  residuals(anov)
## W = 0.97707, p-value = 0.2117
```

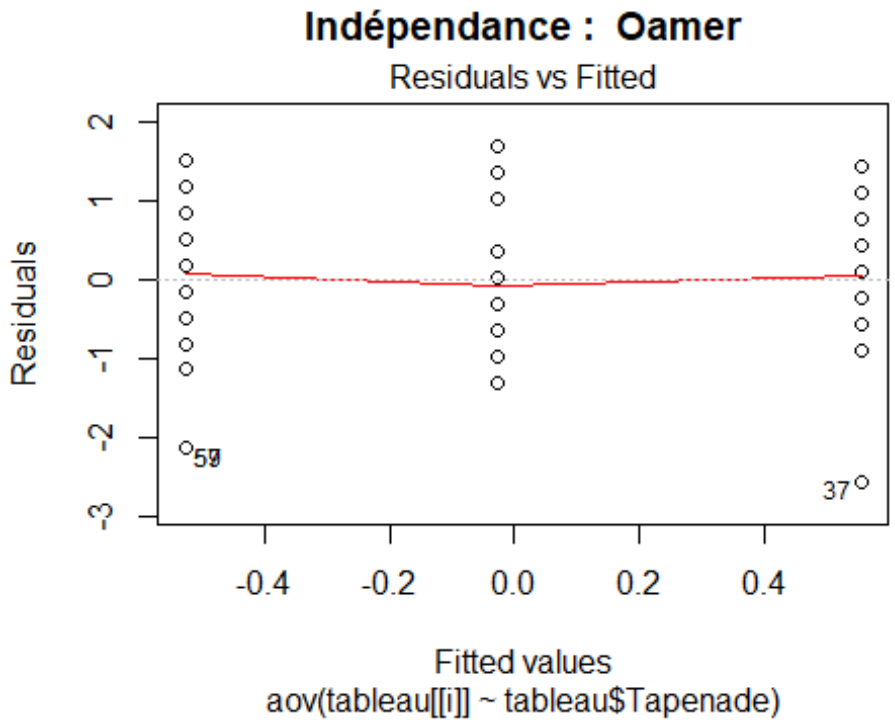



```
## [1] "Test de d'homogéneité des residus de la variable Ofruit"
```

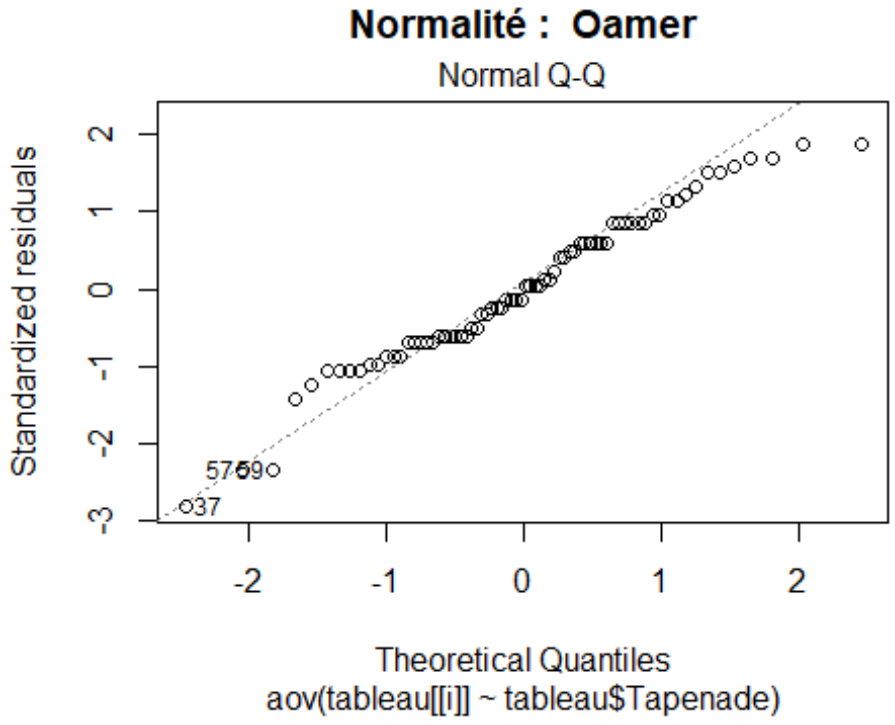




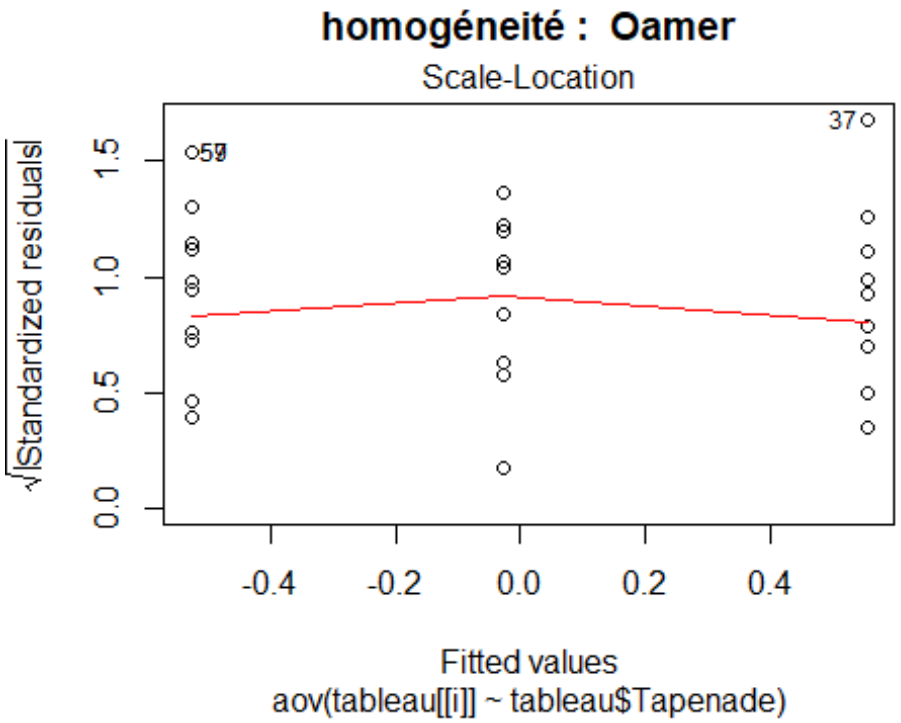

```
## NULL
## [1] "ANOVA I pour la variable Oamer"
##                  Df Sum Sq Mean Sq F value   Pr(>F)
## tableau$Tapenade  2  14.11   7.056    8.22 0.000628 ***
## Residuals        69  59.22   0.858
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## [1] "Test d'indépendance des residus de la variable Oamer"
##  lag Autocorrelation D-W Statistic p-value
##    1      0.07929435      1.830441   0.336
##  Alternative hypothesis: rho != 0
```

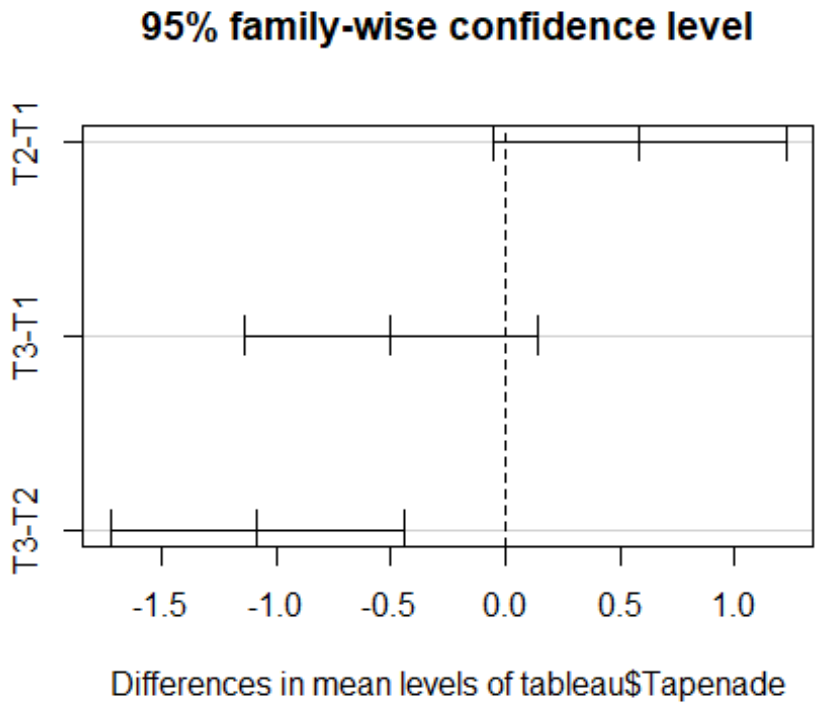



```
## NULL
## [1] "Test de normalité des residus de la variable Oamer"
##
##  Shapiro-Wilk normality test
##
## data:  residuals(anov)
## W = 0.97304, p-value = 0.1245
```

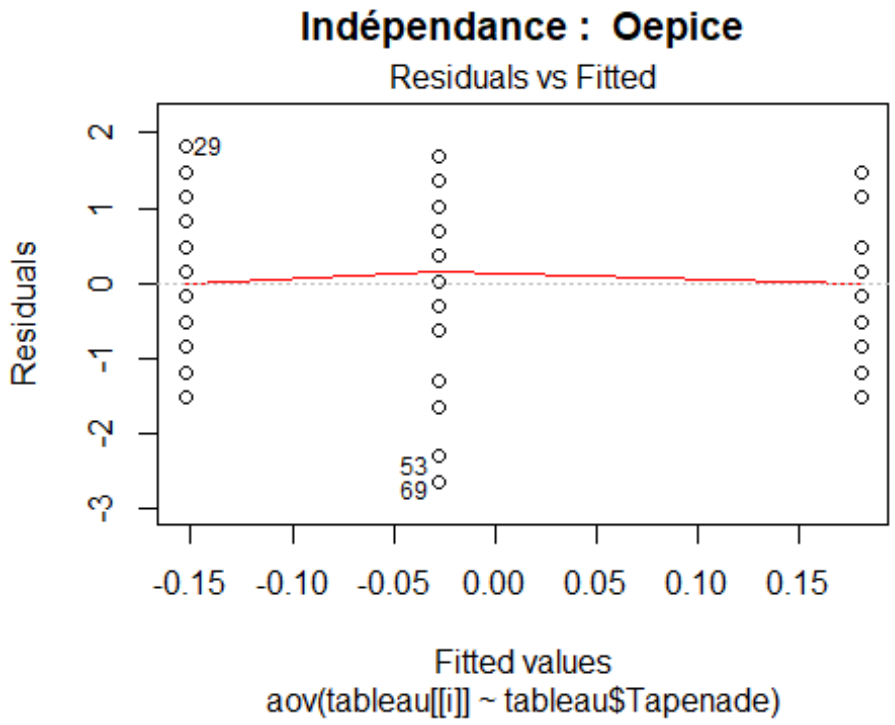



```
## [1] "Test de d'homogéneité des residus de la variable Oamer"
```

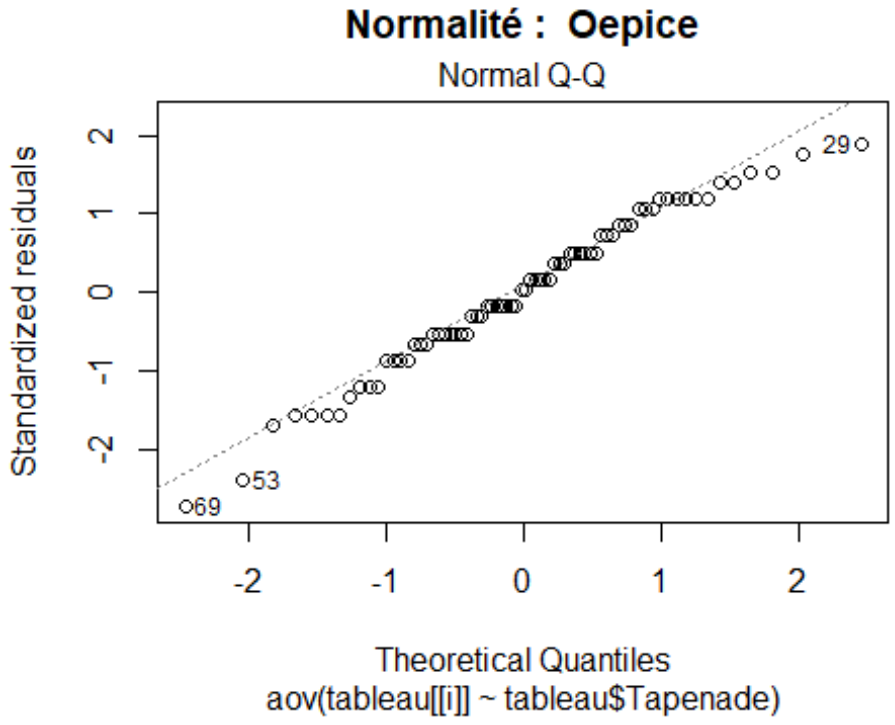




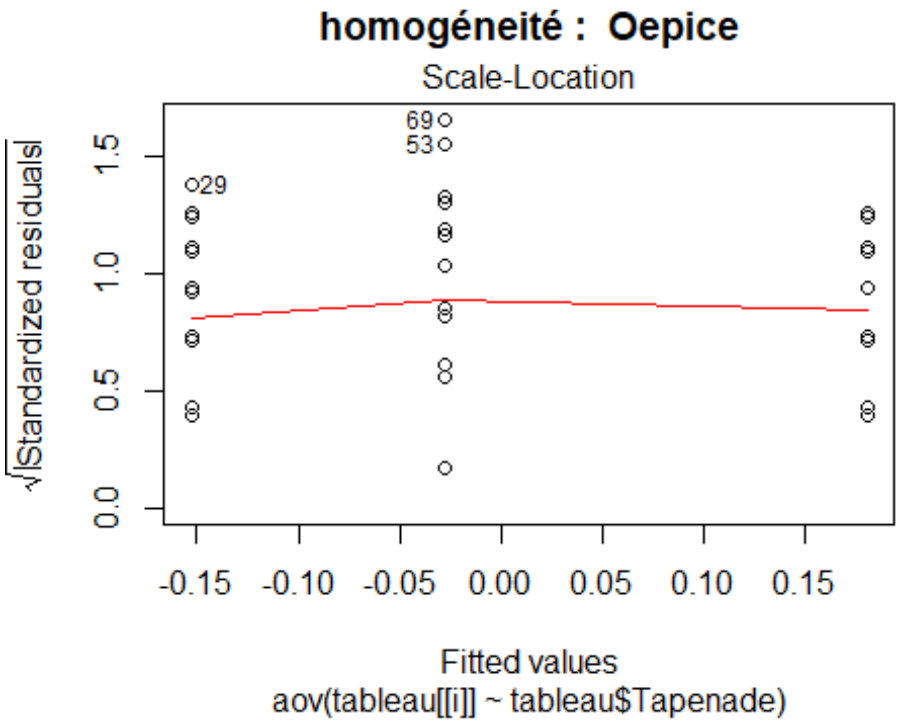

```
## NULL
## [1] "ANOVA I pour la variable Oepice"
##                  Df Sum Sq Mean Sq F value Pr(>F)
## tableau$Tapenade  2   1.36  0.6806   0.698  0.501
## Residuals        69  67.31  0.9754
## [1] "Test d'indépendance des residus de la variable Oepice"
##  lag Autocorrelation D-W Statistic p-value
##    1      -0.2208207      2.433992   0.096
##  Alternative hypothesis: rho != 0
```

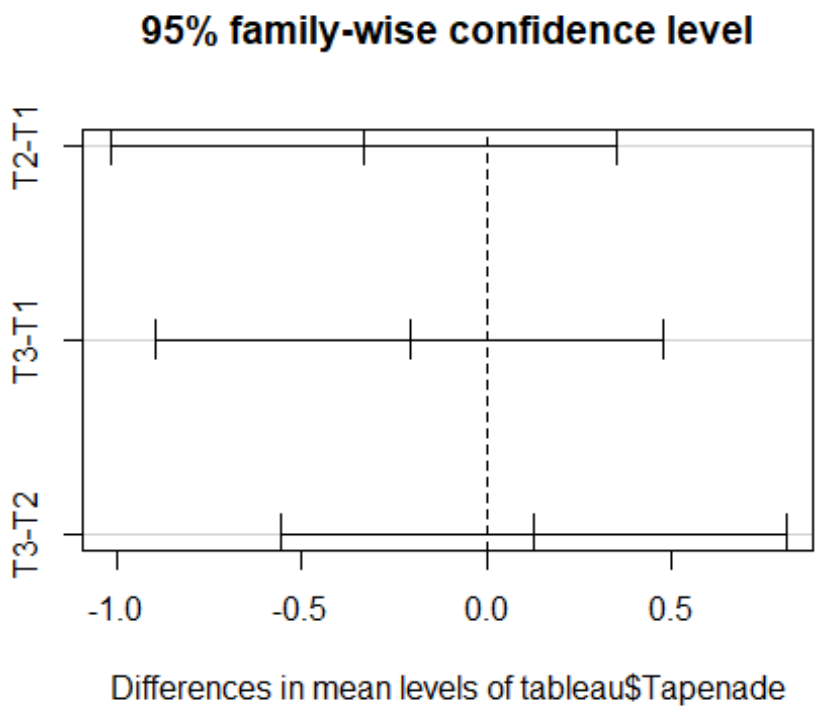



```
## NULL
## [1] "Test de normalité des residus de la variable Oepice"
##
##  Shapiro-Wilk normality test
##
## data:  residuals(anov)
## W = 0.97926, p-value = 0.2805
```

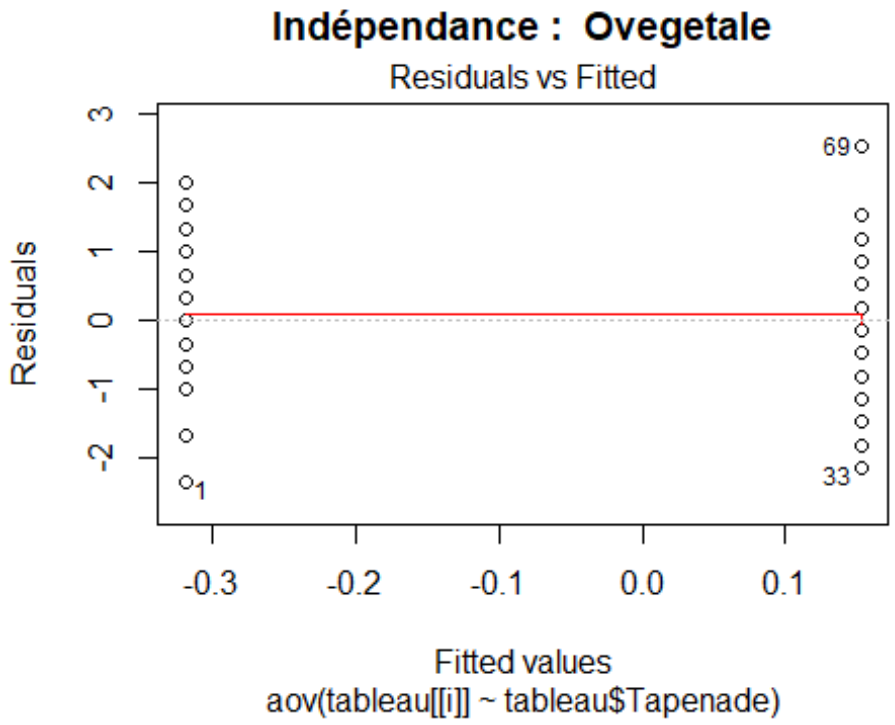



```
## [1] "Test de d'homogéneité des residus de la variable Oepice"
```

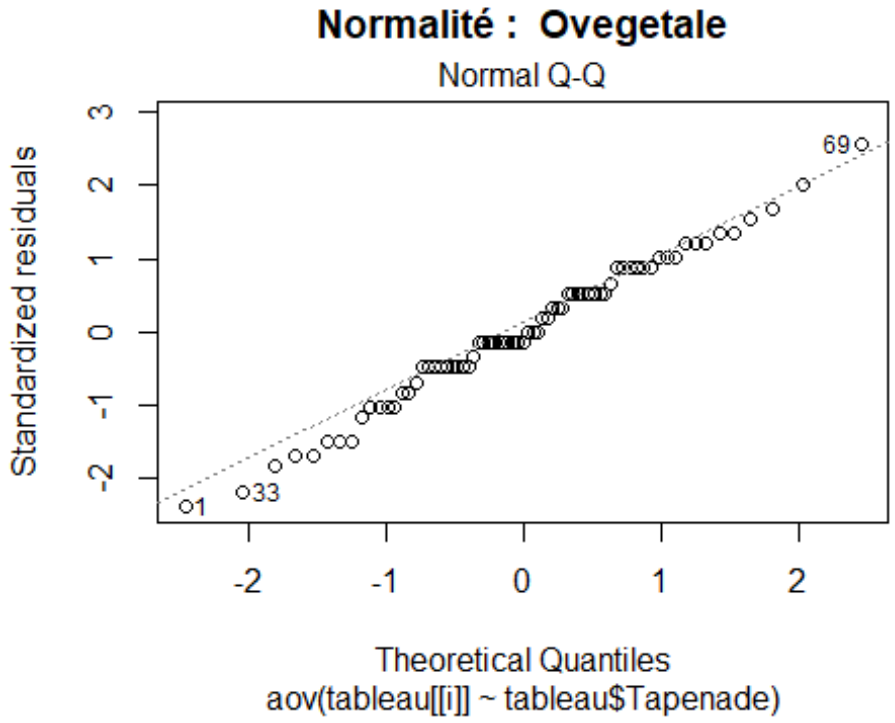




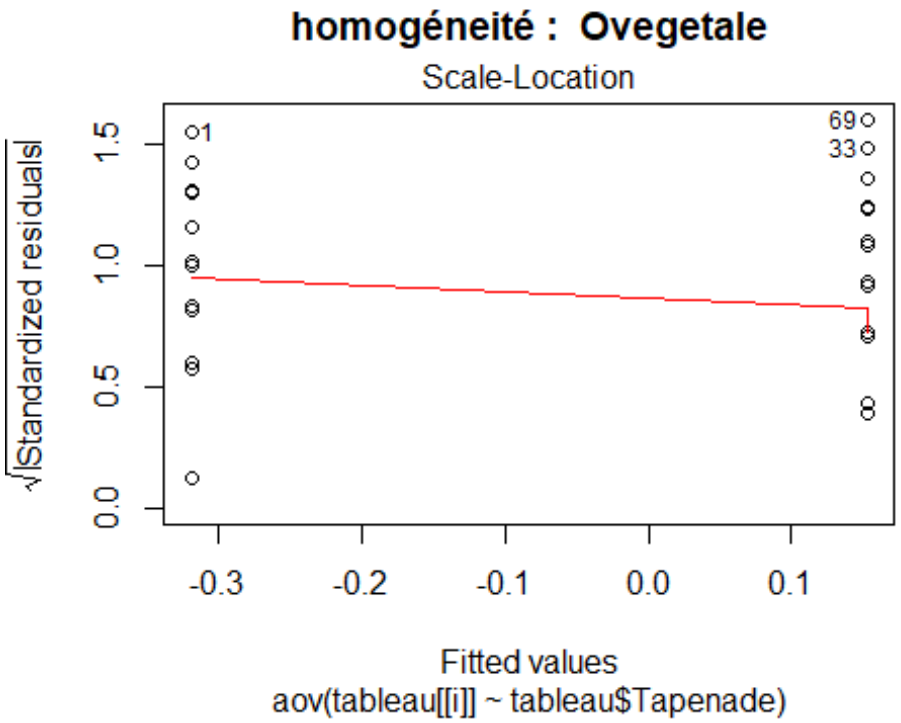

```
## NULL
## [1] "ANOVA I pour la variable Ovegetale"
##                  Df Sum Sq Mean Sq F value Pr(>F)
## tableau$Tapenade  2   3.46   1.729   1.716  0.188
## Residuals        68  68.54   1.008
## 1 observation deleted due to missingness
## [1] "Test d'indépendance des residus de la variable Ovegetale"
##  lag Autocorrelation D-W Statistic p-value
##    1     0.007095151      1.905046   0.496
##  Alternative hypothesis: rho != 0
```

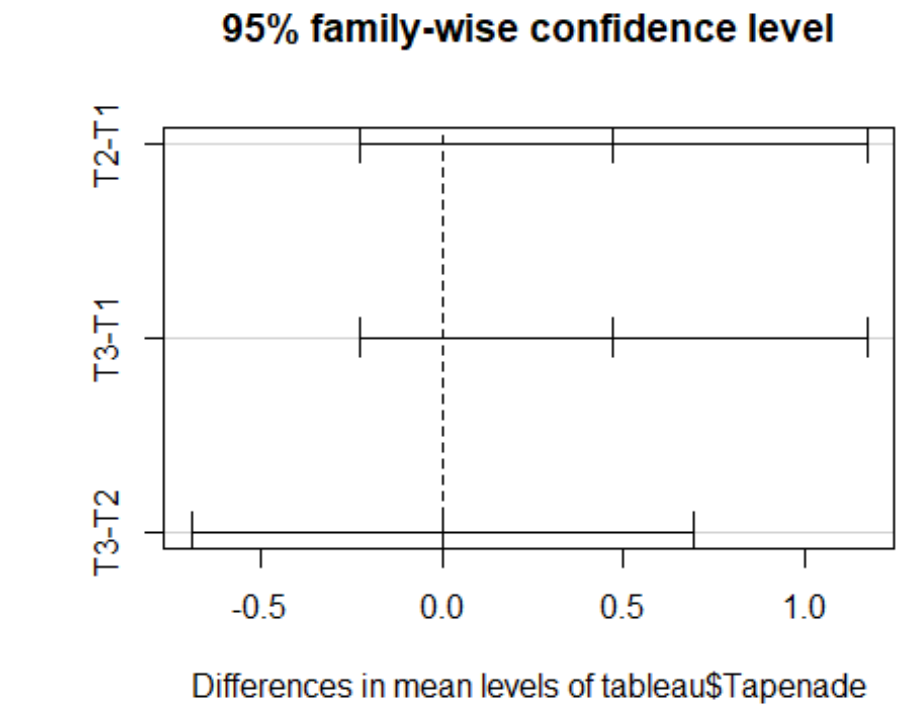



```
## NULL
## [1] "Test de normalité des residus de la variable Ovegetale"
##
##  Shapiro-Wilk normality test
##
## data:  residuals(anov)
## W = 0.98868, p-value = 0.7765
```

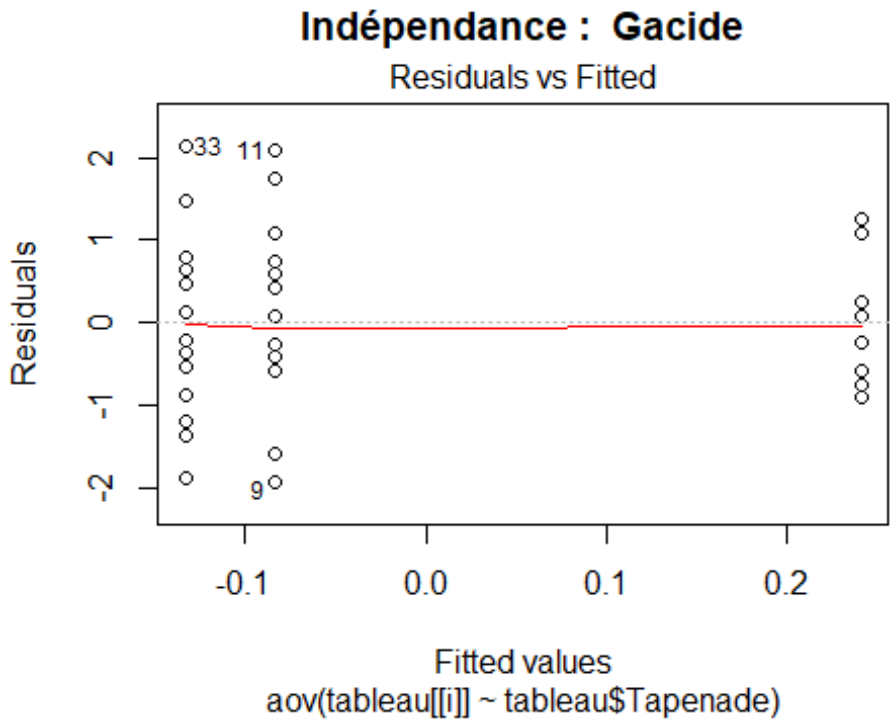



```
## [1] "Test de d'homogéneité des residus de la variable Ovegetale"
```

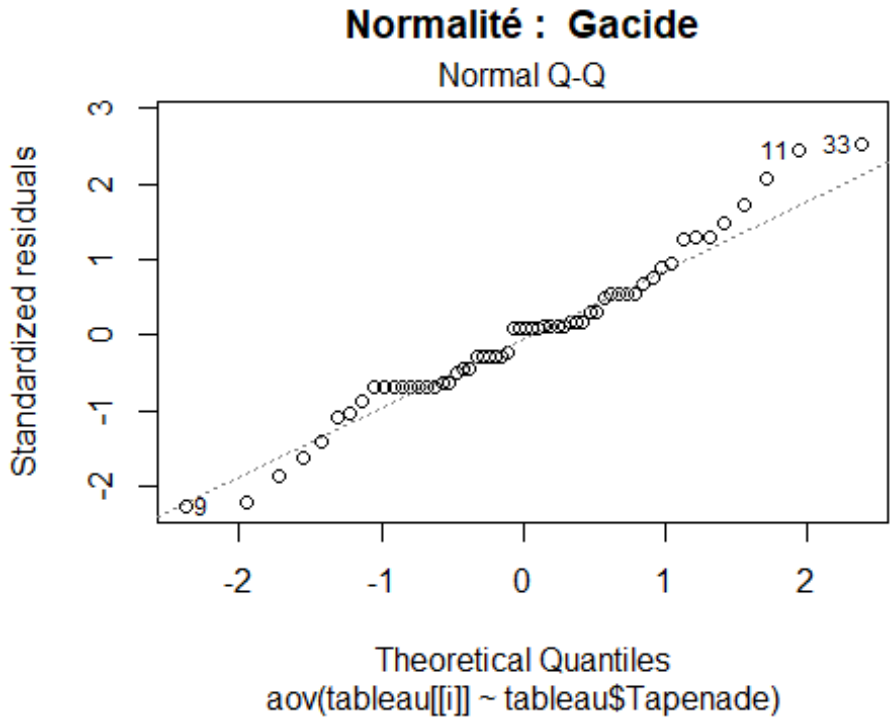




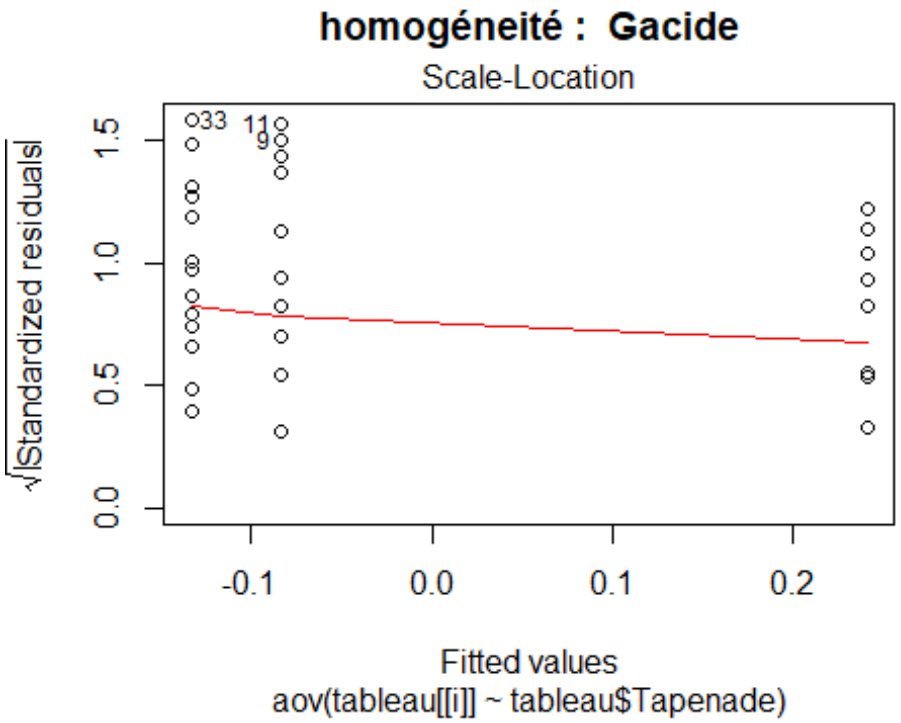

```
## NULL
## [1] "ANOVA I pour la variable Gacide"
##                   Df Sum Sq Mean Sq F value Pr(>F)
## tableau$Tapenade  2   1.54  0.7688   1.016  0.369
## Residuals        55  41.63  0.7569
## 14 observations deleted due to missingness
## [1] "Test d'indépendance des residus de la variable Gacide"
##  lag Autocorrelation D-W Statistic p-value
##    1      -0.2721562      2.528222    0.07
##  Alternative hypothesis: rho != 0
```

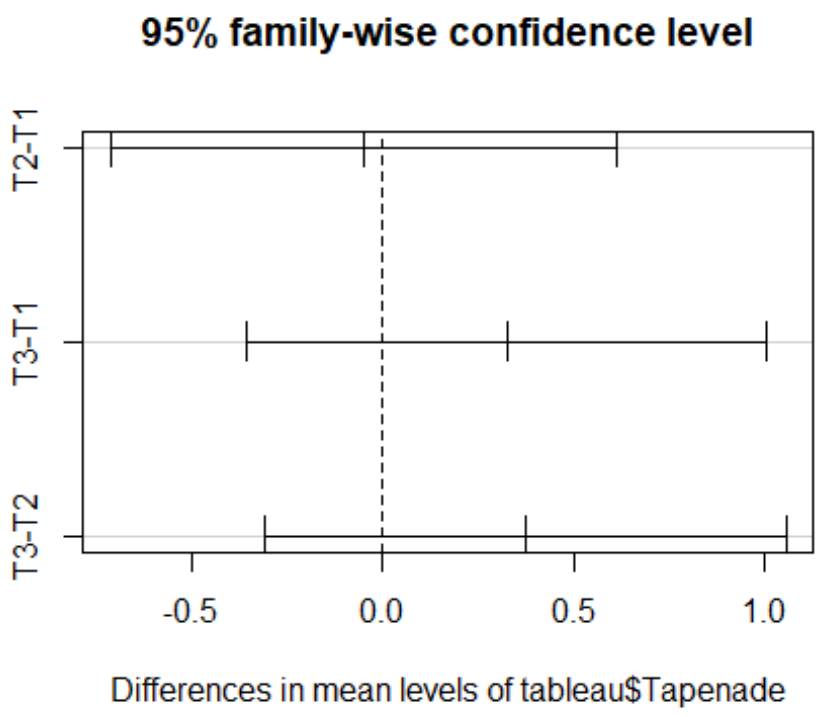



```
## NULL
## [1] "Test de normalité des residus de la variable Gacide"
##
##  Shapiro-Wilk normality test
##
## data:  residuals(anov)
## W = 0.97143, p-value = 0.1871
```



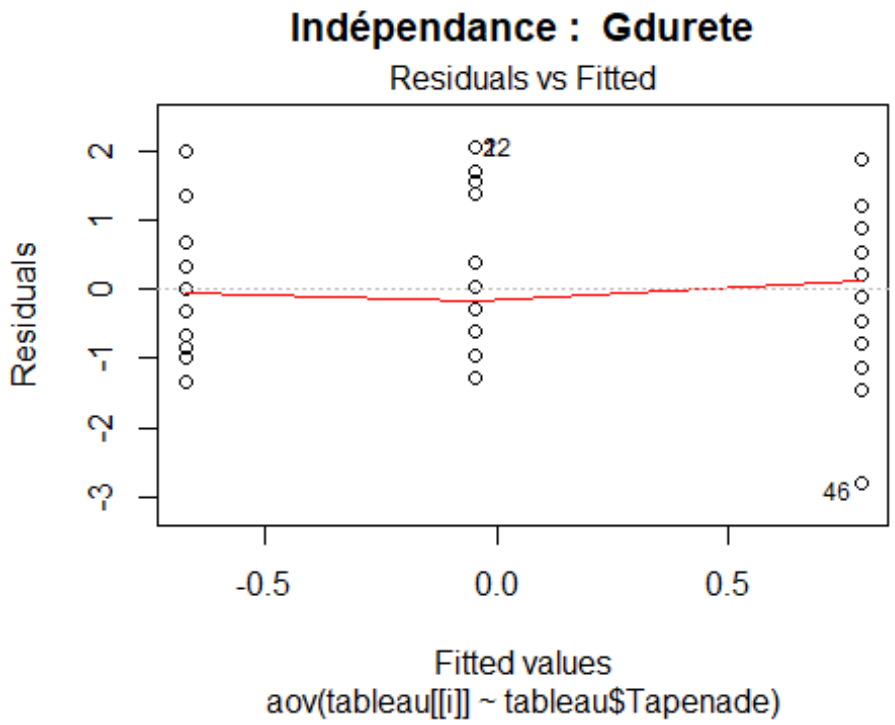

```
## [1] "Test de d'homogéneité des residus de la variable Gacide"
```



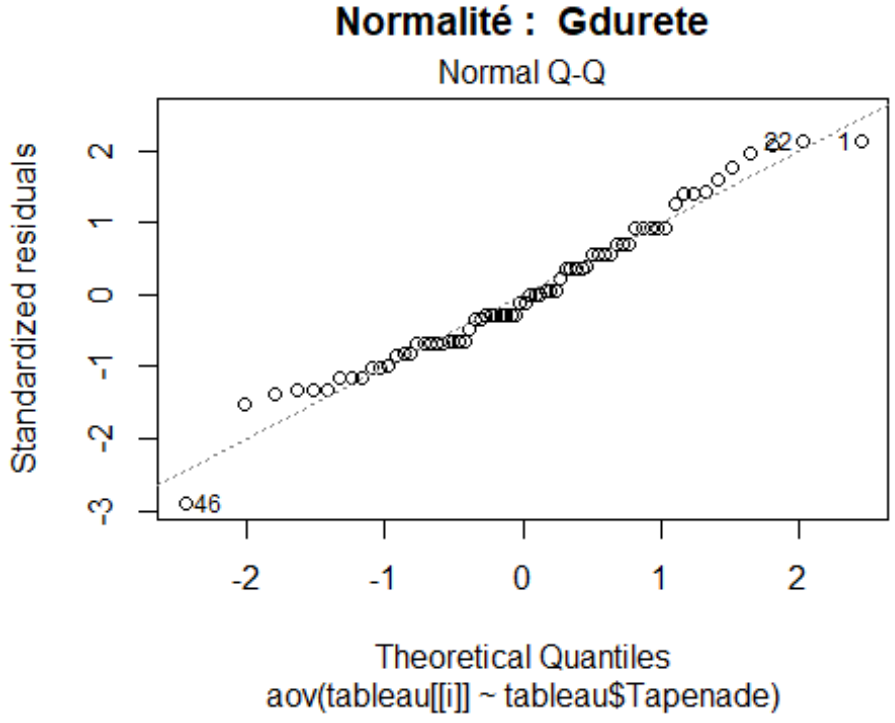



```
## NULL
## [1] "ANOVA I pour la variable Gdurete"
##                  Df Sum Sq Mean Sq F value   Pr(>F)
## tableau$Tapenade  2  24.60  12.302   12.63 2.21e-05 ***
## Residuals        67  65.23   0.974
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## 2 observations deleted due to missingness
## [1] "Test d'indépendance des residus de la variable Gdurete"
##  lag Autocorrelation D-W Statistic p-value
```

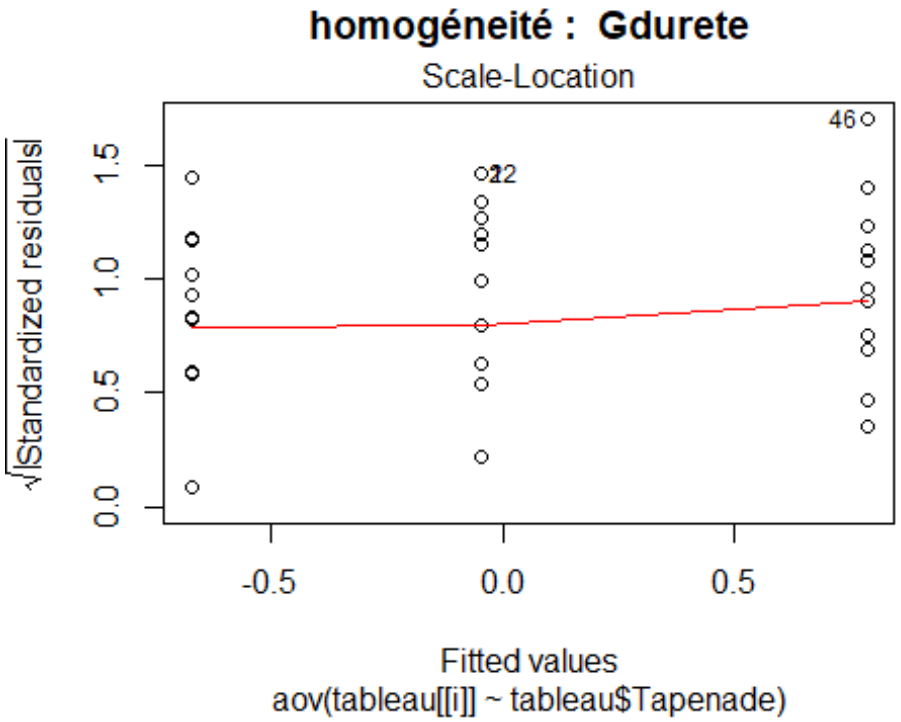
```
##    1     -0.07623979      2.081469   0.872
##  Alternative hypothesis: rho != 0
```

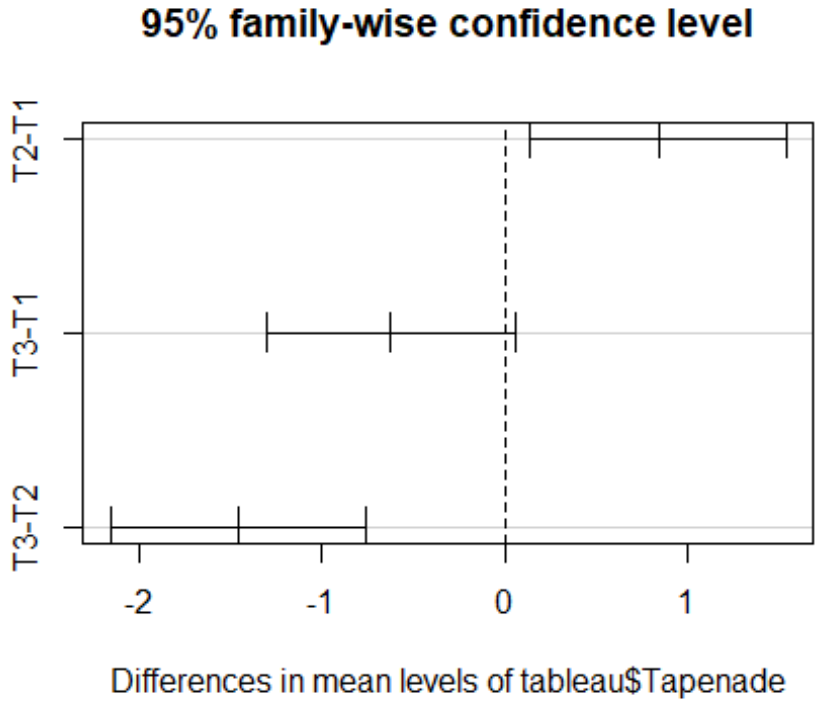



```
## NULL
## [1] "Test de normalité des residus de la variable Gdurete"
##
##  Shapiro-Wilk normality test
##
## data:  residuals(anov)
## W = 0.97422, p-value = 0.1577
```



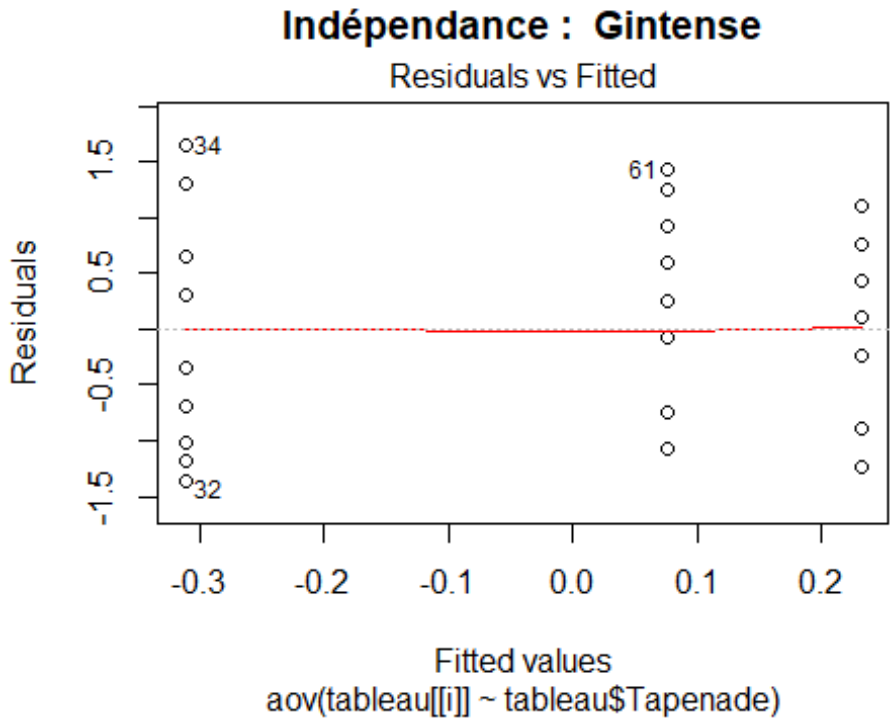
```
## [1] "Test de d'homogéneité des residus de la variable Gdurete"
```



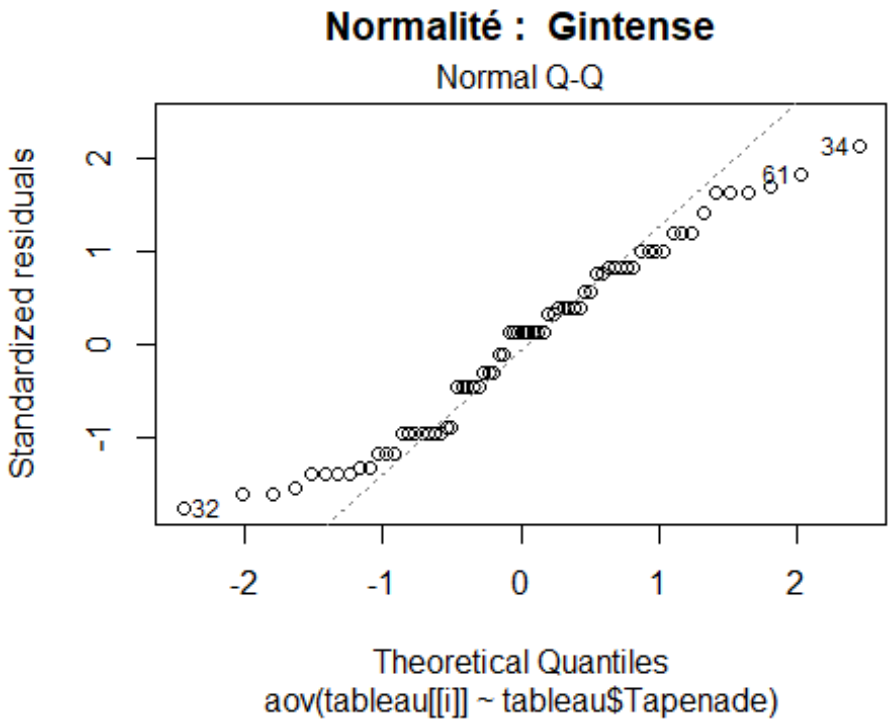



```
## NULL
## [1] "ANOVA I pour la variable Gintense"
##                  Df Sum Sq Mean Sq F value Pr(>F)
## tableau$Tapenade  2   3.61  1.8049   2.864  0.064 .
## Residuals        67  42.22  0.6302
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## 2 observations deleted due to missingness
## [1] "Test d'indépendance des residus de la variable Gintense"
```

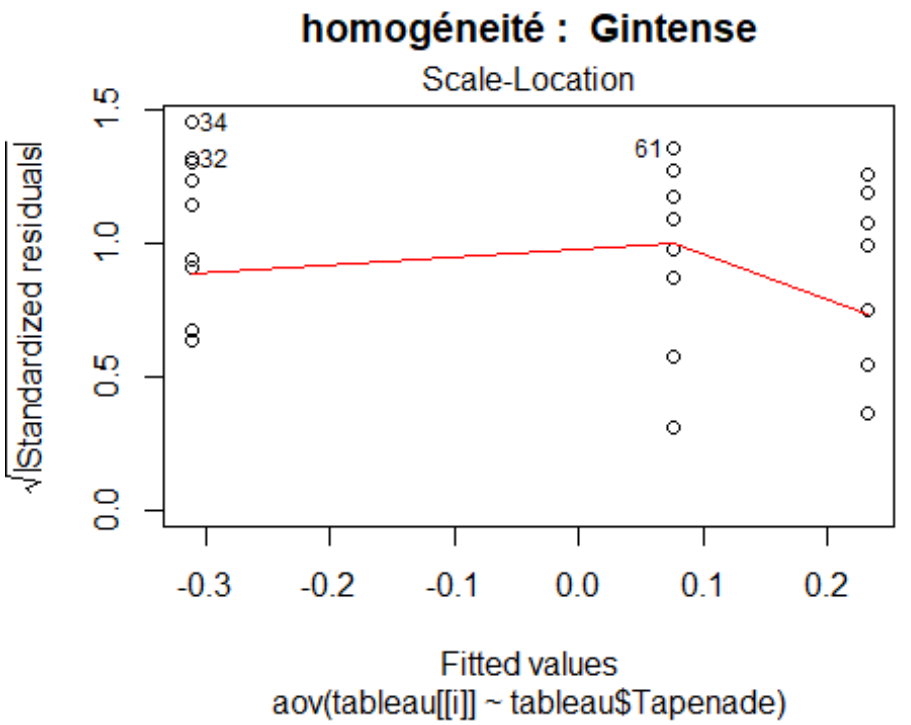
```
##  lag Autocorrelation D-W Statistic p-value
##    1       0.3791581      1.227572   0.002
##  Alternative hypothesis: rho != 0
```

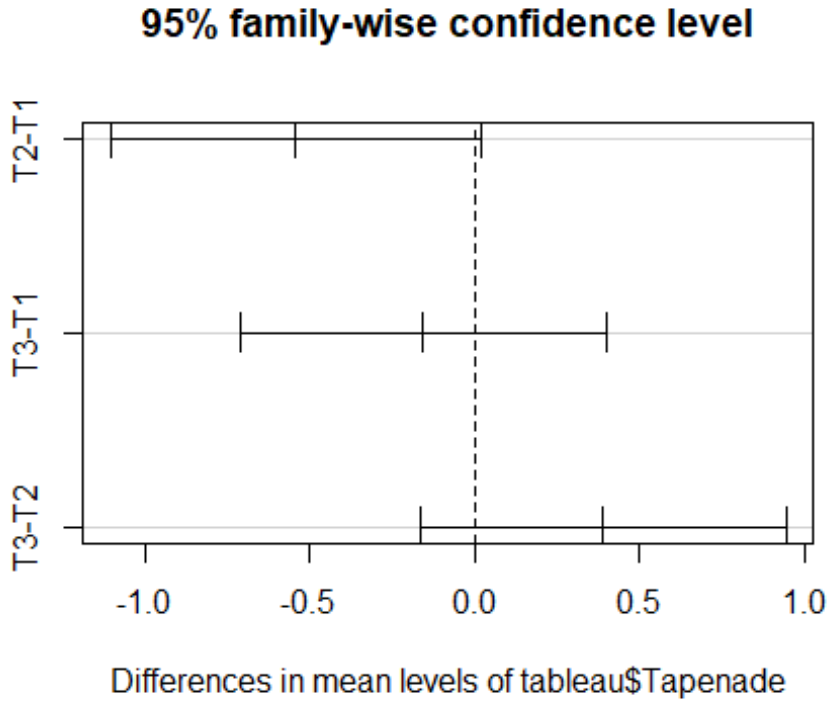



```
## NULL
## [1] "Test de normalité des residus de la variable Gintense"
##
##  Shapiro-Wilk normality test
##
## data:  residuals(anov)
## W = 0.96183, p-value = 0.03161
```



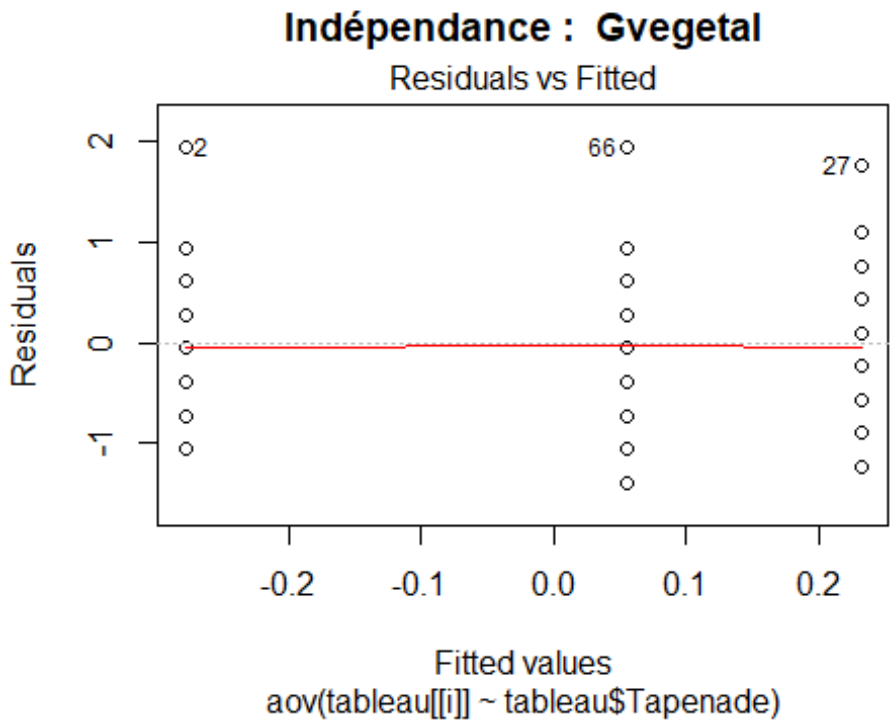

```
## [1] "Test de d'homogéneité des residus de la variable Gintense"
```



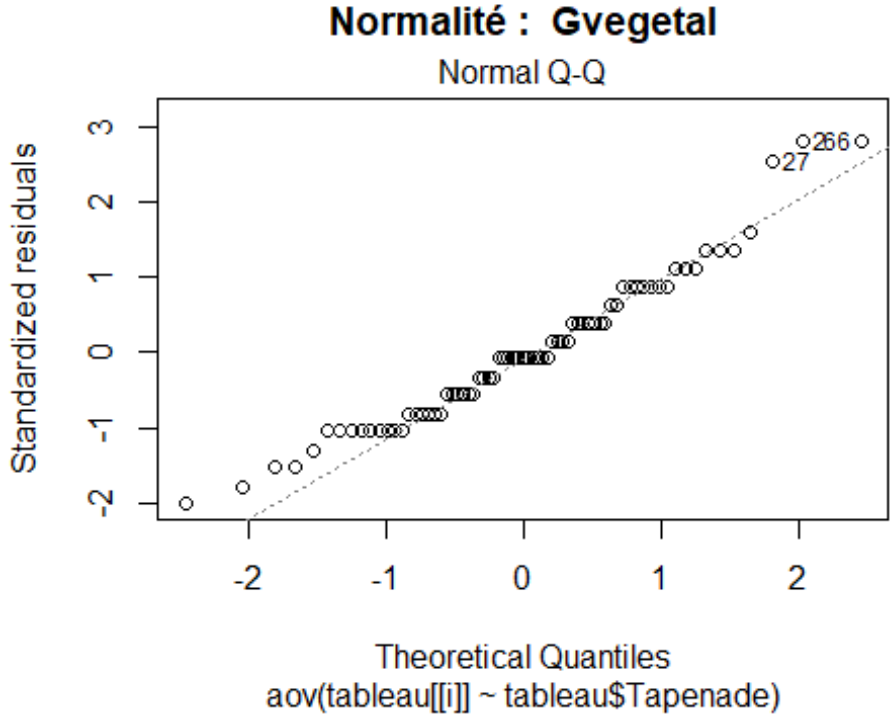



```
## NULL
## [1] "ANOVA I pour la variable Gvegetal"
##                  Df Sum Sq Mean Sq F value Pr(>F)
## tableau$Tapenade  2   3.16  1.5813   3.147 0.0493 *
## Residuals        68  34.17  0.5025
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## 1 observation deleted due to missingness
## [1] "Test d'indépendance des residus de la variable Gvegetal"
##  lag Autocorrelation D-W Statistic p-value
```

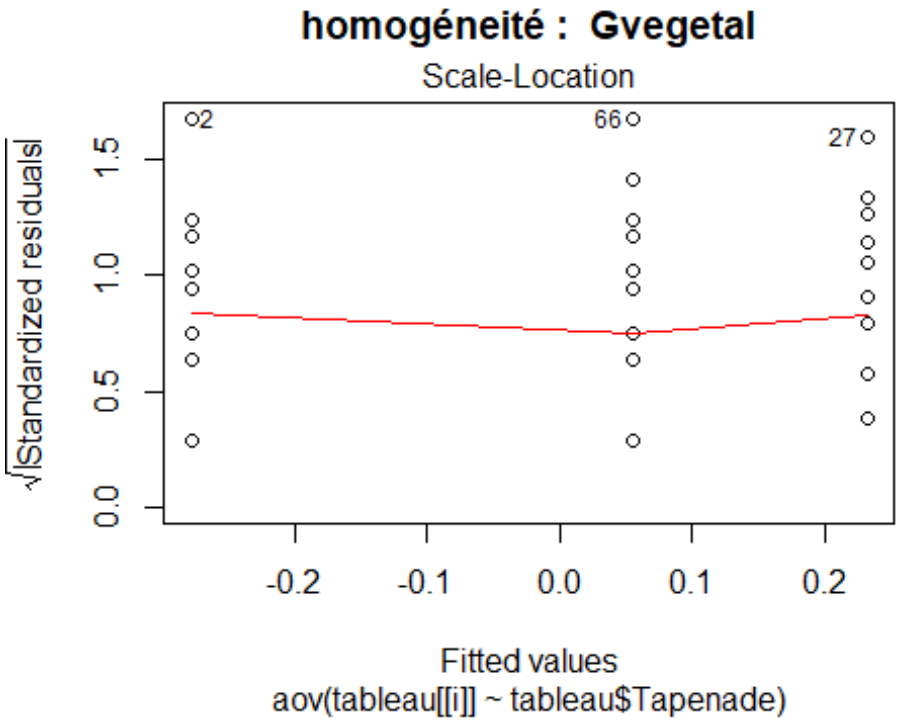
```
##    1      0.03361335      1.930425    0.57
##  Alternative hypothesis: rho != 0
```

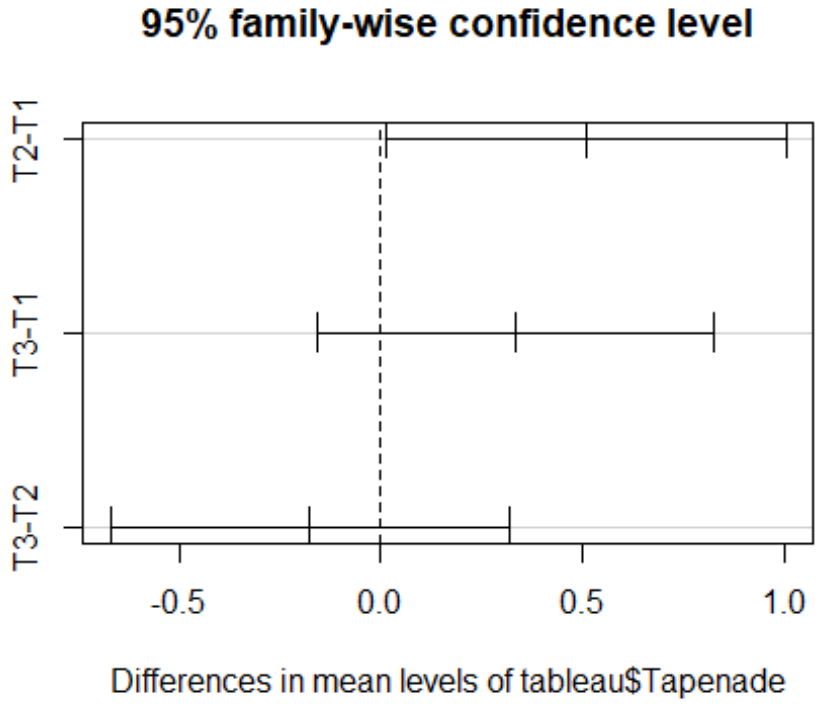



```
## NULL
## [1] "Test de normalité des residus de la variable Gvegetal"
##
##  Shapiro-Wilk normality test
##
## data:  residuals(anov)
## W = 0.96074, p-value = 0.02588
```



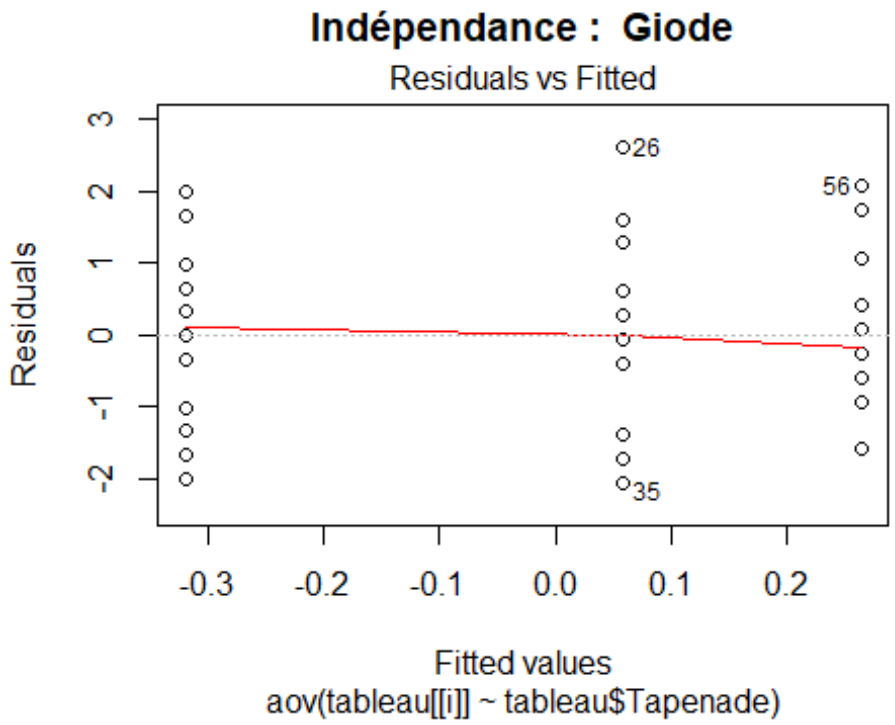
```
## [1] "Test de d'homogéneité des residus de la variable Gvegetal"
```



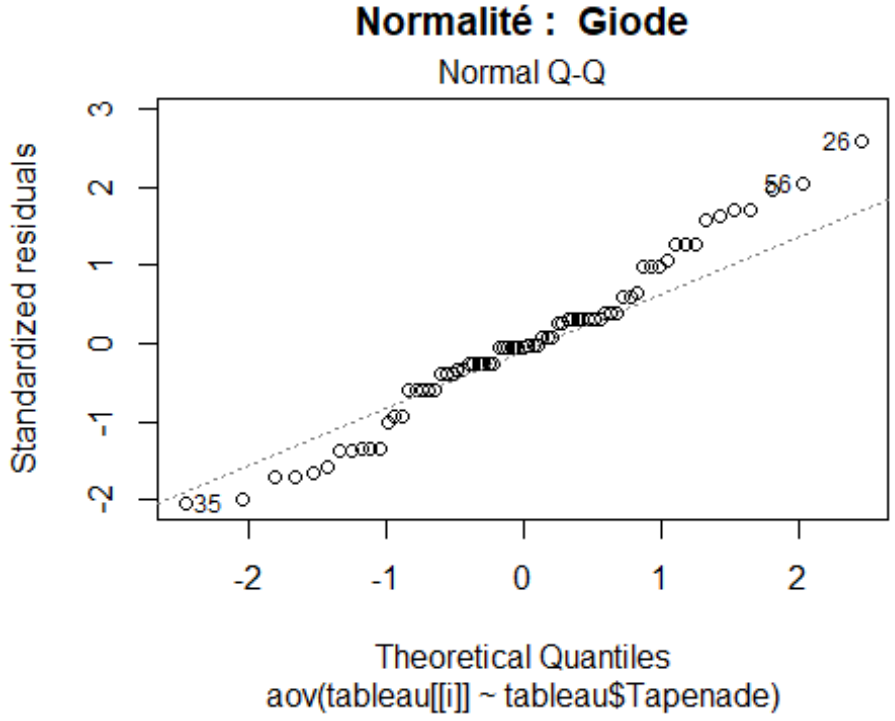



```
## NULL
## [1] "ANOVA I pour la variable Giode"
##                  Df Sum Sq Mean Sq F value Pr(>F)
## tableau$Tapenade  2   4.20   2.099   1.969  0.147
## Residuals        68  72.47   1.066
## 1 observation deleted due to missingness
## [1] "Test d'indépendance des residus de la variable Giode"
##  lag Autocorrelation D-W Statistic p-value
```

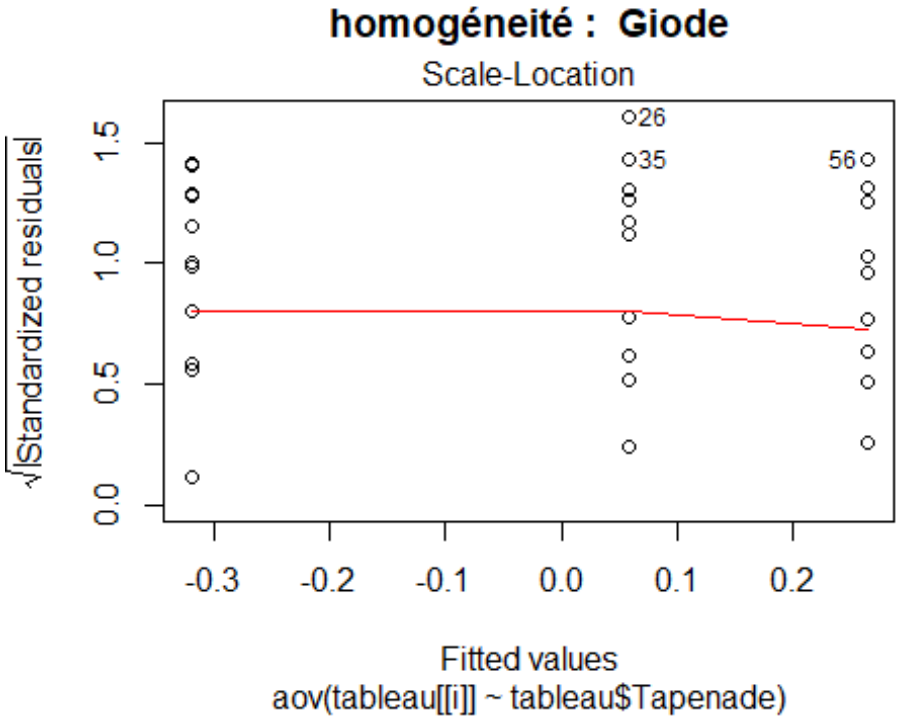
```
##    1     -0.08329291      2.164217   0.644
##  Alternative hypothesis: rho != 0
```

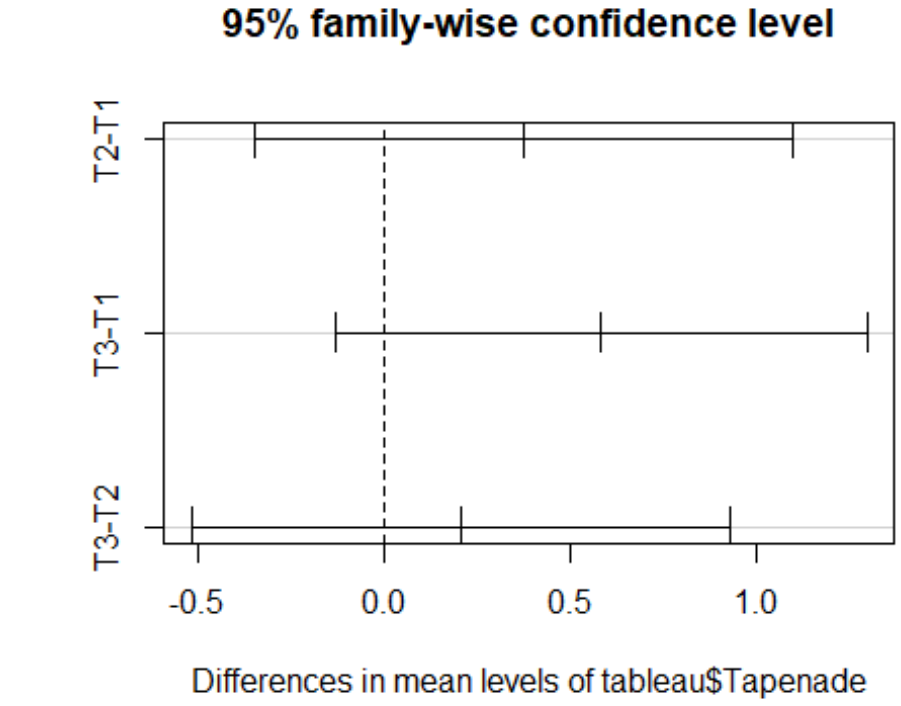



```
## NULL
## [1] "Test de normalité des residus de la variable Giode"
##
##  Shapiro-Wilk normality test
##
## data:  residuals(anov)
## W = 0.97791, p-value = 0.2439
```



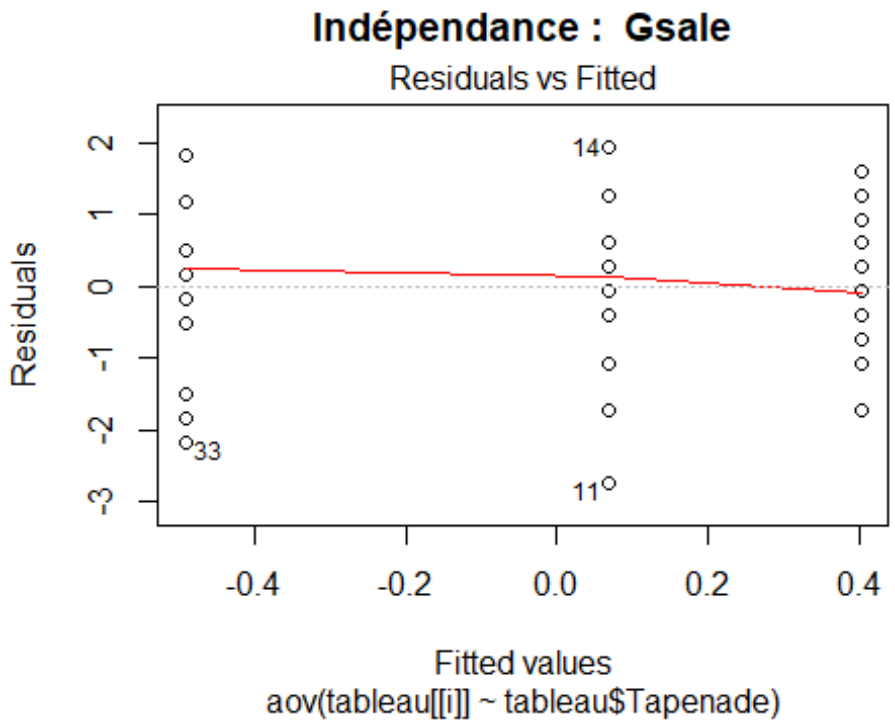
```
## [1] "Test de d'homogéneité des residus de la variable Giode"
```



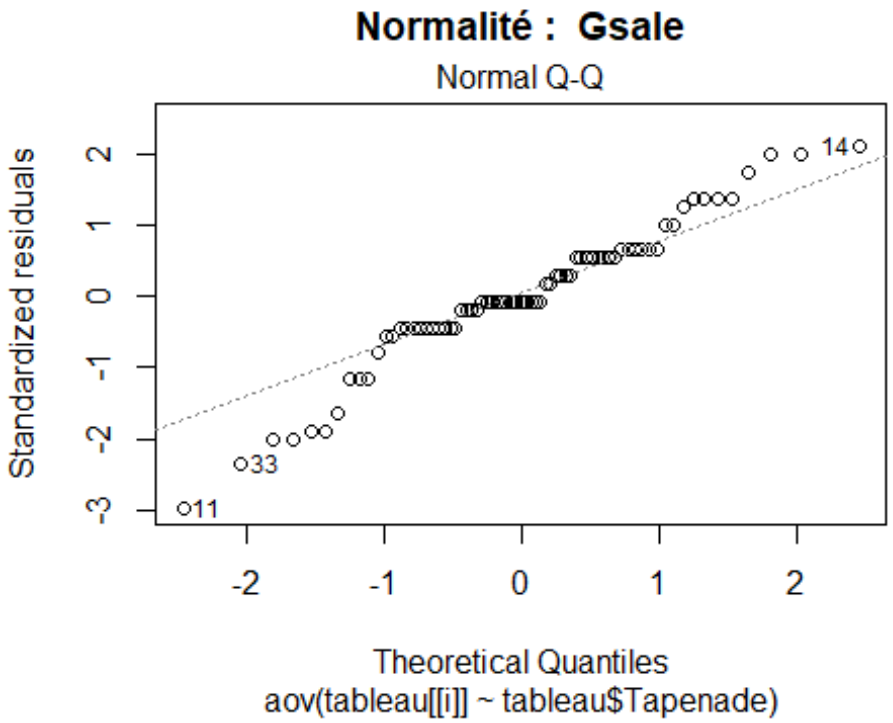



```
## NULL
## [1] "ANOVA I pour la variable Gsale"
##                  Df Sum Sq Mean Sq F value  Pr(>F)
## tableau$Tapenade  2   9.59   4.797     5.4 0.00666 **
## Residuals        68  60.41   0.888
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## 1 observation deleted due to missingness
## [1] "Test d'indépendance des residus de la variable Gsale"
```

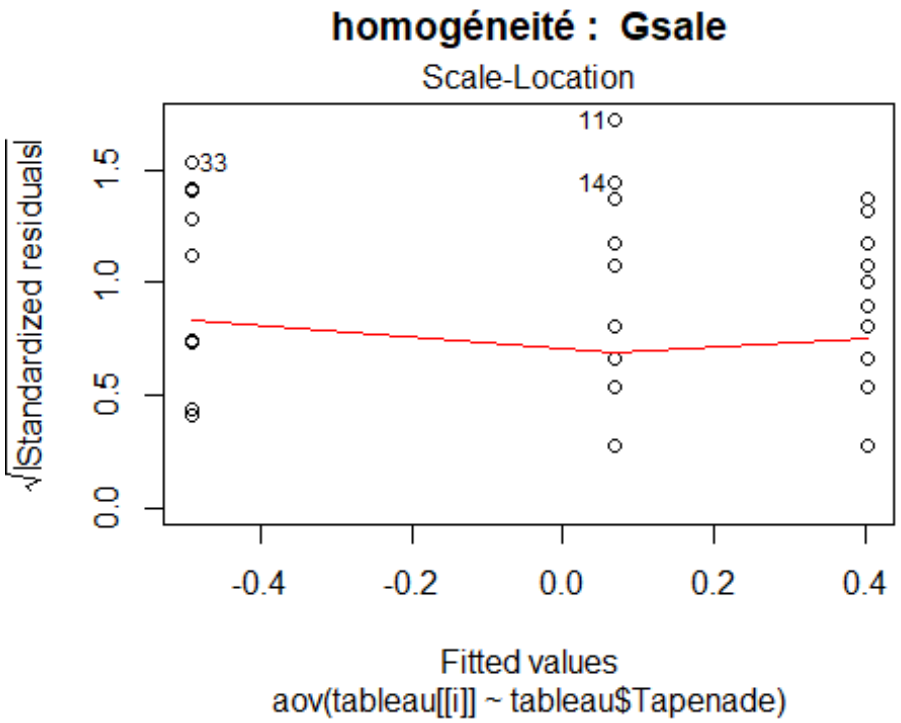
```
##  lag Autocorrelation D-W Statistic p-value
##    1       0.1347287      1.727777    0.17
##  Alternative hypothesis: rho != 0
```

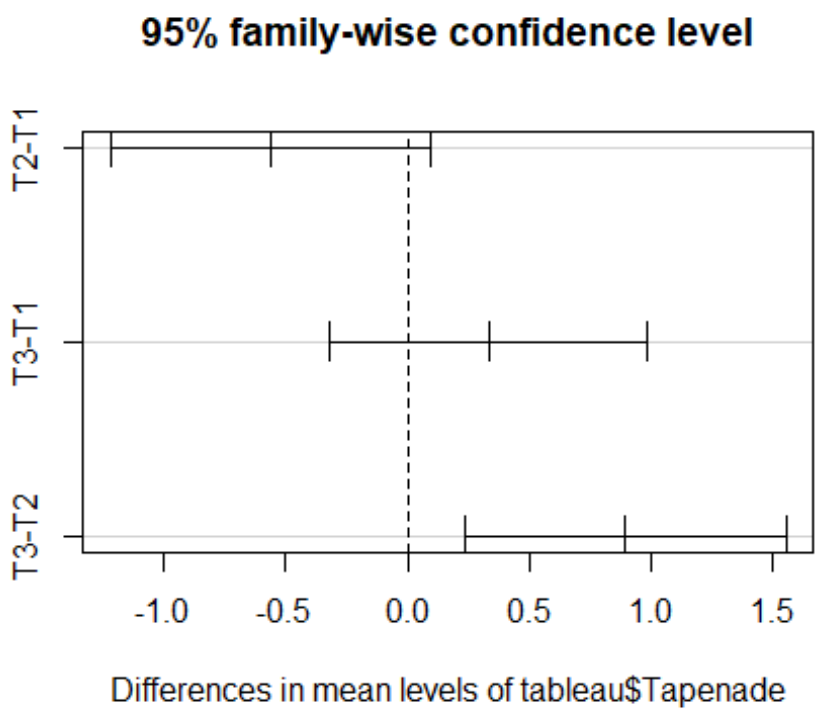



```
## NULL
## [1] "Test de normalité des residus de la variable Gsale"
##
##  Shapiro-Wilk normality test
##
## data:  residuals(anov)
## W = 0.9571, p-value = 0.01625
```

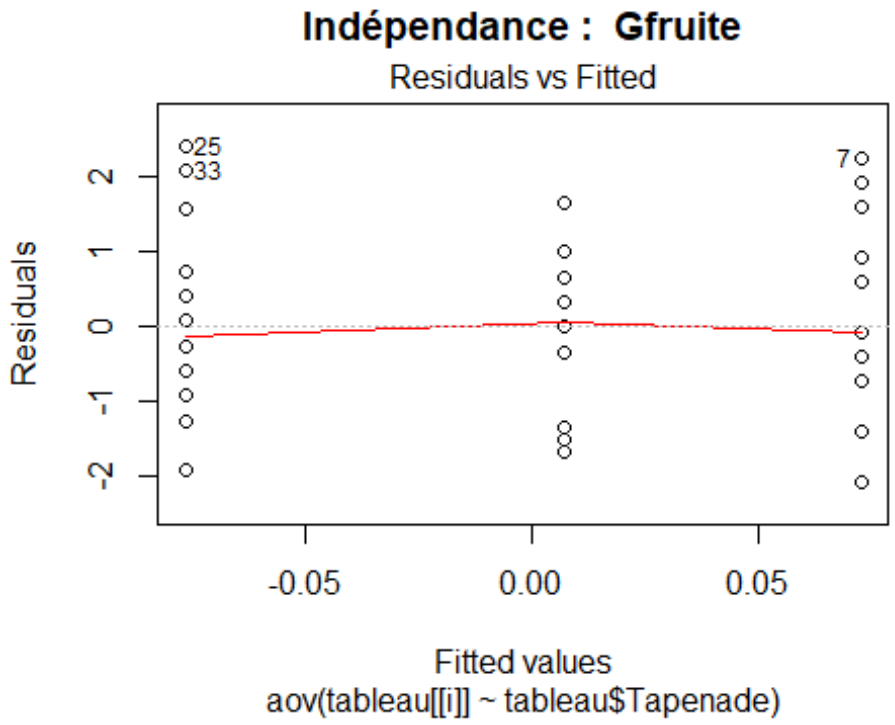



```
## [1] "Test de d'homogéneité des residus de la variable Gsale"
```

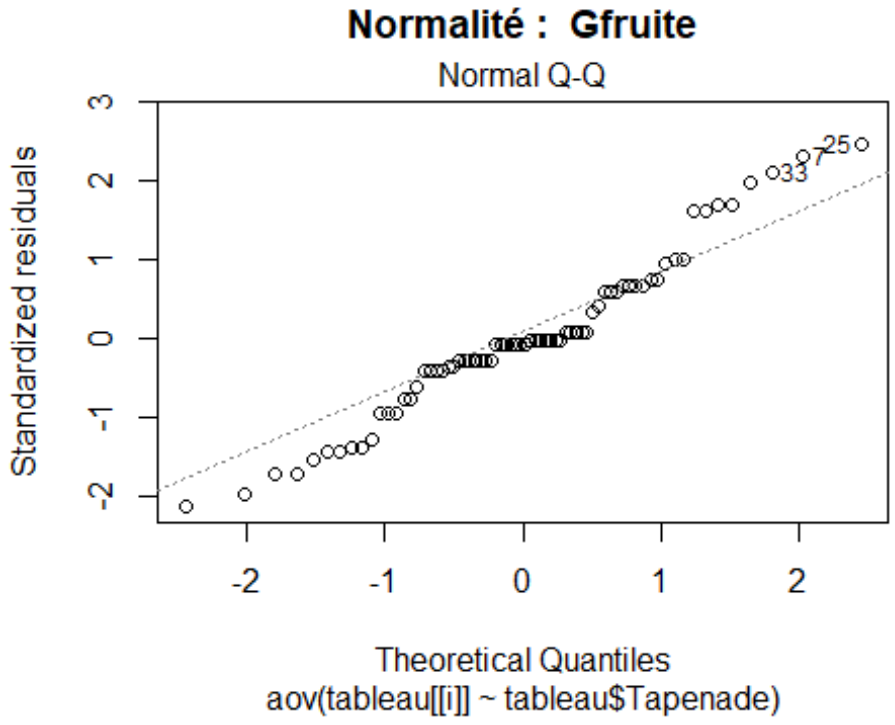




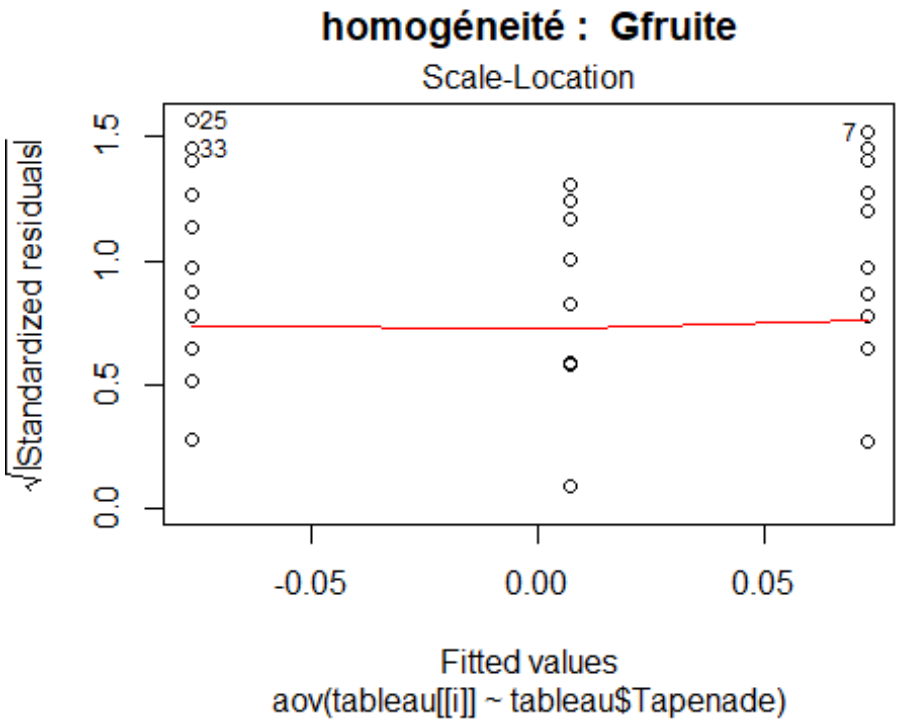

```
## NULL
## [1] "ANOVA I pour la variable Gfruite"
##                  Df Sum Sq Mean Sq F value Pr(>F)
## tableau$Tapenade  2   0.26  0.1310   0.131  0.877
## Residuals        67  66.90  0.9986
## 2 observations deleted due to missingness
## [1] "Test d'indépendance des residus de la variable Gfruite"
##  lag Autocorrelation D-W Statistic p-value
##    1     -0.03126923      2.054372    0.96
##  Alternative hypothesis: rho != 0
```

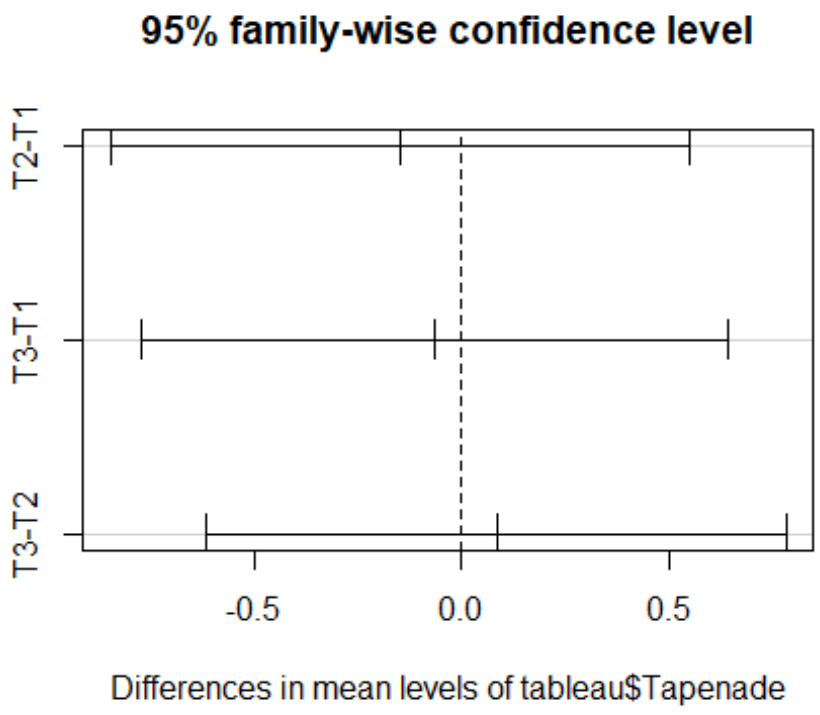



```
## NULL
## [1] "Test de normalité des residus de la variable Gfruite"
##
##  Shapiro-Wilk normality test
##
## data:  residuals(anov)
## W = 0.96502, p-value = 0.04767
```

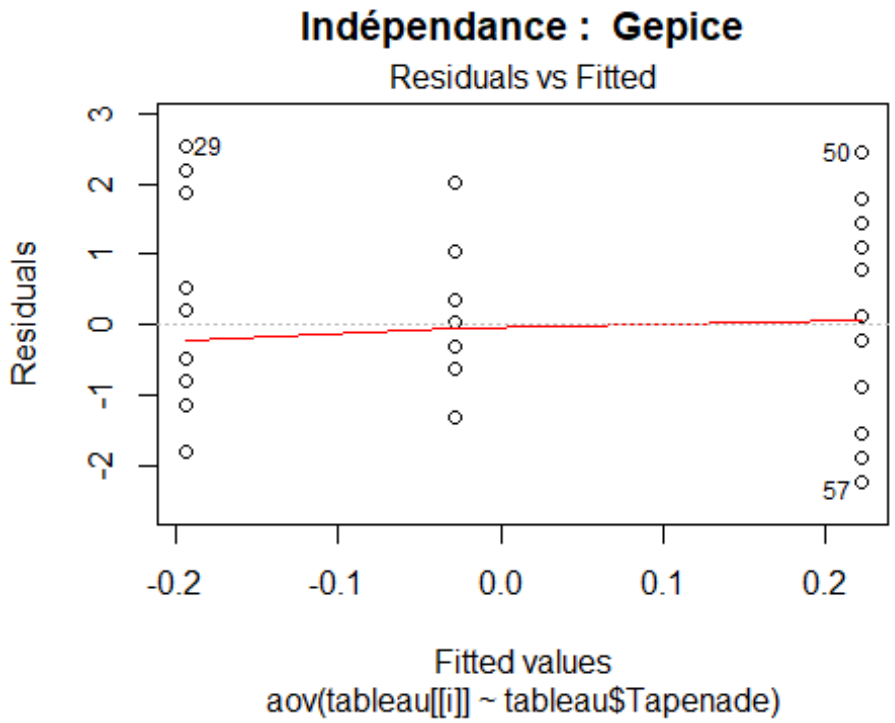



```
## [1] "Test de d'homogéneité des residus de la variable Gfruite"
```

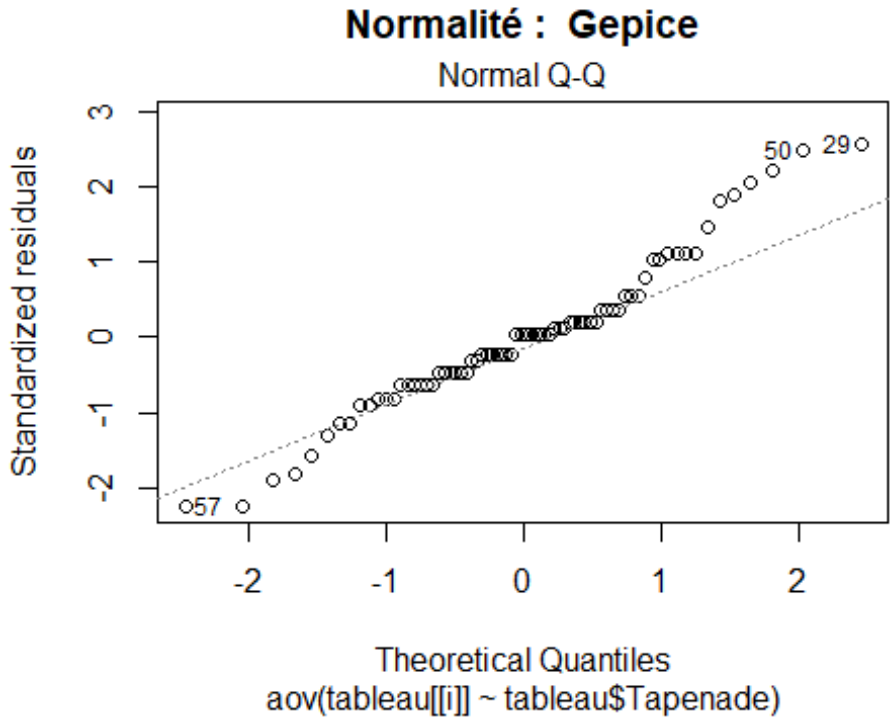




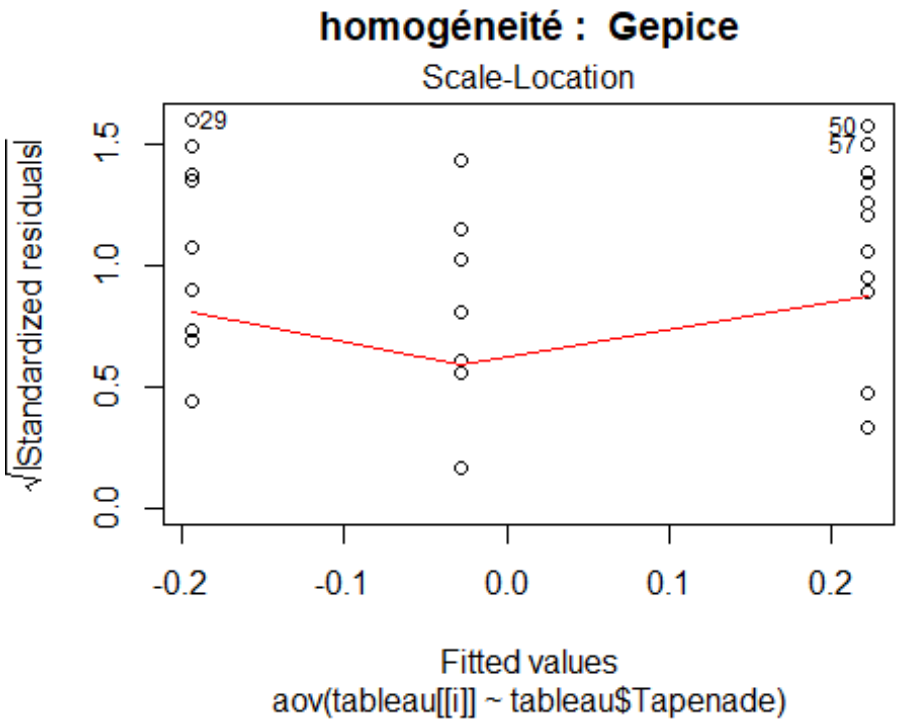

```
## NULL
## [1] "ANOVA I pour la variable Gepice"
##                  Df Sum Sq Mean Sq F value Pr(>F)
## tableau$Tapenade  2   2.11   1.056   1.032  0.362
## Residuals        69  70.56   1.022
## [1] "Test d'indépendance des residus de la variable Gepice"
##  lag Autocorrelation D-W Statistic p-value
##    1     -0.03170385      2.062697   0.994
##  Alternative hypothesis: rho != 0
```

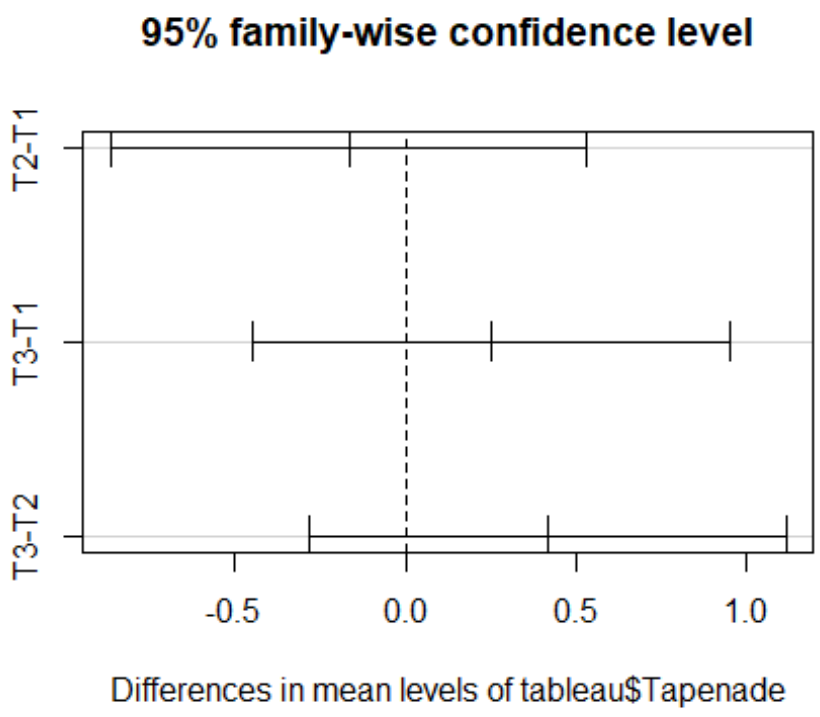



```
## NULL
## [1] "Test de normalité des residus de la variable Gepice"
##
##  Shapiro-Wilk normality test
##
## data:  residuals(anov)
## W = 0.96486, p-value = 0.04179
```

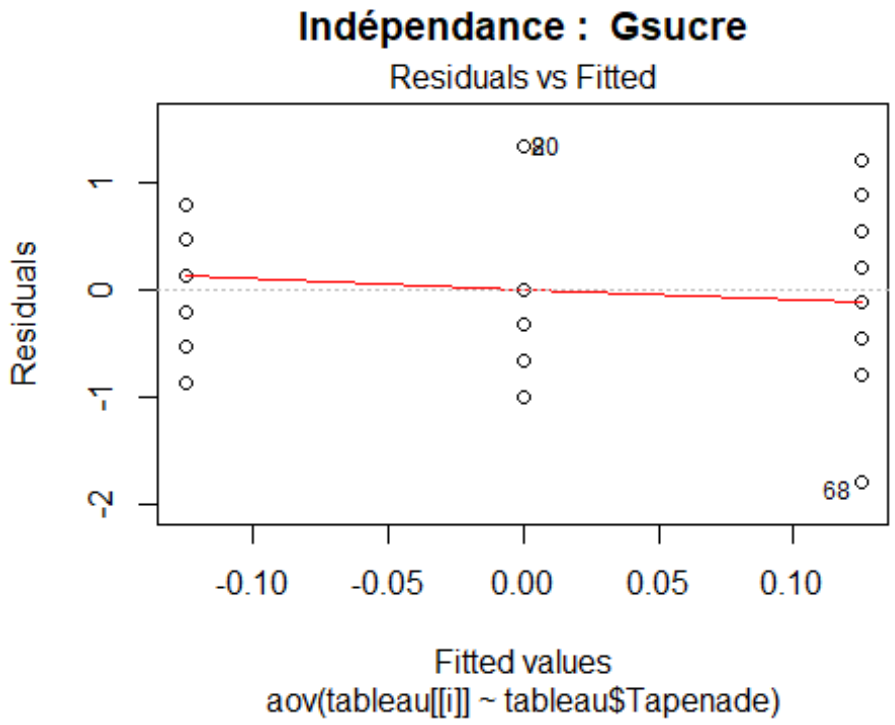



```
## [1] "Test de d'homogéneité des residus de la variable Gepice"
```

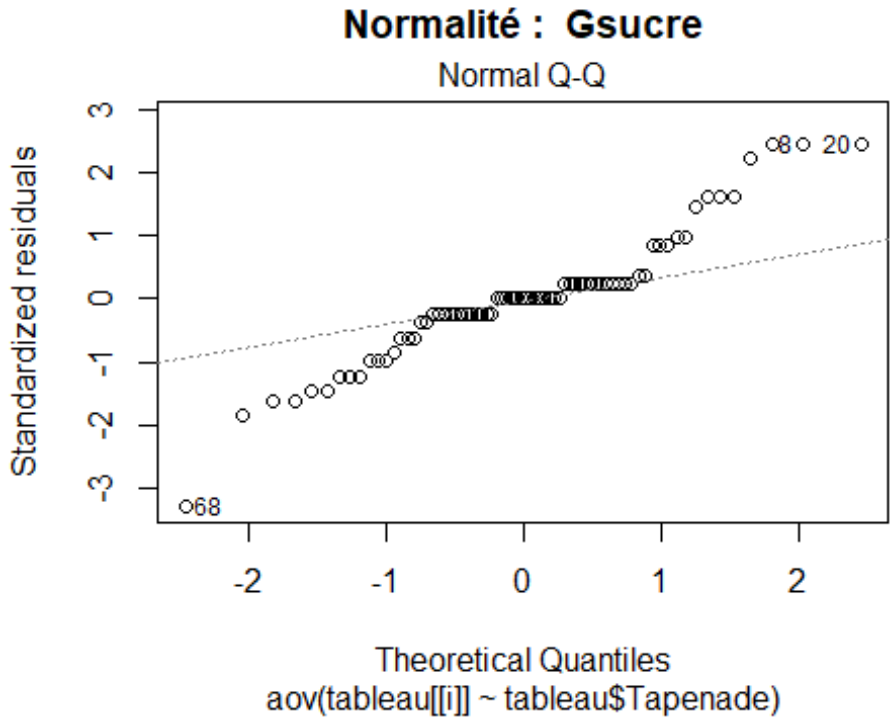




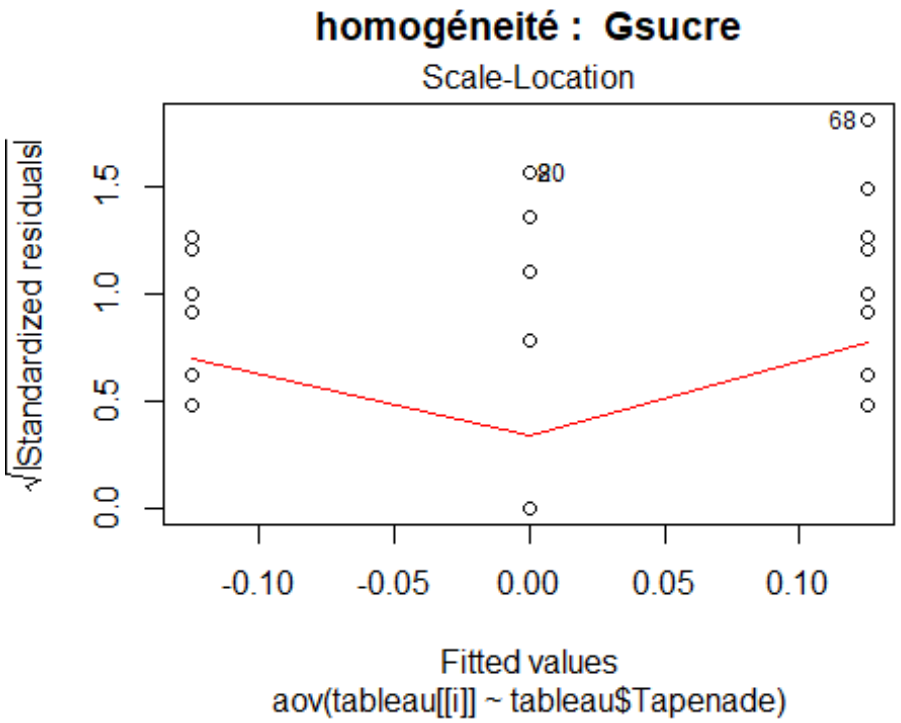

```
## NULL
## [1] "ANOVA I pour la variable Gsucre"
##                  Df Sum Sq Mean Sq F value Pr(>F)
## tableau$Tapenade  2   0.75   0.375   1.218  0.302
## Residuals        69  21.25   0.308
## [1] "Test d'indépendance des residus de la variable Gsucre"
##  lag Autocorrelation D-W Statistic p-value
##    1      -0.2139706      2.343546   0.218
##  Alternative hypothesis: rho != 0
```

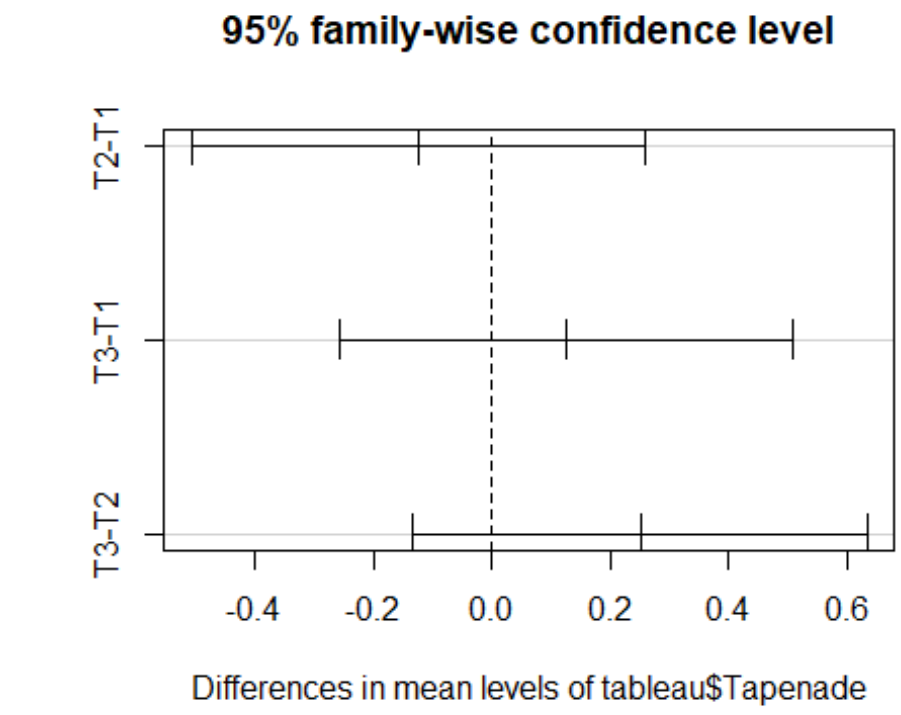



```
## NULL
## [1] "Test de normalité des residus de la variable Gsucre"
##
##  Shapiro-Wilk normality test
##
## data:  residuals(anov)
## W = 0.92937, p-value = 0.0005756
```

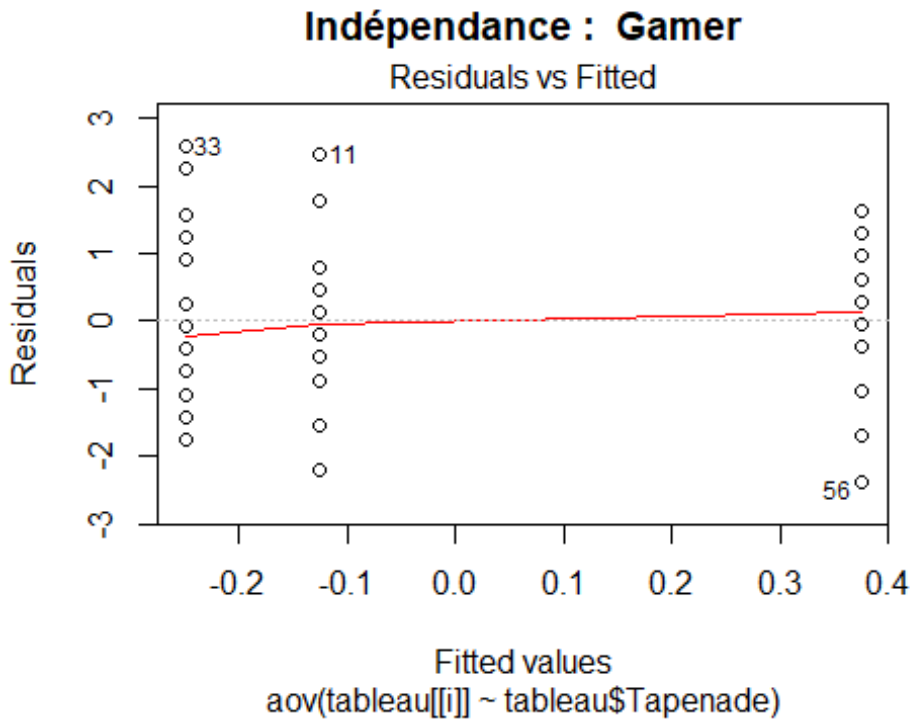



```
## [1] "Test de d'homogéneité des residus de la variable Gsucre"
```

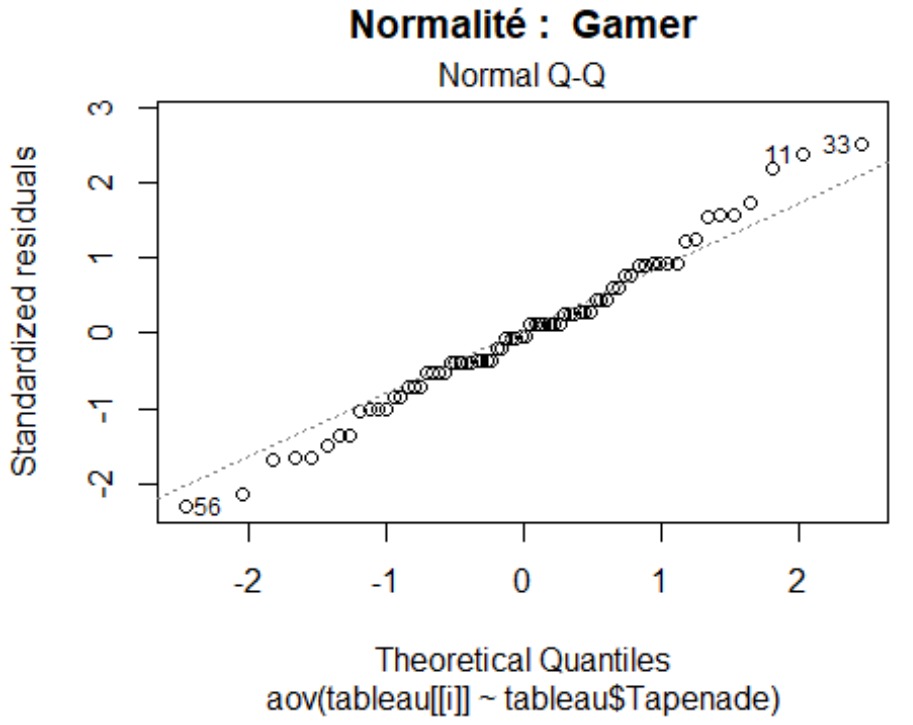




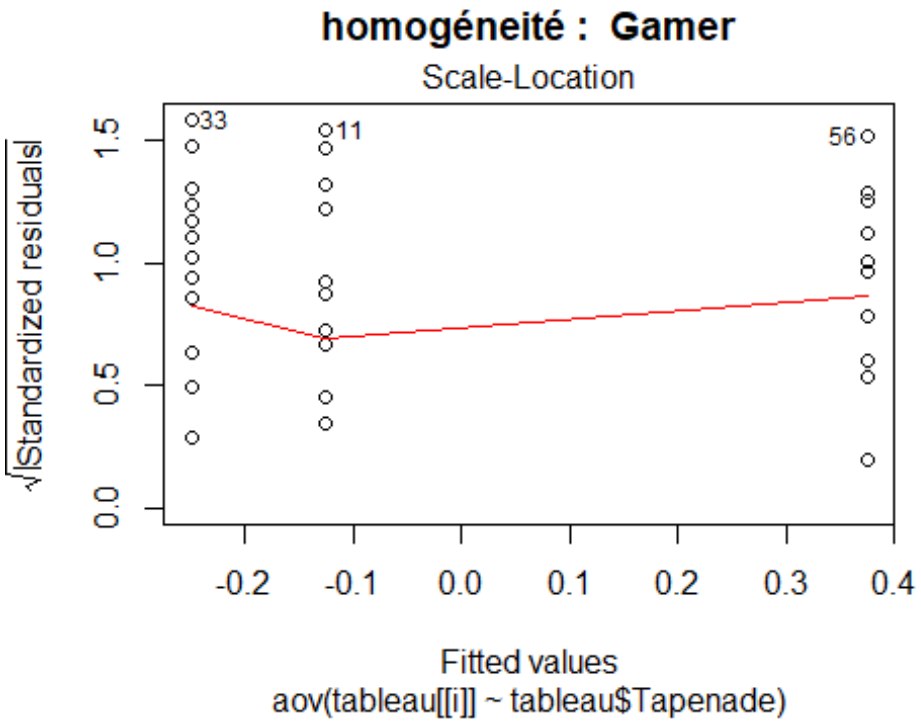

```
## NULL
## [1] "ANOVA I pour la variable Gamer"
##                  Df Sum Sq Mean Sq F value Pr(>F)
## tableau$Tapenade  2   5.25   2.625    2.36  0.102
## Residuals        69  76.75   1.112
## [1] "Test d'indépendance des residus de la variable Gamer"
##  lag Autocorrelation D-W Statistic p-value
##    1       0.1190282      1.759908   0.226
##  Alternative hypothesis: rho != 0
```

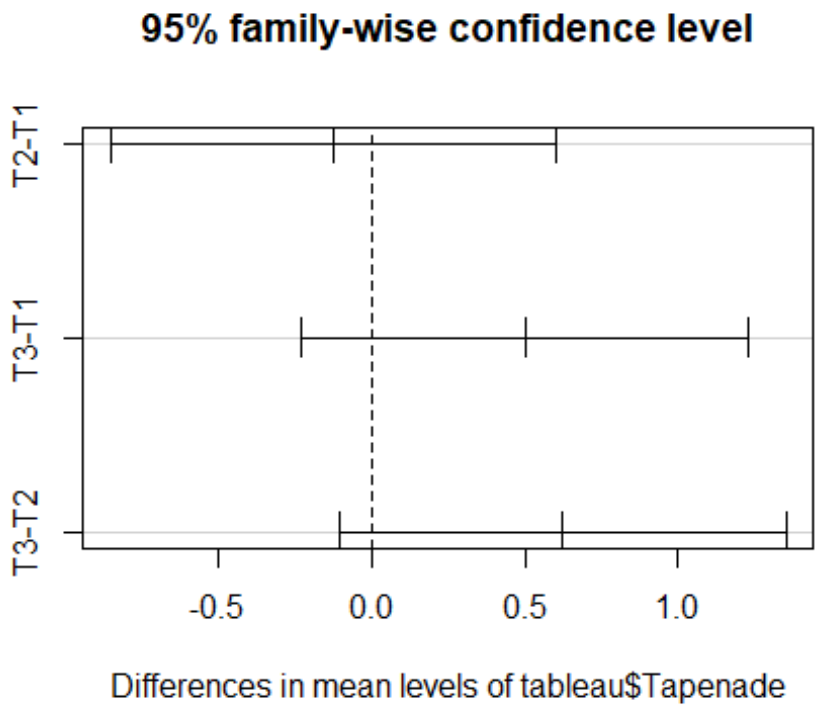



```
## NULL
## [1] "Test de normalité des residus de la variable Gamer"
##
##  Shapiro-Wilk normality test
##
## data:  residuals(anov)
## W = 0.98674, p-value = 0.6527
```

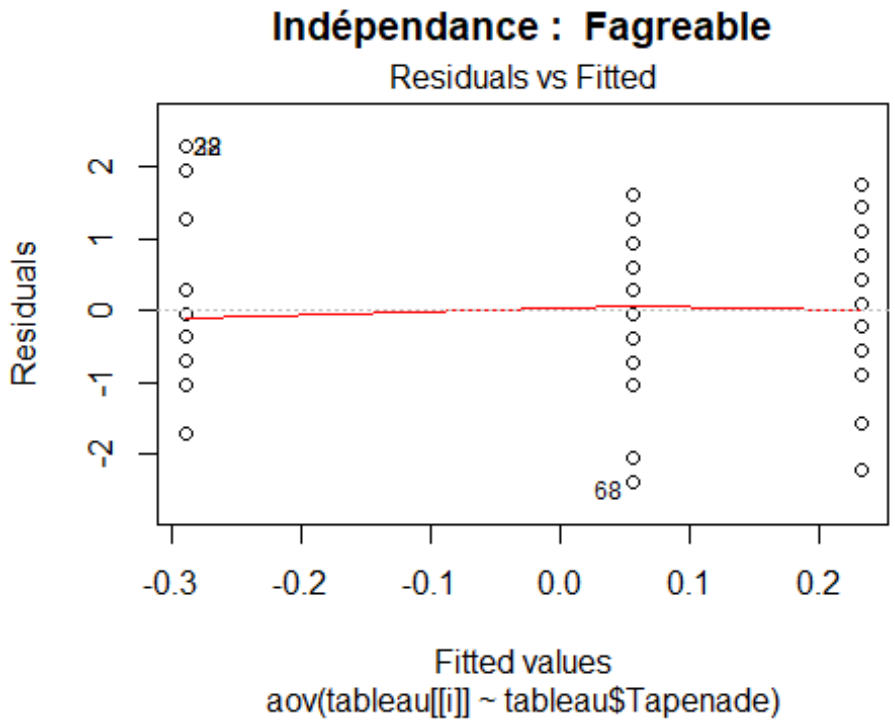



```
## [1] "Test de d'homogéneité des residus de la variable Gamer"
```

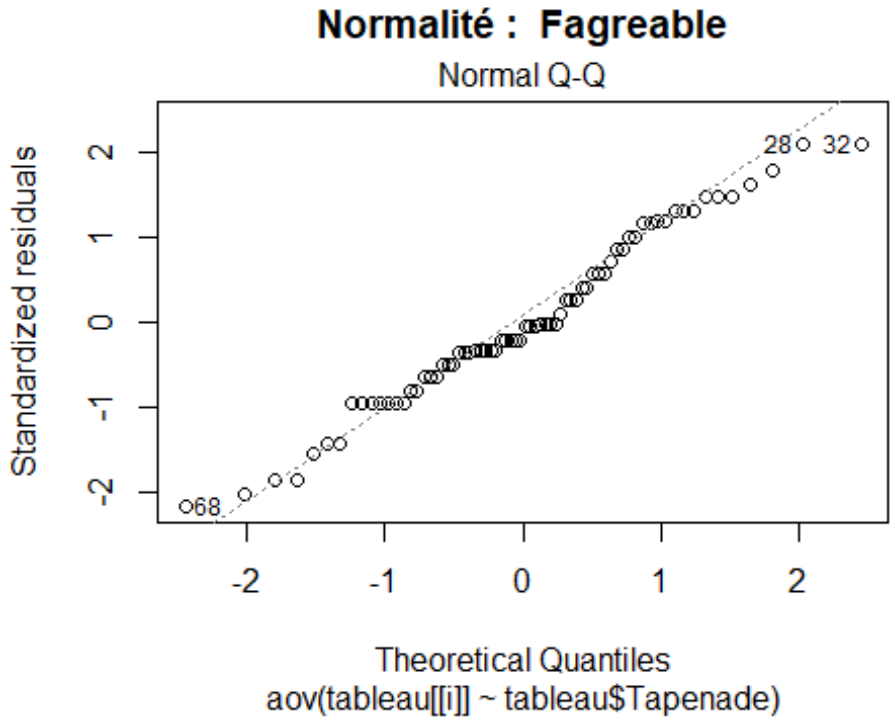




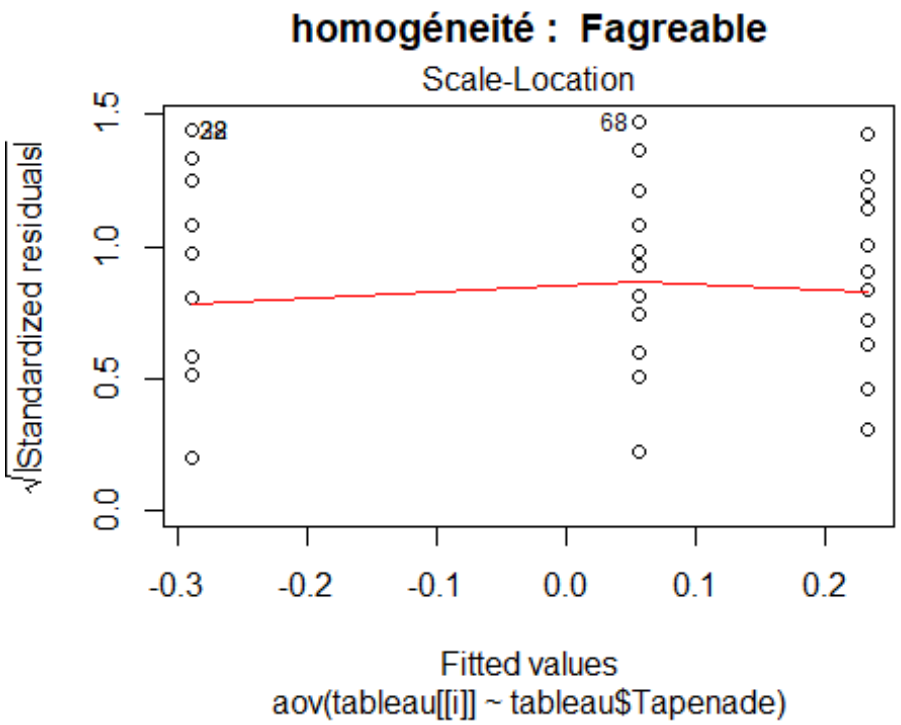

```
## NULL
## [1] "ANOVA I pour la variable Fagreable"
##                  Df Sum Sq Mean Sq F value Pr(>F)
## tableau$Tapenade  2   3.24   1.622   1.282  0.284
## Residuals        67  84.76   1.265
## 2 observations deleted due to missingness
## [1] "Test d'indépendance des residus de la variable Fagreable"
##  lag Autocorrelation D-W Statistic p-value
##    1       -0.177589      2.320366   0.266
##  Alternative hypothesis: rho != 0
```

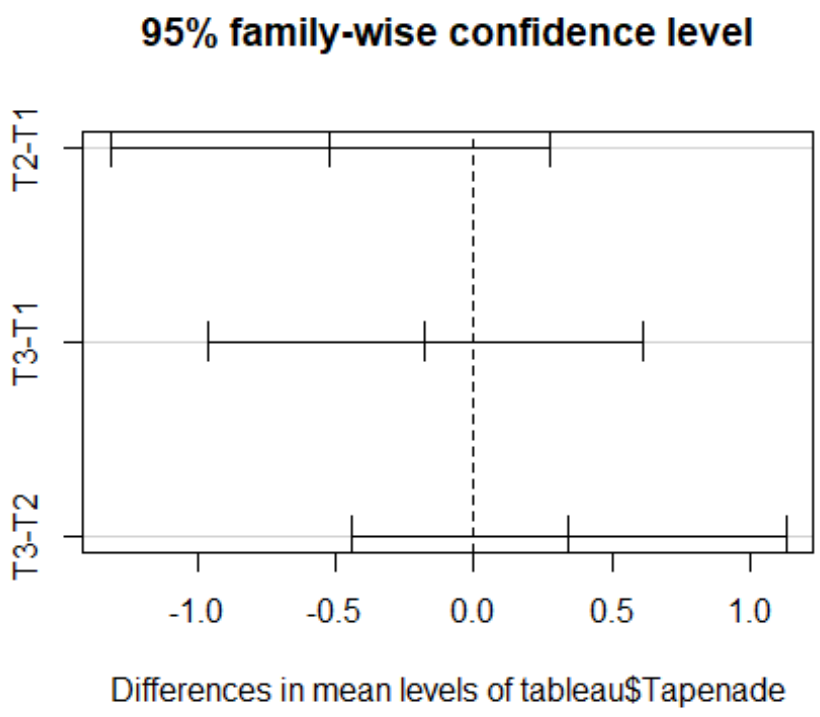



```
## NULL
## [1] "Test de normalité des residus de la variable Fagreable"
##
##  Shapiro-Wilk normality test
##
## data:  residuals(anov)
## W = 0.97738, p-value = 0.2358
```

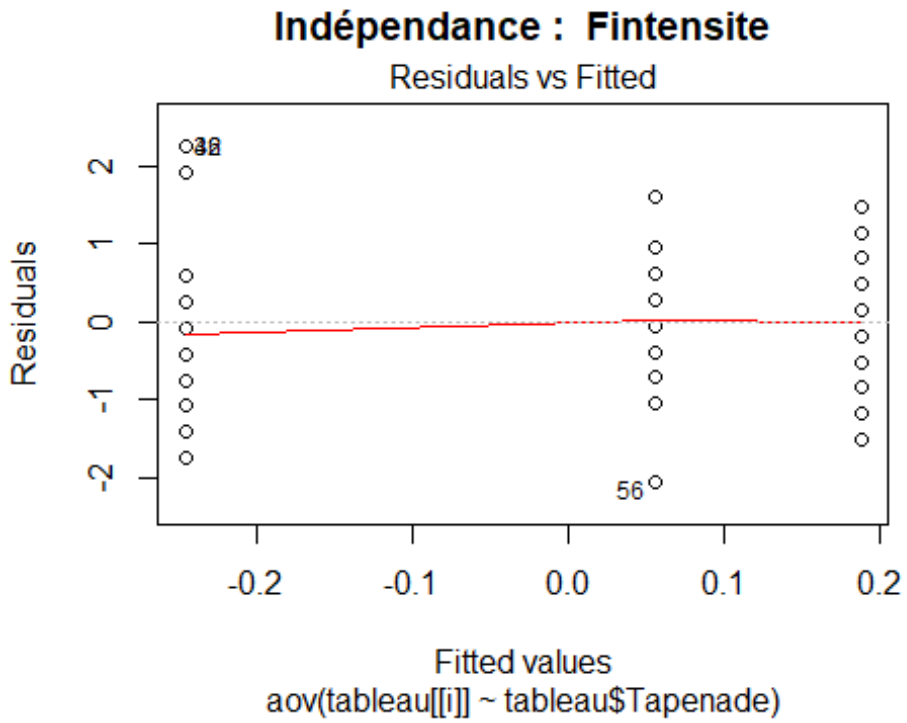



```
## [1] "Test de d'homogéneité des residus de la variable Fagreable"
```

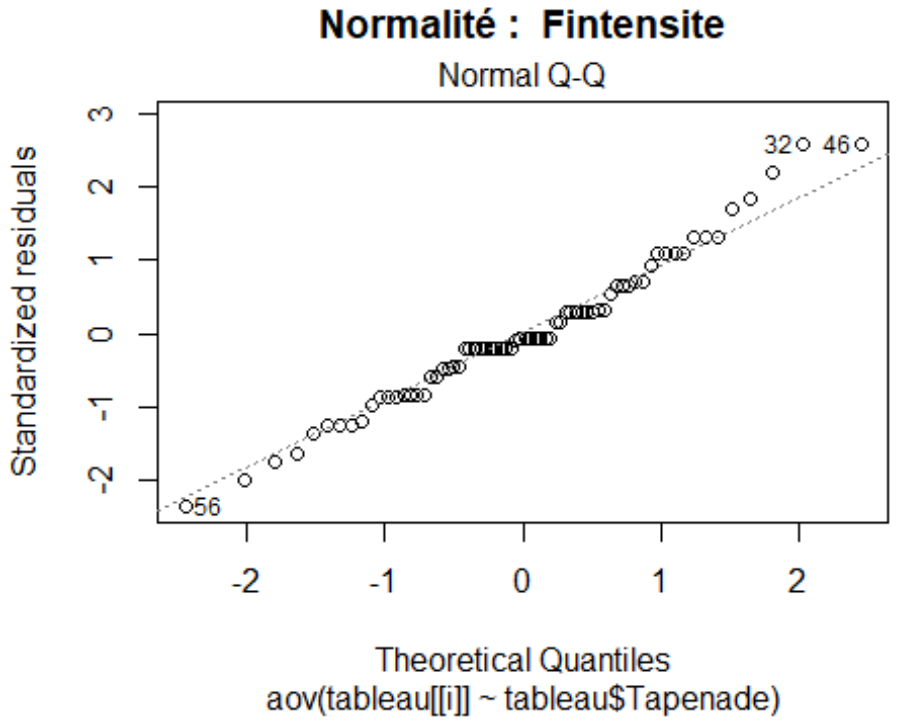




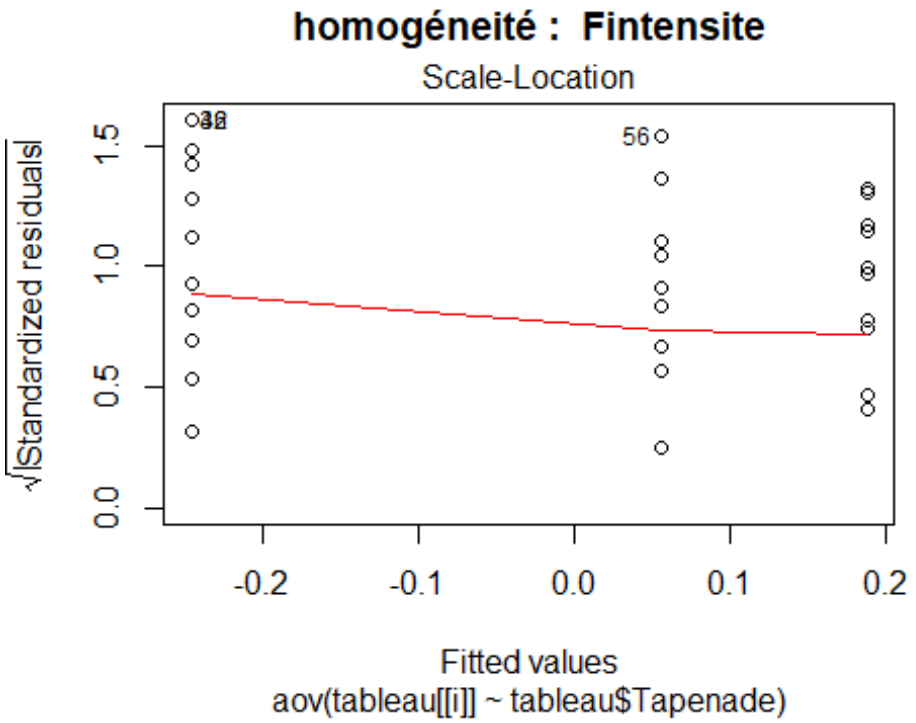

```
## NULL
## [1] "ANOVA I pour la variable Fintensite"
##                  Df Sum Sq Mean Sq F value Pr(>F)
## tableau$Tapenade  2   2.29  1.1433   1.444  0.243
## Residuals        67  53.05  0.7917
## 2 observations deleted due to missingness
## [1] "Test d'indépendance des residus de la variable Fintensite"
##  lag Autocorrelation D-W Statistic p-value
##    1       0.1597055      1.680135   0.088
##  Alternative hypothesis: rho != 0
```

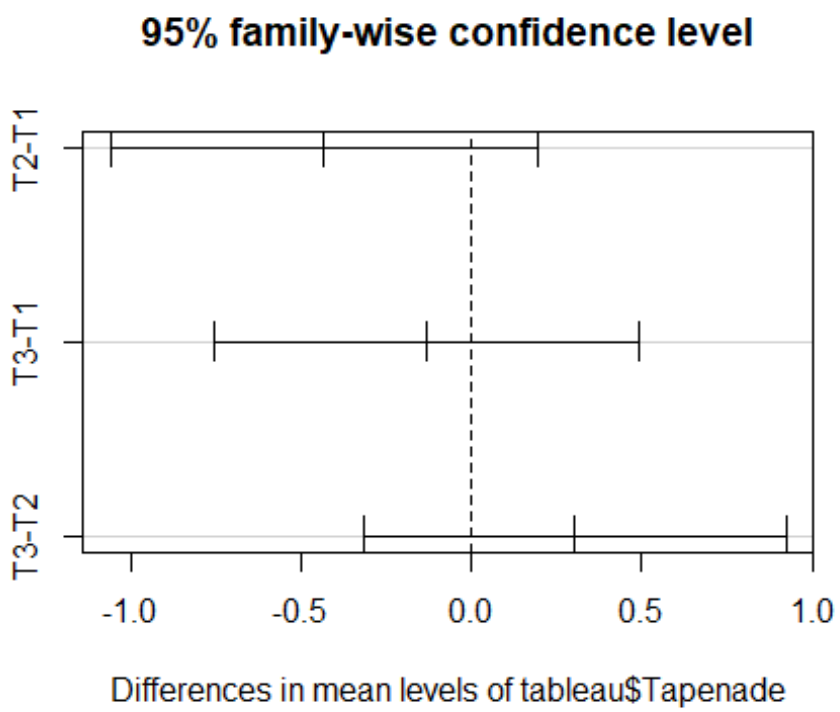



```
## NULL
## [1] "Test de normalité des residus de la variable Fintensite"
##
##  Shapiro-Wilk normality test
##
## data:  residuals(anov)
## W = 0.97938, p-value = 0.3021
```

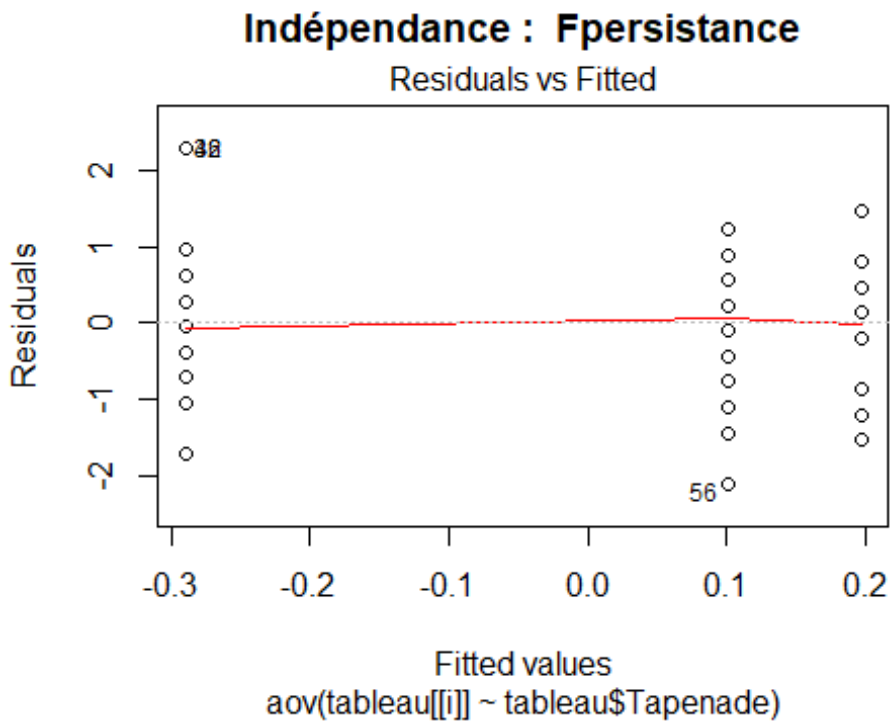



```
## [1] "Test de d'homogéneité des residus de la variable Fintensite"
```

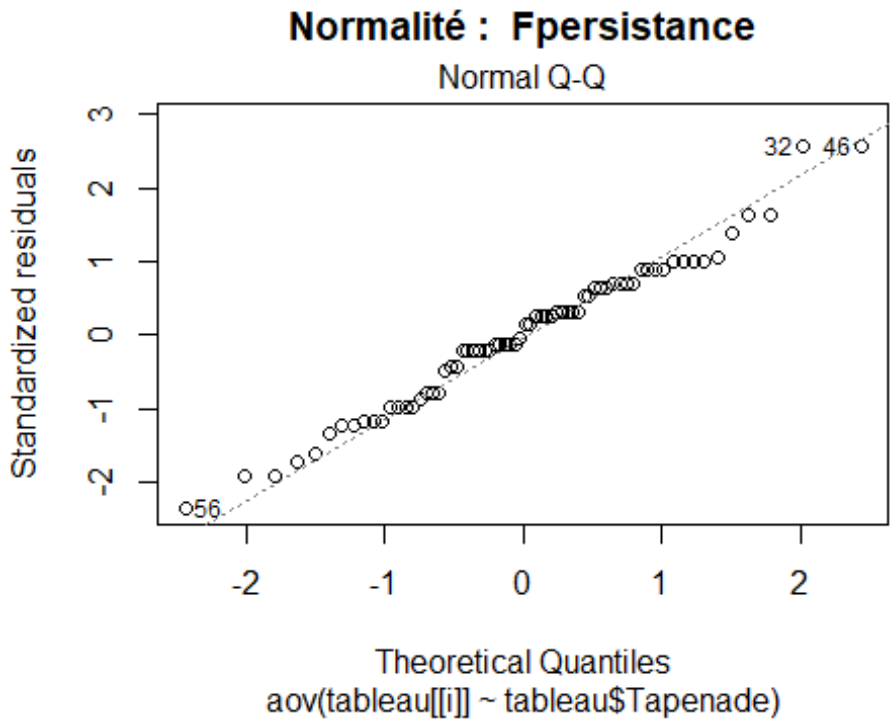




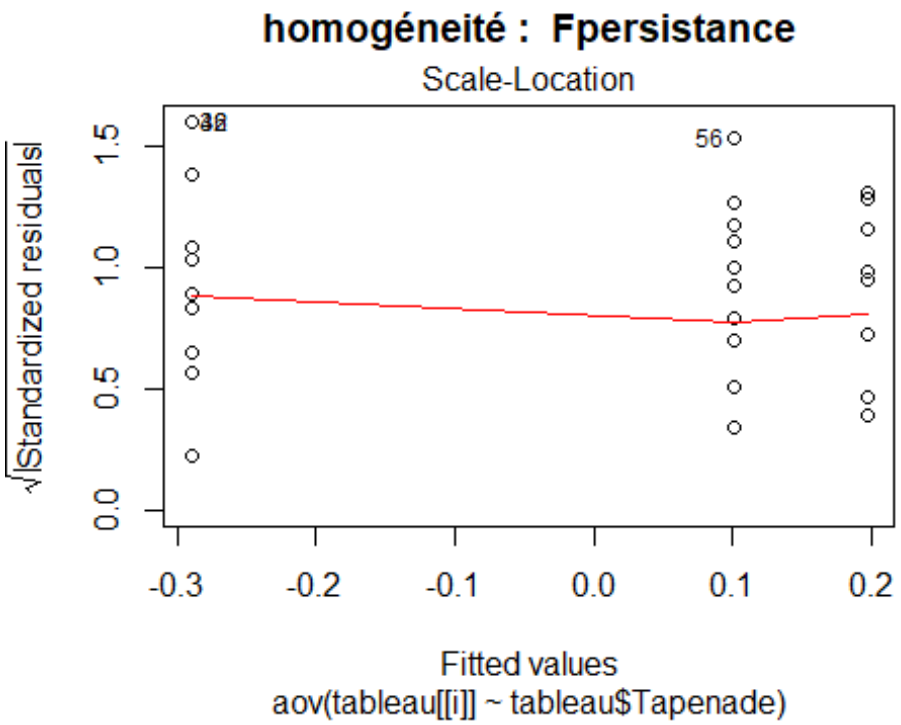

```
## NULL
## [1] "ANOVA I pour la variable Fpersistance"
##                  Df Sum Sq Mean Sq F value Pr(>F)
## tableau$Tapenade  2   3.02  1.5113   1.809  0.172
## Residuals        65  54.31  0.8355
## 4 observations deleted due to missingness
## [1] "Test d'indépendance des residus de la variable Fpersistance"
##  lag Autocorrelation D-W Statistic p-value
##    1       0.2168063      1.554324   0.036
##  Alternative hypothesis: rho != 0
```

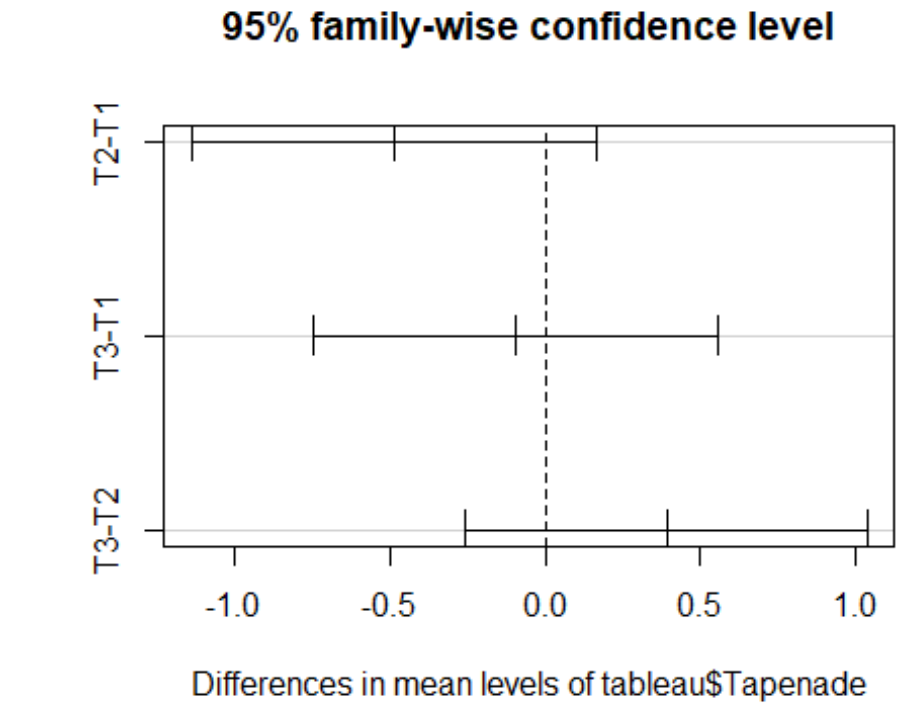



```
## NULL
## [1] "Test de normalité des residus de la variable Fpersistance"
##
##  Shapiro-Wilk normality test
##
## data:  residuals(anov)
## W = 0.98275, p-value = 0.4685
```

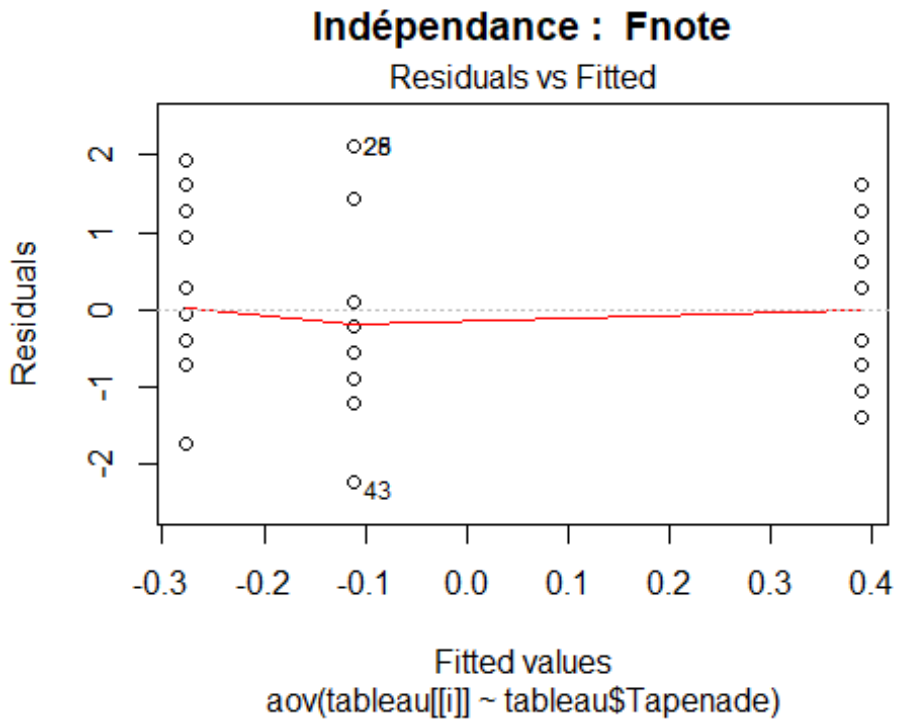



```
## [1] "Test de d'homogéneité des residus de la variable Fpersistance"
```

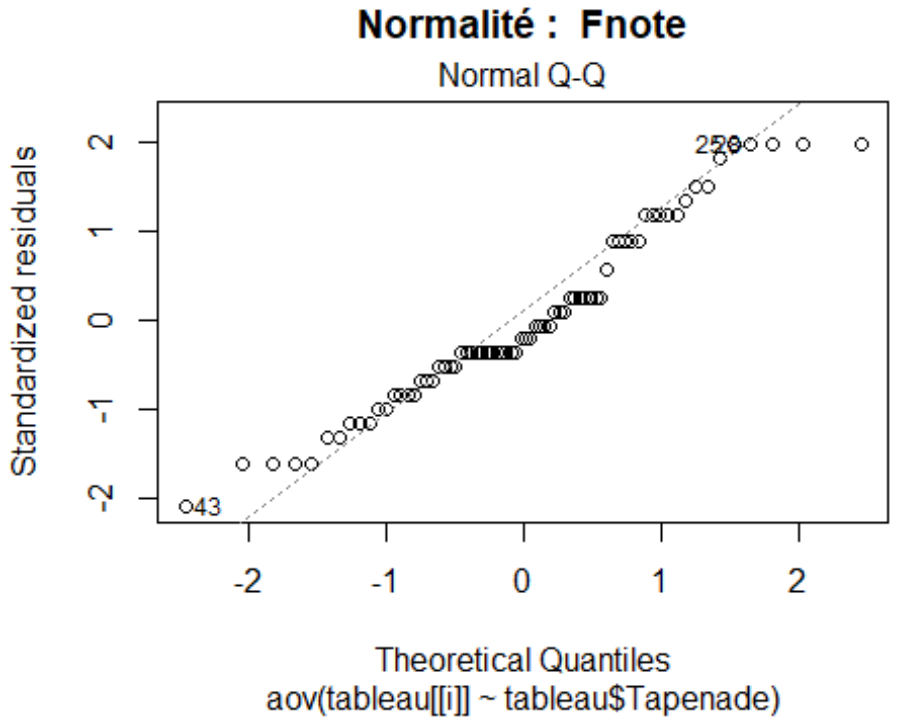




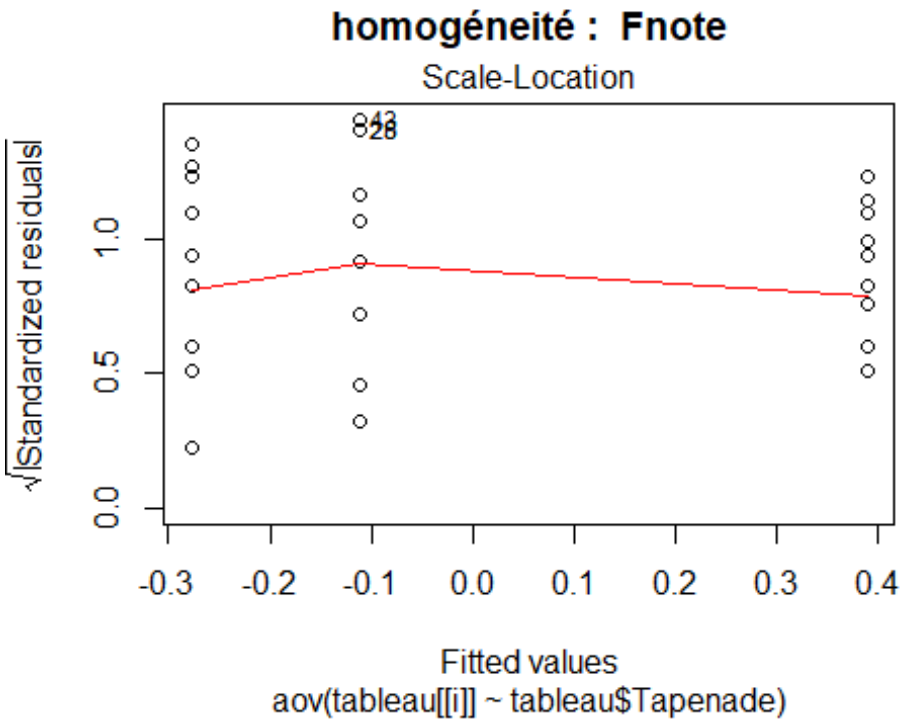

```
## NULL
## [1] "ANOVA I pour la variable Fnote"
##                  Df Sum Sq Mean Sq F value Pr(>F)
## tableau$Tapenade  2   5.78   2.889   2.424  0.096 .
## Residuals        69  82.22   1.192
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## [1] "Test d'indépendance des residus de la variable Fnote"
##  lag Autocorrelation D-W Statistic p-value
##    1      -0.1098348      2.216892   0.478
##  Alternative hypothesis: rho != 0
```

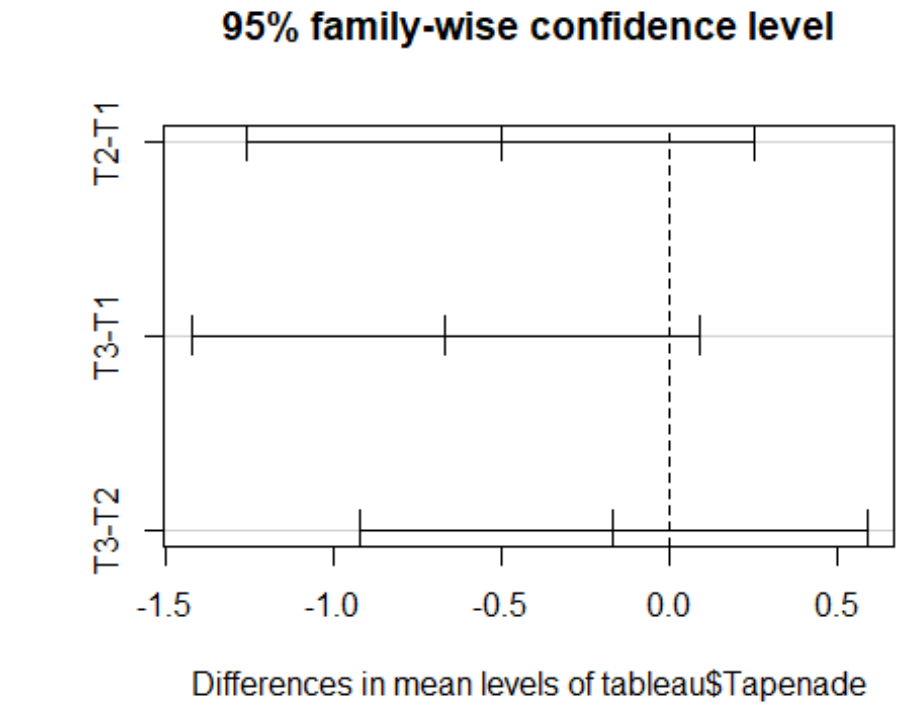



```
## NULL
## [1] "Test de normalité des residus de la variable Fnote"
##
##  Shapiro-Wilk normality test
##
## data:  residuals(anov)
## W = 0.9589, p-value = 0.01915
```

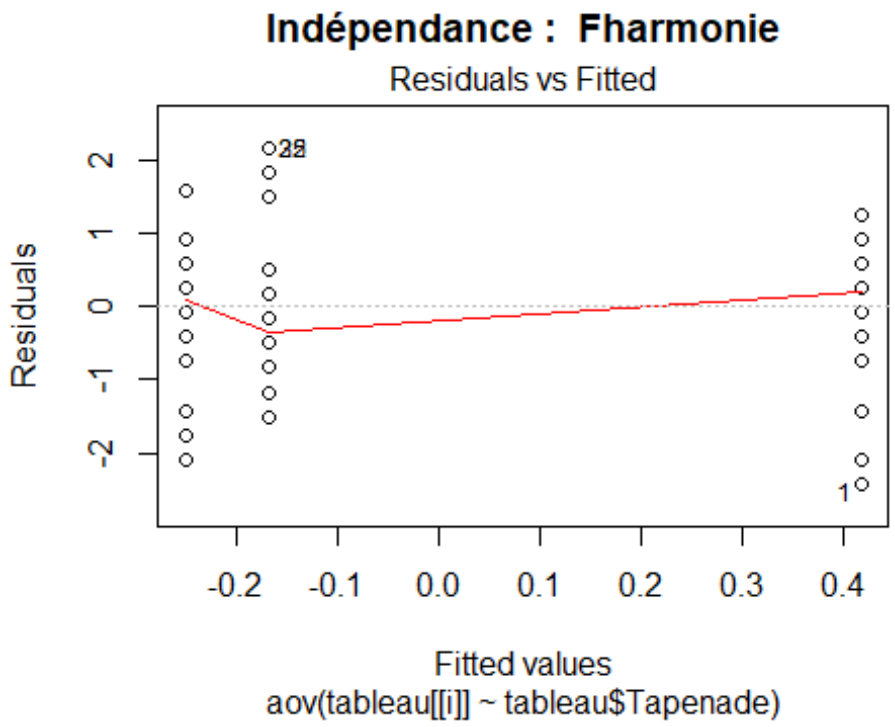



```
## [1] "Test de d'homogéneité des residus de la variable Fnote"
```

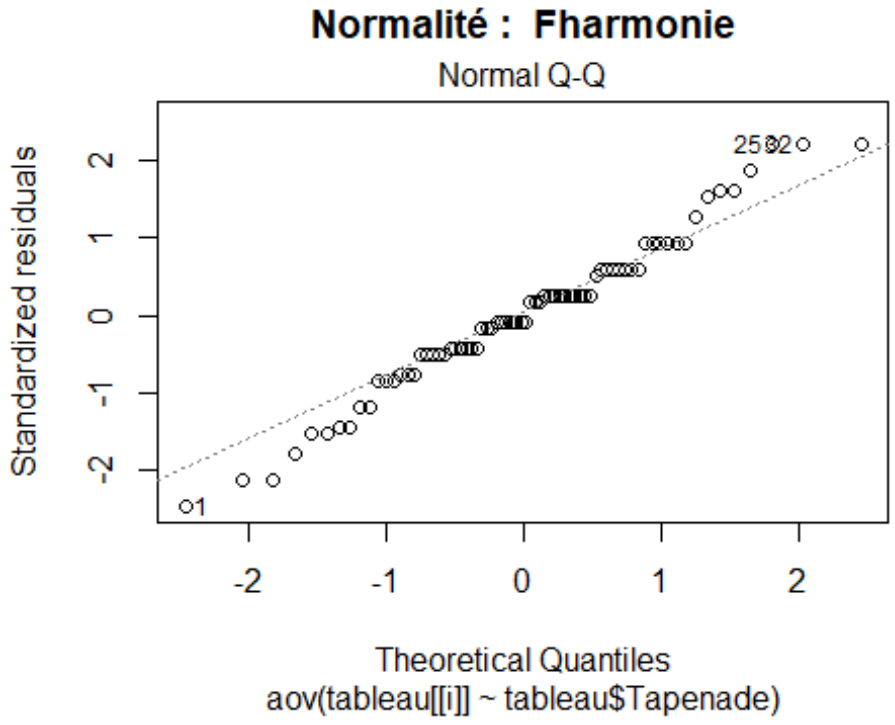




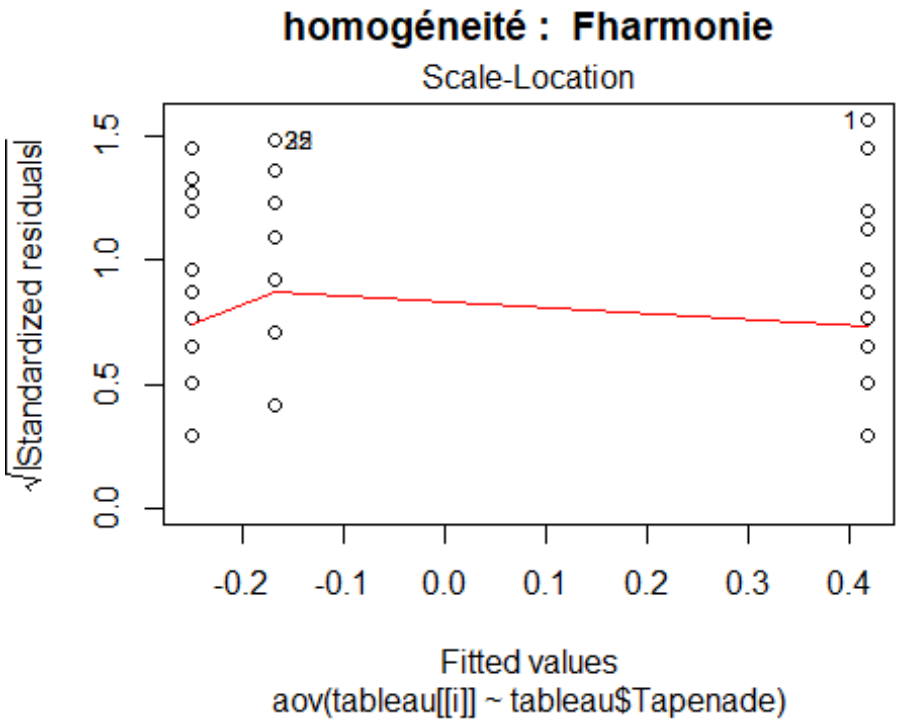

```
## NULL
## [1] "ANOVA I pour la variable Fharmonie"
##                  Df Sum Sq Mean Sq F value Pr(>F)
## tableau$Tapenade  2   6.33   3.167   3.136 0.0497 *
## Residuals        69  69.67   1.010
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## [1] "Test d'indépendance des residus de la variable Fharmonie"
##  lag Autocorrelation D-W Statistic p-value
##    1      -0.1860048      2.287281   0.302
##  Alternative hypothesis: rho != 0
```



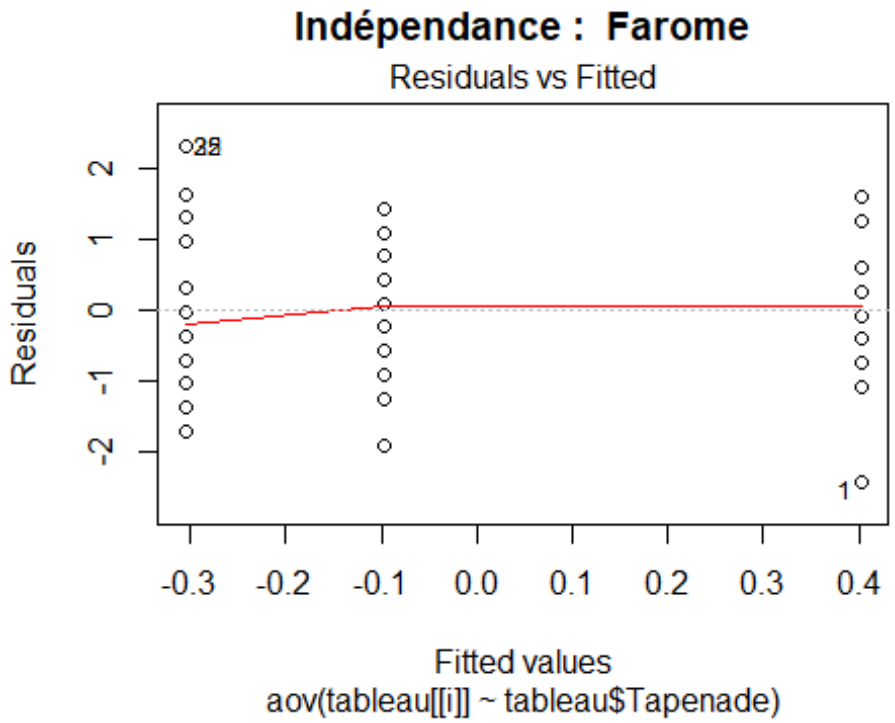

```
## NULL
## [1] "Test de normalité des residus de la variable Fharmonie"
##
##  Shapiro-Wilk normality test
##
## data:  residuals(anov)
## W = 0.98032, p-value = 0.32
```



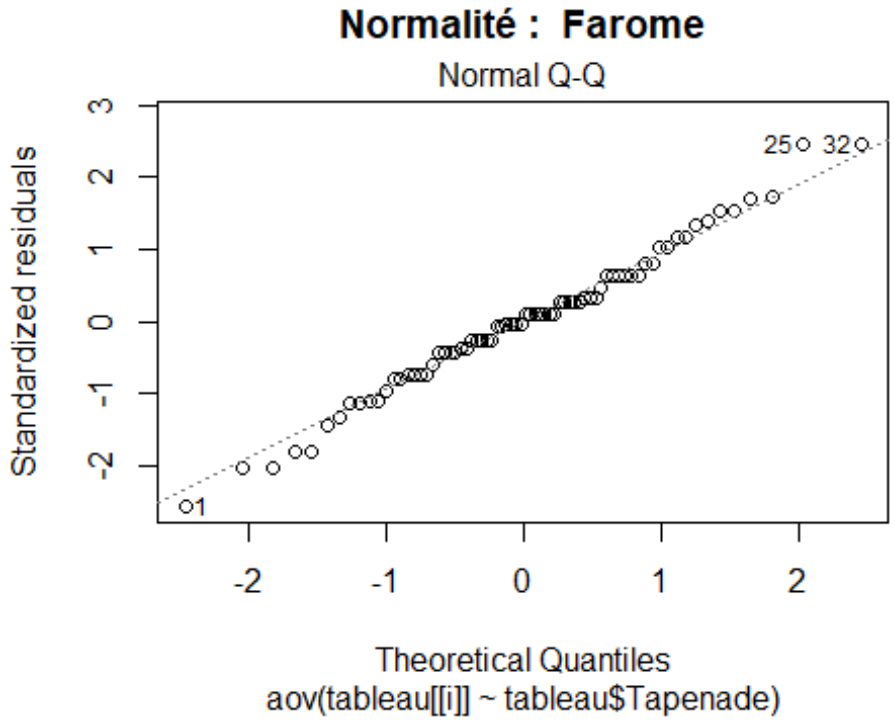

```
## [1] "Test de d'homogéneité des residus de la variable Fharmonie"
```



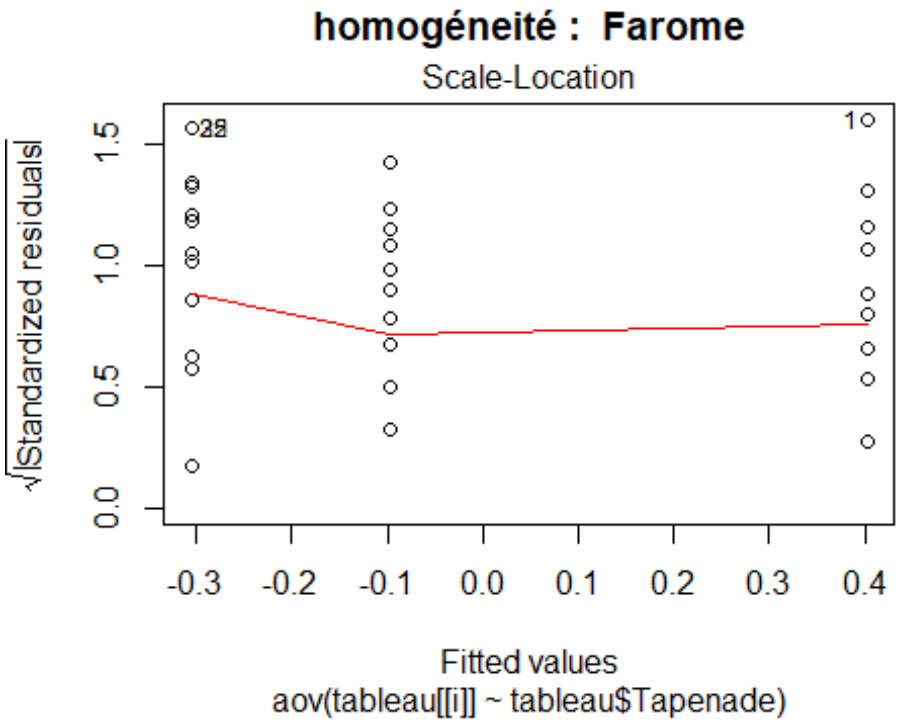

```
## NULL
## [1] "ANOVA I pour la variable Farome"
##                  Df Sum Sq Mean Sq F value Pr(>F)
## tableau$Tapenade  2   6.36   3.181   3.448 0.0374 *
## Residuals        69  63.64   0.922
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## [1] "Test d'indépendance des residus de la variable Farome"
##  lag Autocorrelation D-W Statistic p-value
##    1      -0.1300318      2.169195    0.63
##  Alternative hypothesis: rho != 0
```

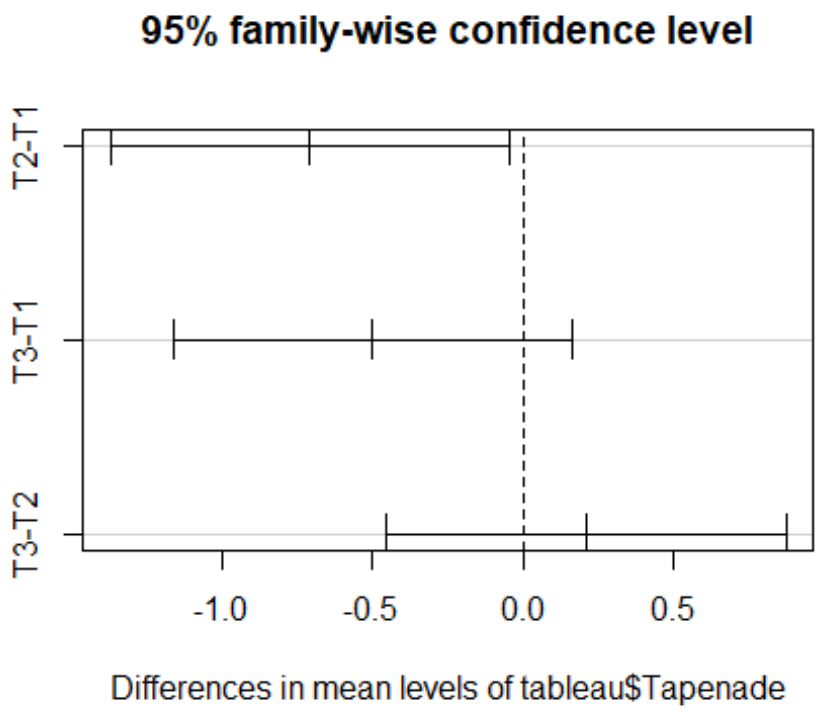



```
## NULL
## [1] "Test de normalité des residus de la variable Farome"
##
##  Shapiro-Wilk normality test
##
## data:  residuals(anov)
## W = 0.98831, p-value = 0.7478
```




```
## [1] "Test de d'homogéneité des residus de la variable Farome"
```



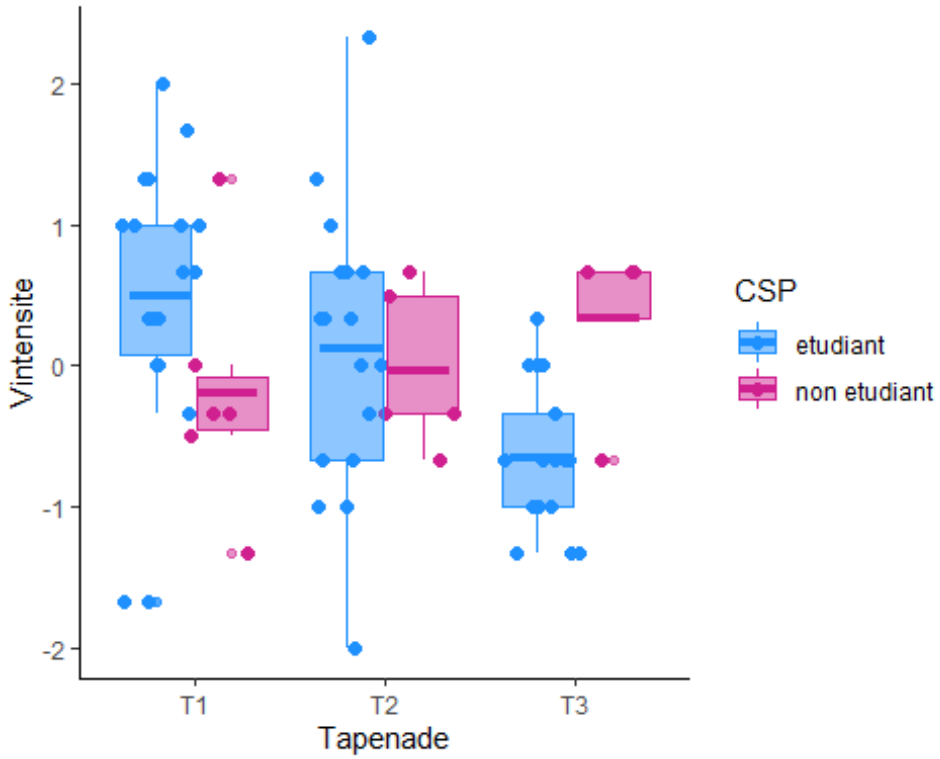


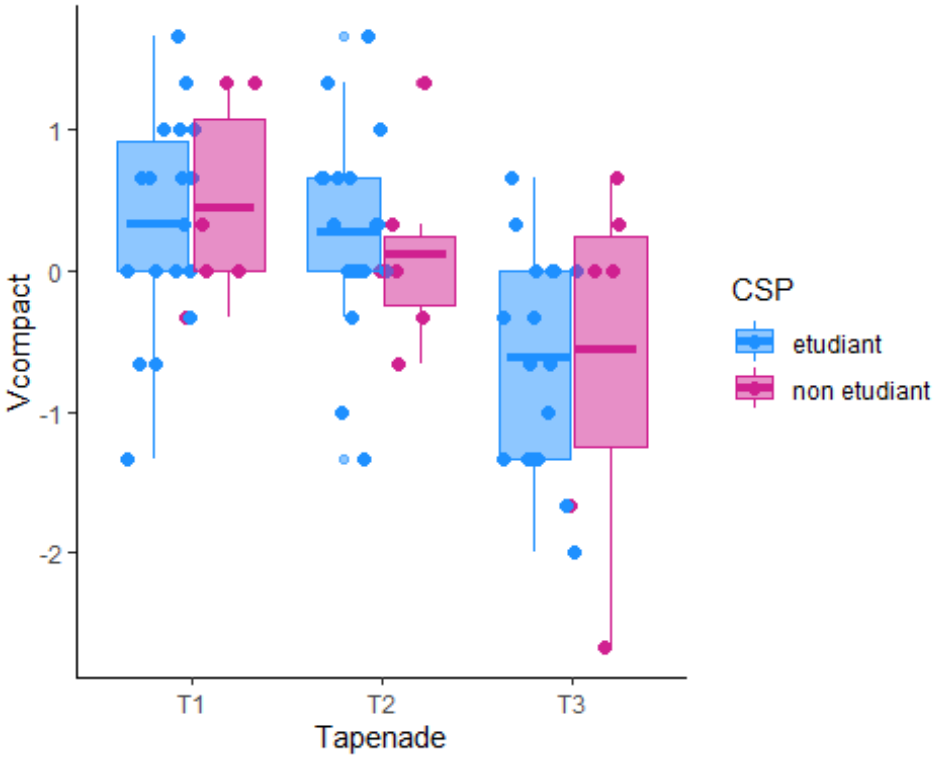

```
## NULL
```

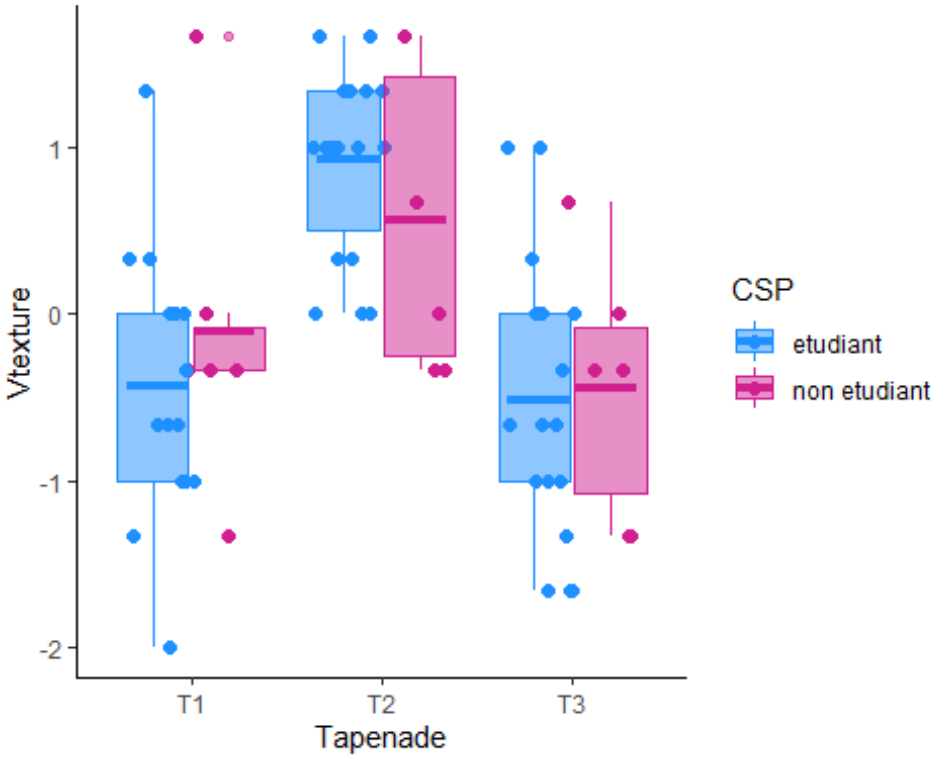
6 ANOVA 2 facteur+tuckey

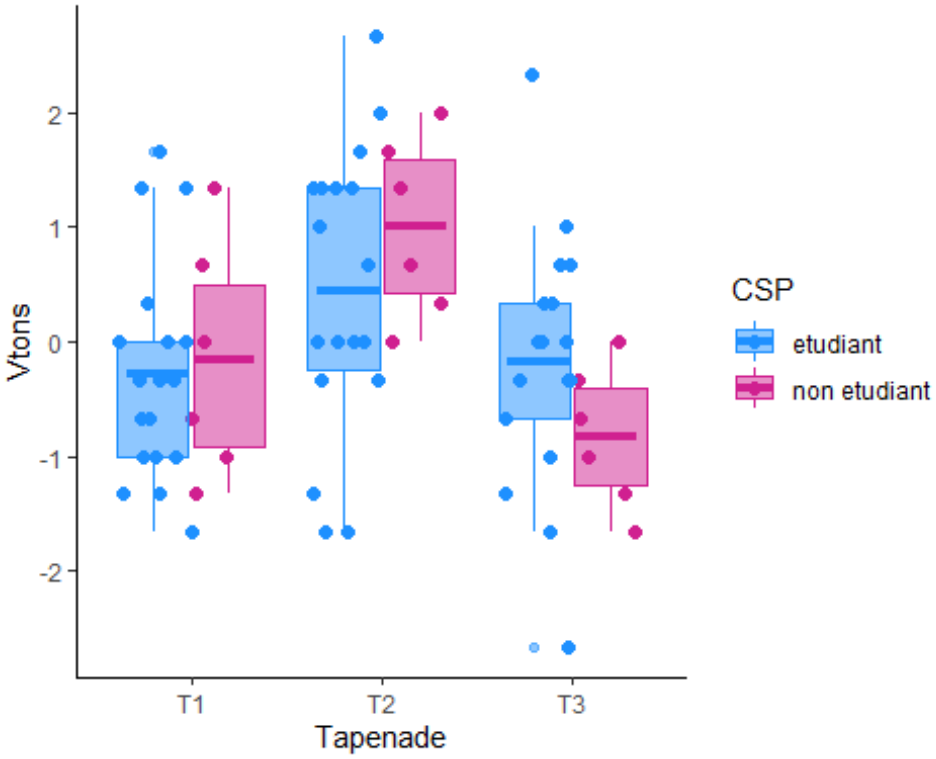
```
#Verifier qu'on peut appliquer une ANOVA 2
## Normalite: vérifier tout a fait en haut et nous avons constater que la majorité des données etait normalisése
## L'homoscédasticité : c'est le cas pour l'égalité des variables car déja verifiée pré cédemment
```

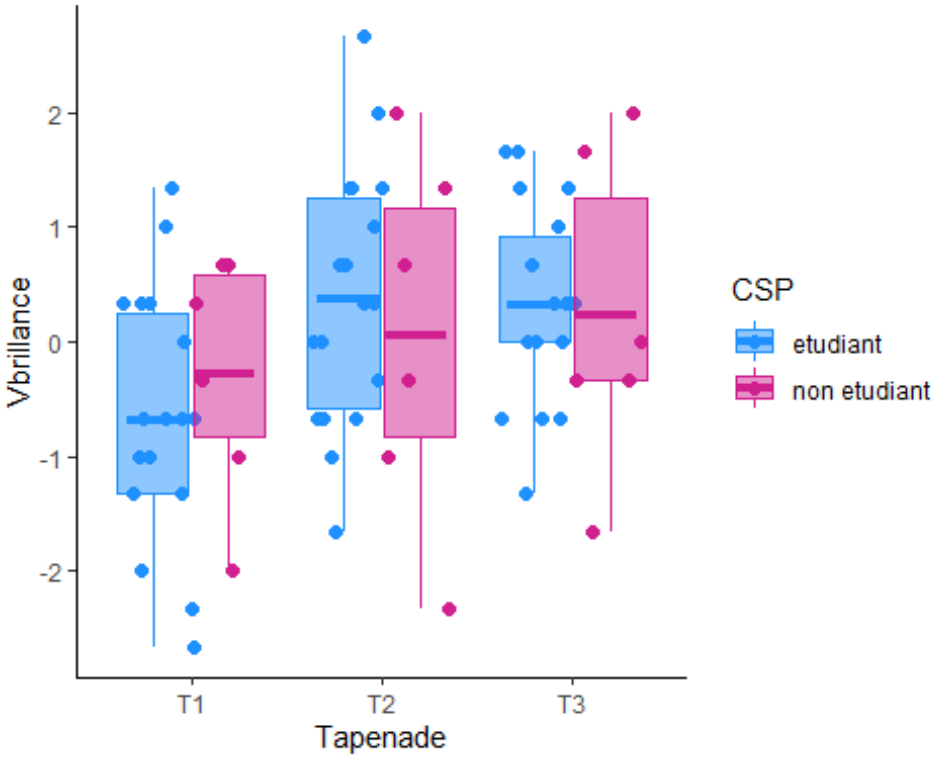
```r
# Modele s'écrit classiquement

## Yijk = μ + ai + bi + gij + Eijk

## Hypothéses

### H0_A:la tapenade a un effet sur les notes
### H0_B:le CSP a un effet sur les notes
### H0_AB: il y'ainteraction entre la tapenade et le CSP
### H1: hypothése alternative(à tester)

# Représentation des données

for(i in 12:37){
  print(ggplot(tableau, aes(x=Tapenade, y=tableau[[i]], colour=CSP, fill=CSP))+
        geom_point(position=position_jitterdodge(dodge.width=0.7), size=2) +
        geom_boxplot(alpha=0.5, position = position_dodge(width=0.8), fatten=NULL)+
        scale_colour_manual(values=c(c("#1E90FF", "#D02090", "#6FEB5D", "#FFFFFF")))+
        scale_fill_manual(values=c("#1E90FF", "#D02090", "#6FEB5D", "#FFFFFF"))+
        stat_summary(fun.y = mean, geom = "errorbar", aes(ymax = ..y.., ymin = ..y..),
       width=0.65,size = 1.5, linetype = "solid",position = position_dodge(width=0.7))+

       ylab(colnames(tableau[i]))+
       heme_classic())
}
```

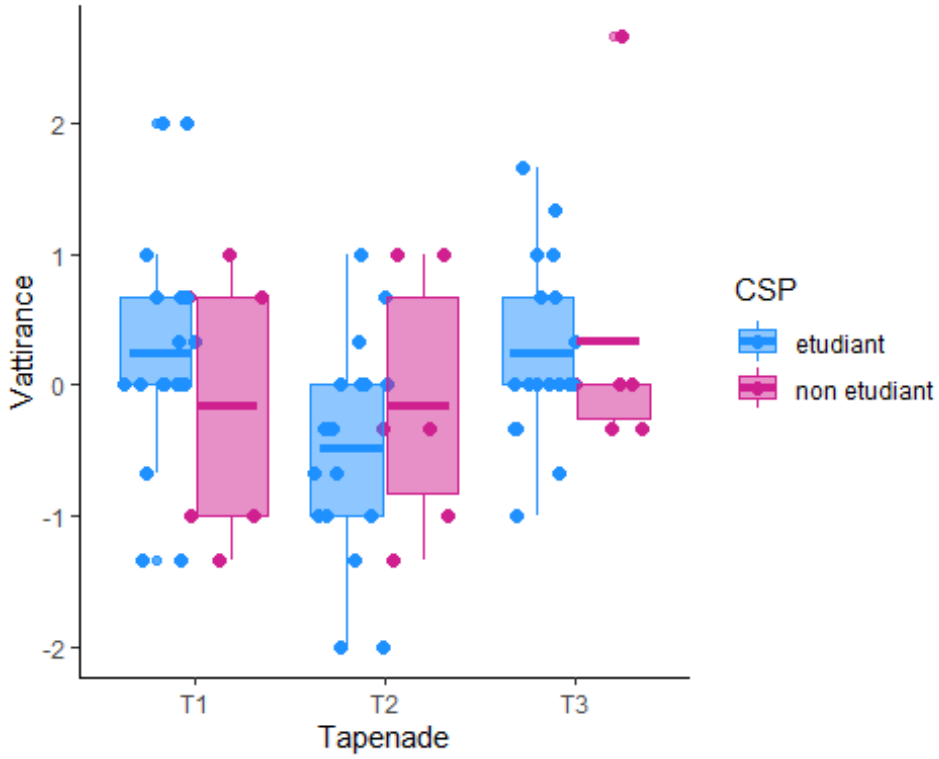



Vcompact
1
0
-1
-2
T1
T2
T3
Tapenade
CSP
etudiant
non etudiant


Vtexture
1
0
-1
-2
T1
T2
T3
Tapenade
CSP
etudiant
non etudiant


Vtons
2
1
0
-1
-2
T1
T2
T3
Tapenade
CSP
etudiant
non etudiant


Vbrillance
2
1
0
-1
-2
T1
T2
T3
Tapenade
CSP
etudiant
non etudiant


Vattirance
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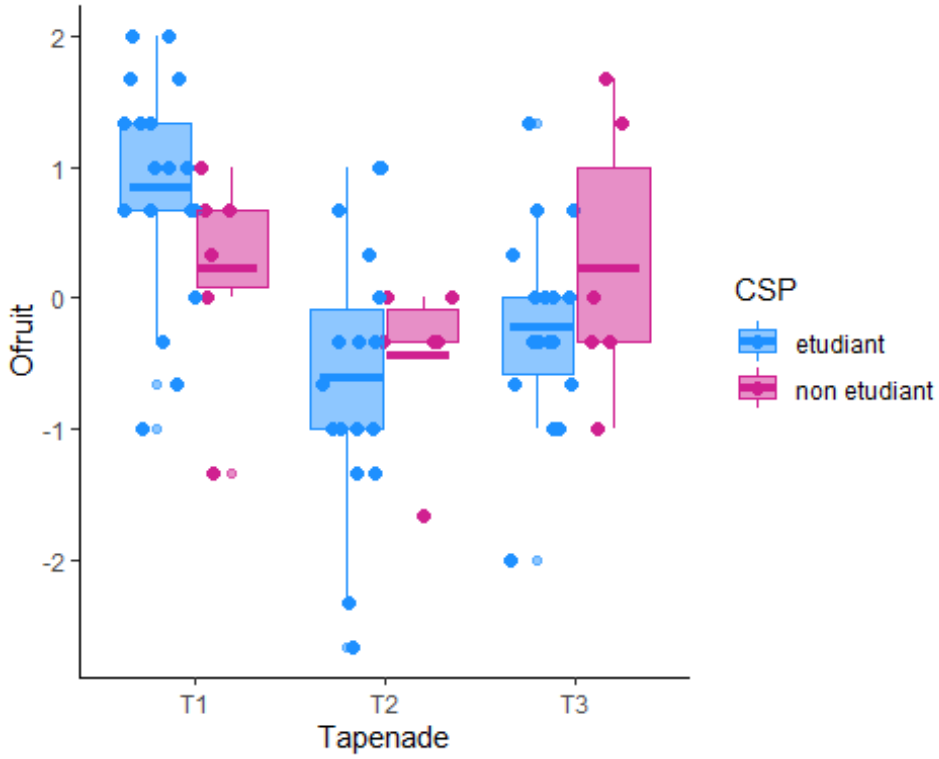
Ofruit
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Tapenade
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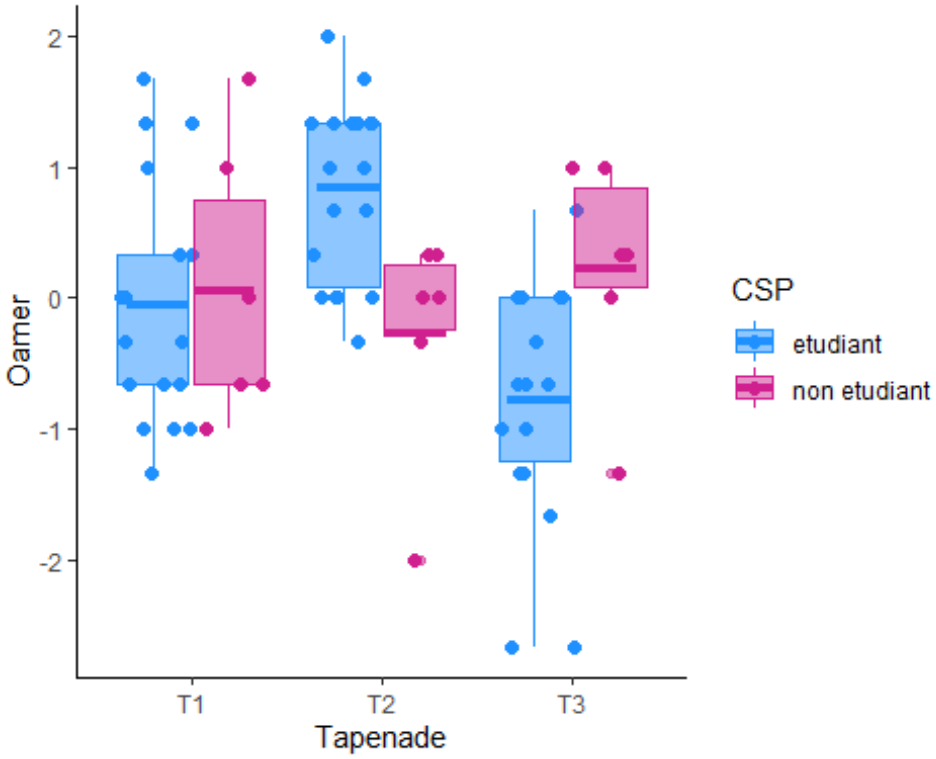
Oamer
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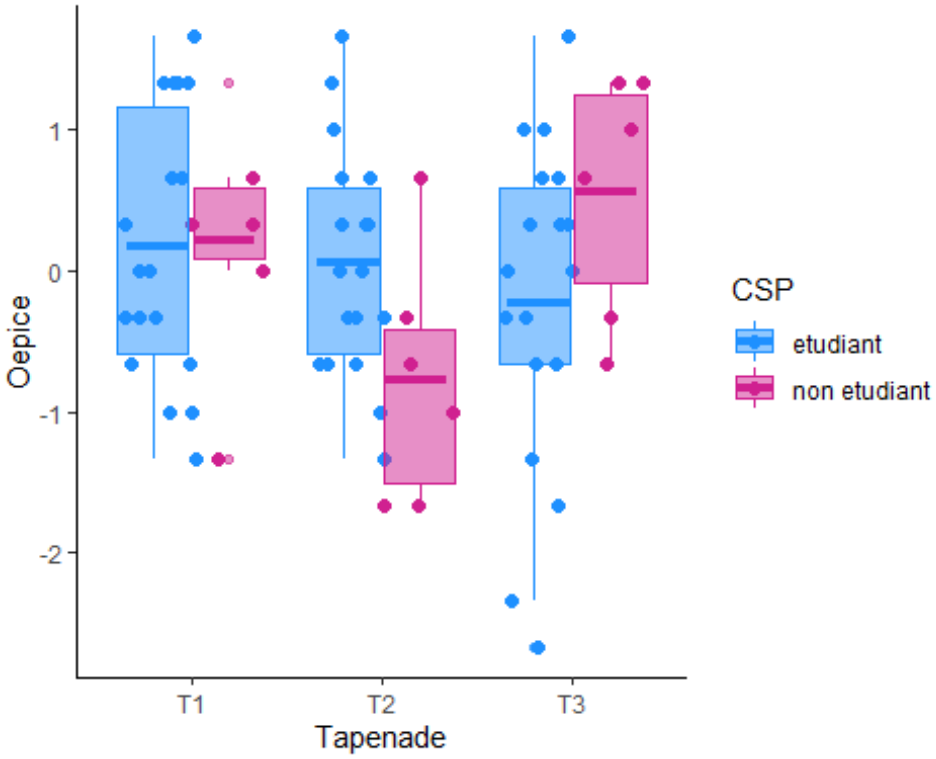
Tapenade
CSP
etudiant
non etudiant


Oepice
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-1
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T1
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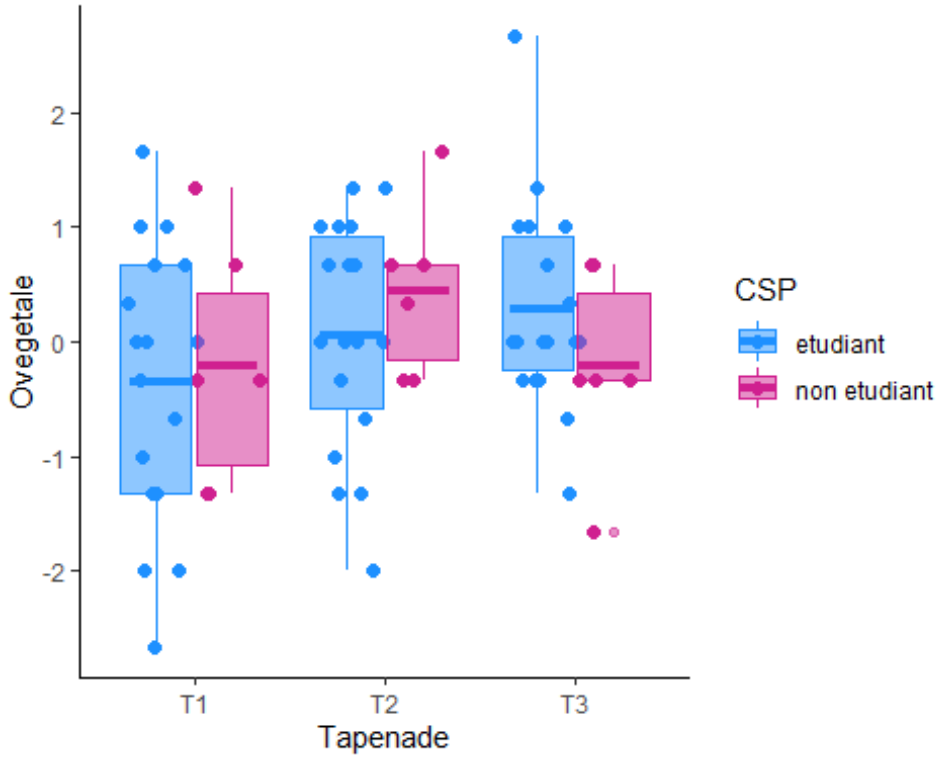
T3
Tapenade
CSP
etudiant
non etudiant


Ovegetale
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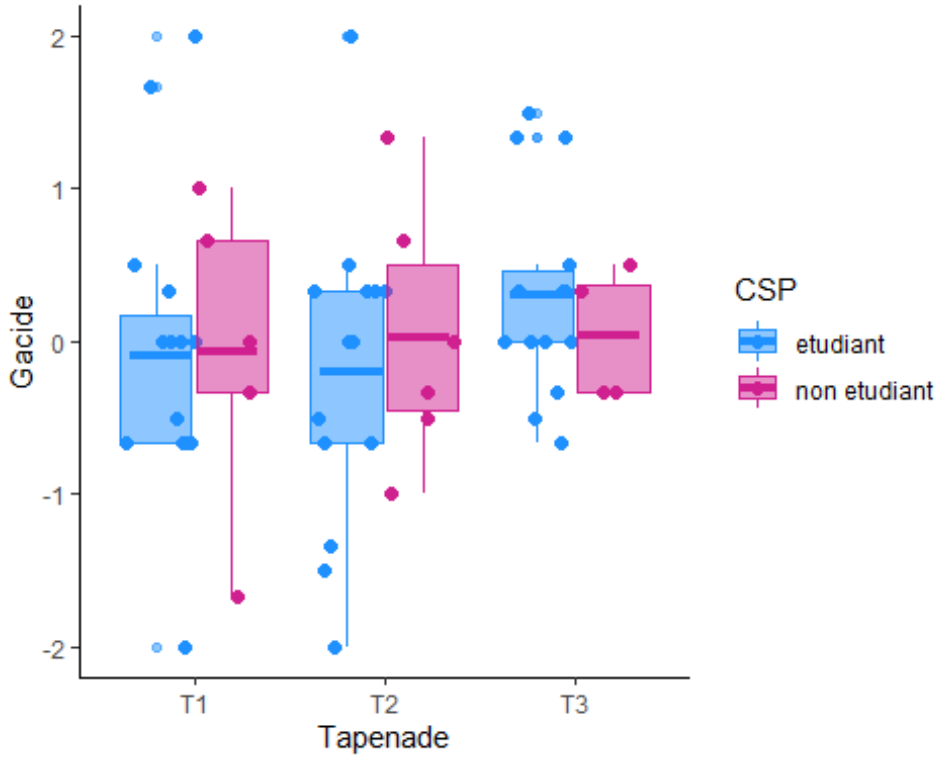
Tapenade
CSP
etudiant
non etudiant


Gacide
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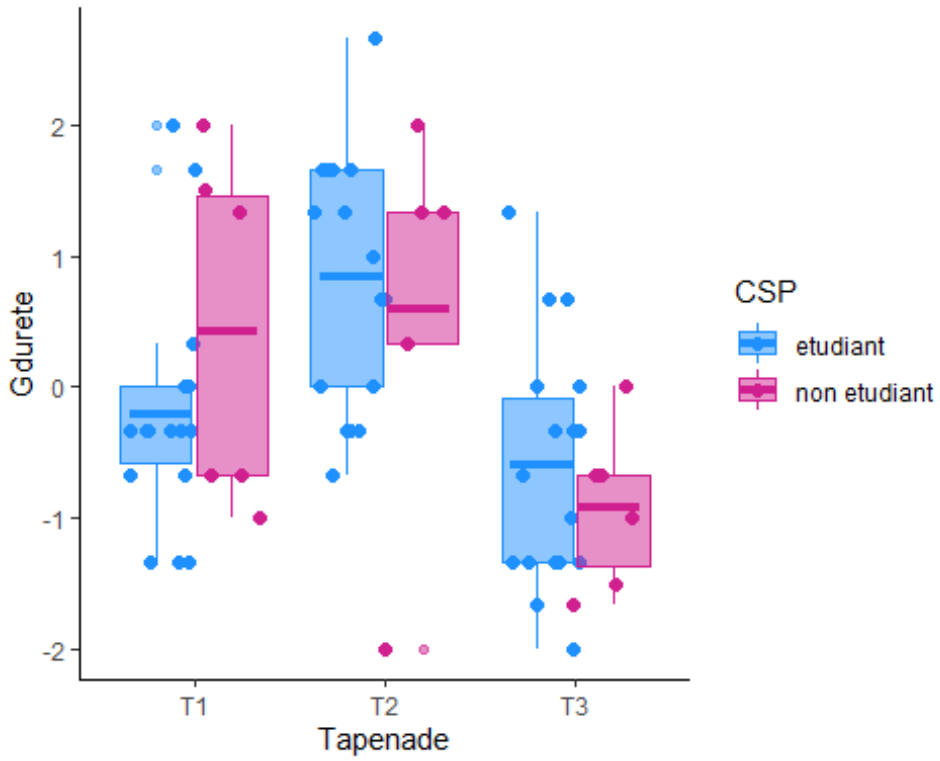
Tapenade
CSP
etudiant
non etudiant


Gdurete
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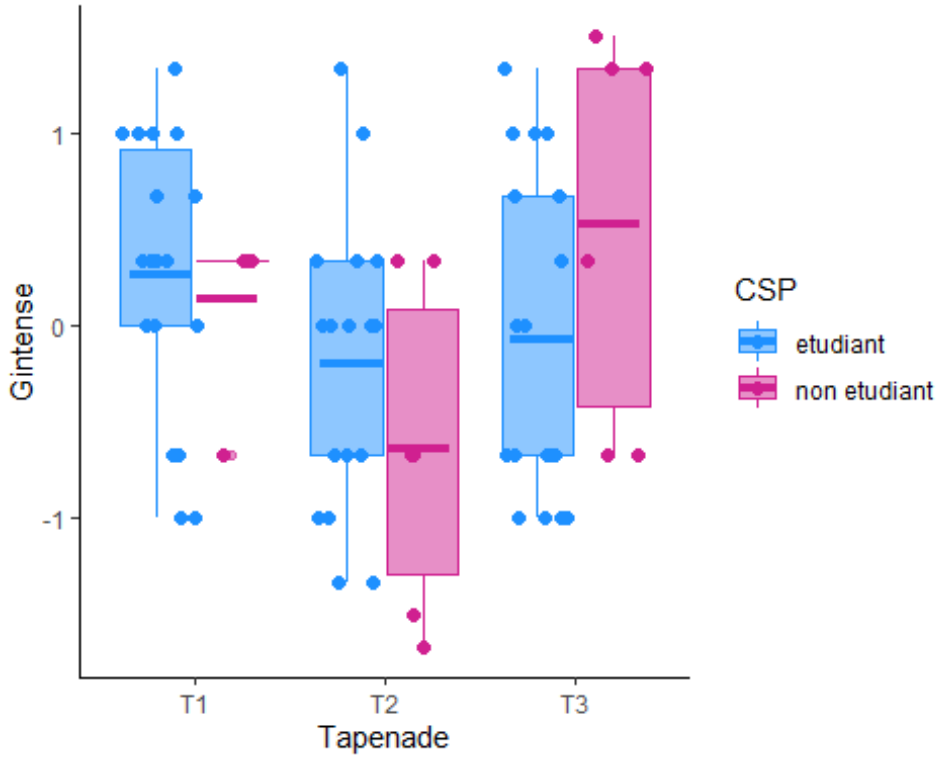
Tapenade
CSP
etudiant
non etudiant


Gintense
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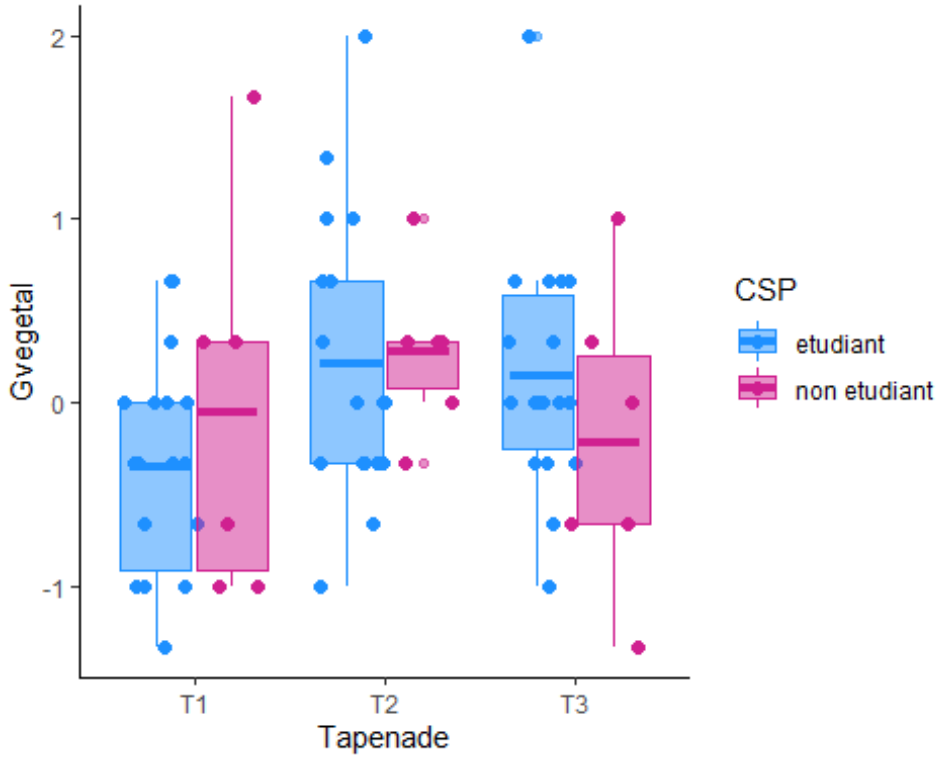
non etudiant


Gvegetal
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Tapenade
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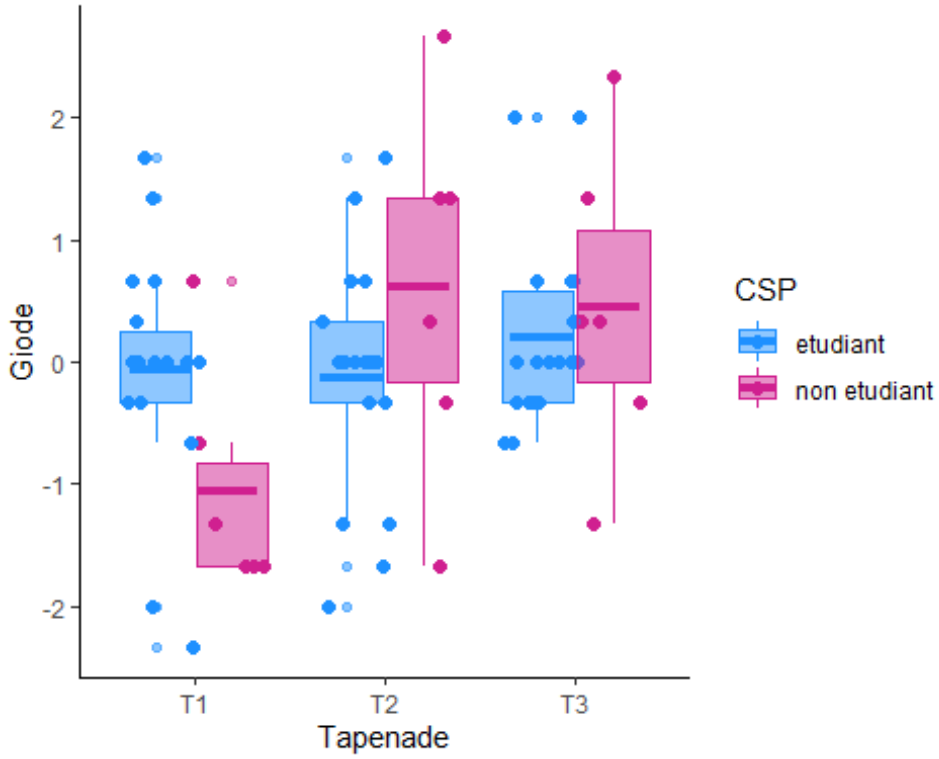
Giode
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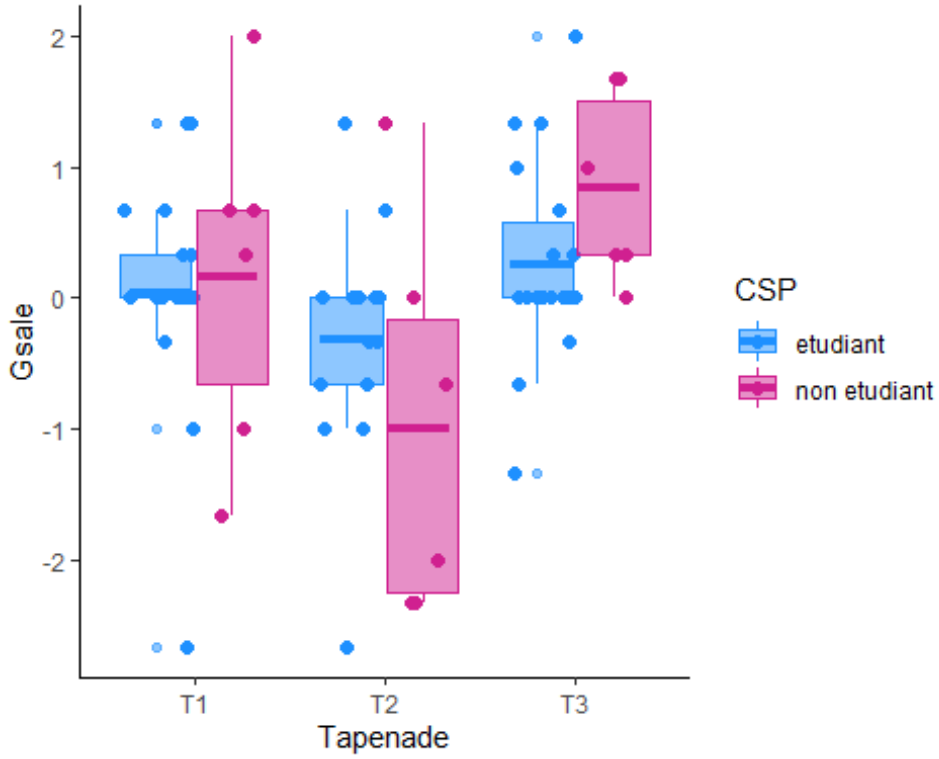
Tapenade
CSP
etudiant
non etudiant


Gsale
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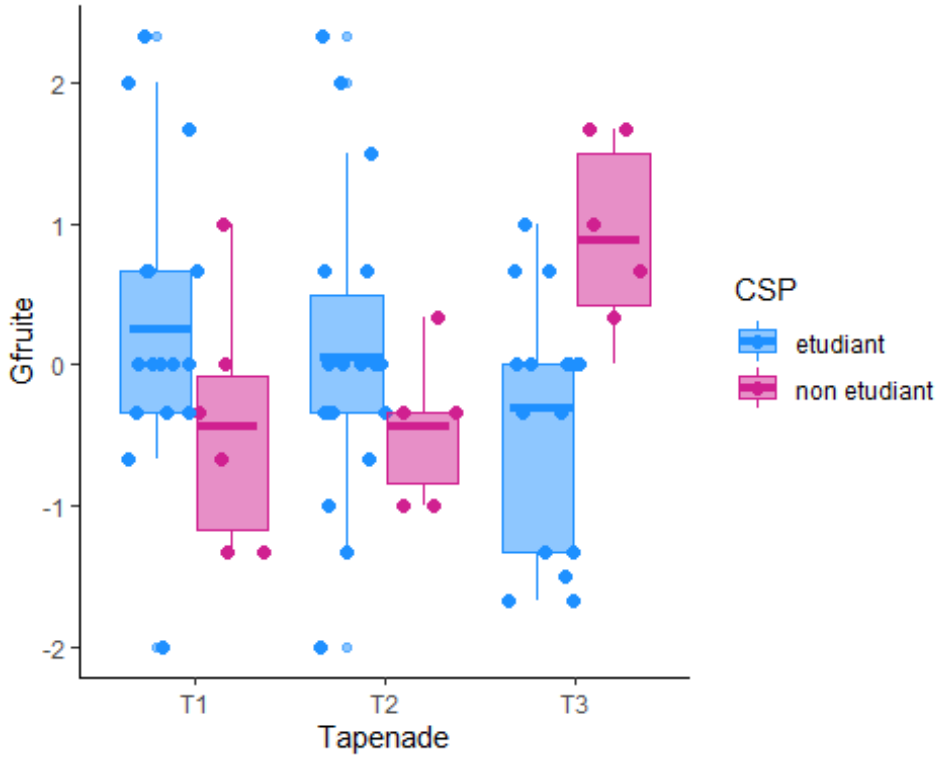
Tapenade
CSP
etudiant
non etudiant


Gfruite
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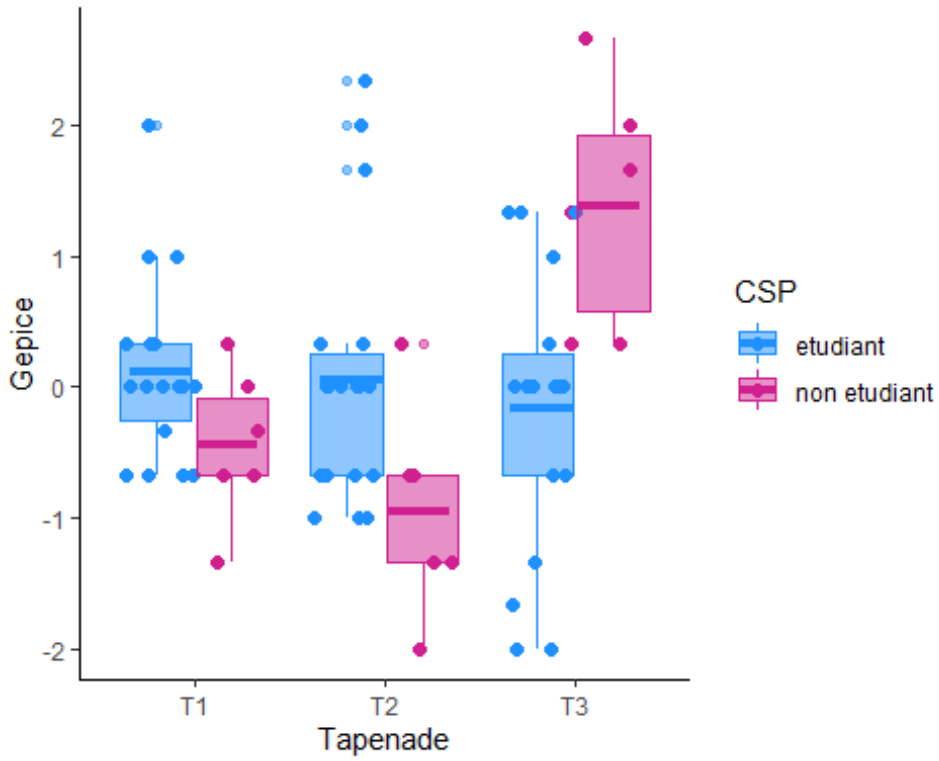
Tapenade
CSP
etudiant
non etudiant


Gepice
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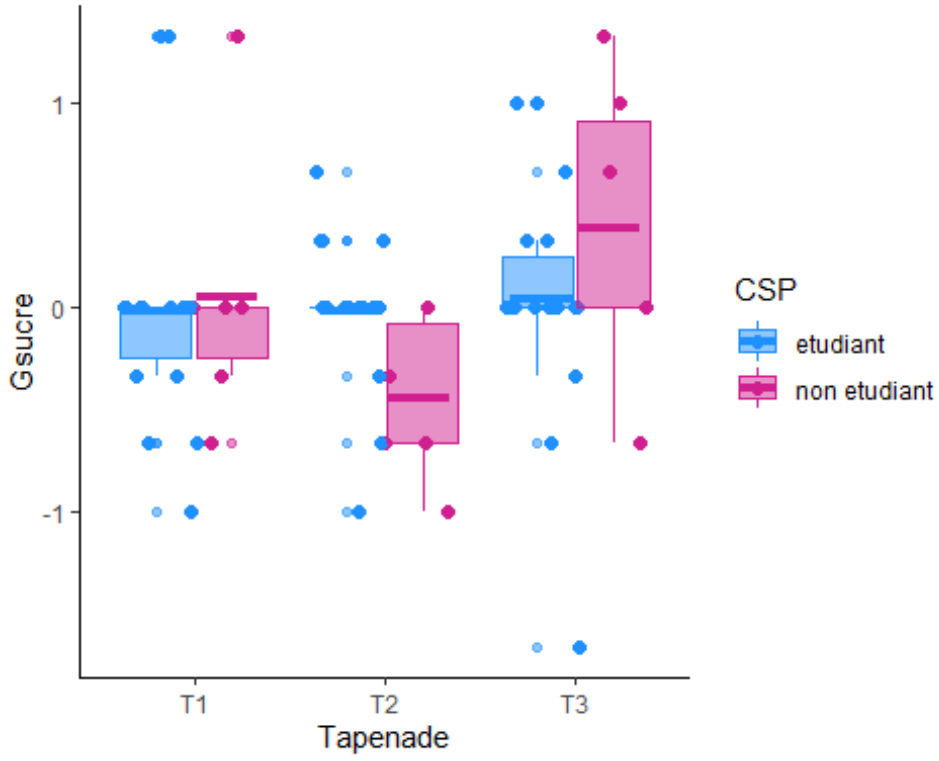
T3
Tapenade
CSP
etudiant
non etudiant


Gsucre
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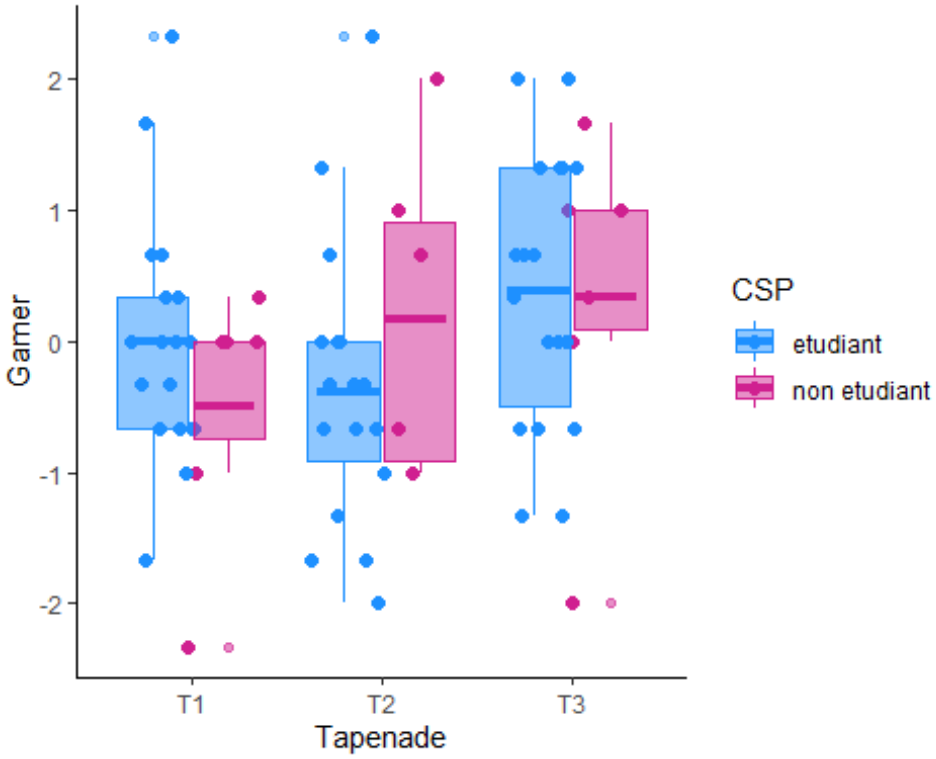
T3
Tapenade
CSP
etudiant
non etudiant


Gamer
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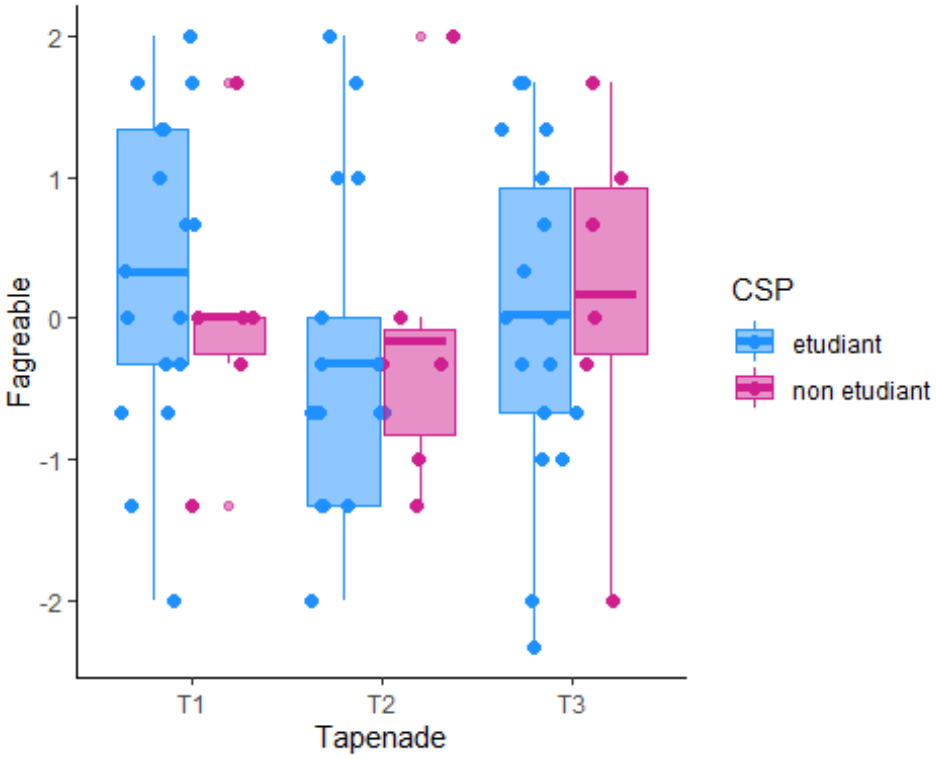
T2
T3
Tapenade
CSP
etudiant
non etudiant


Fagreable
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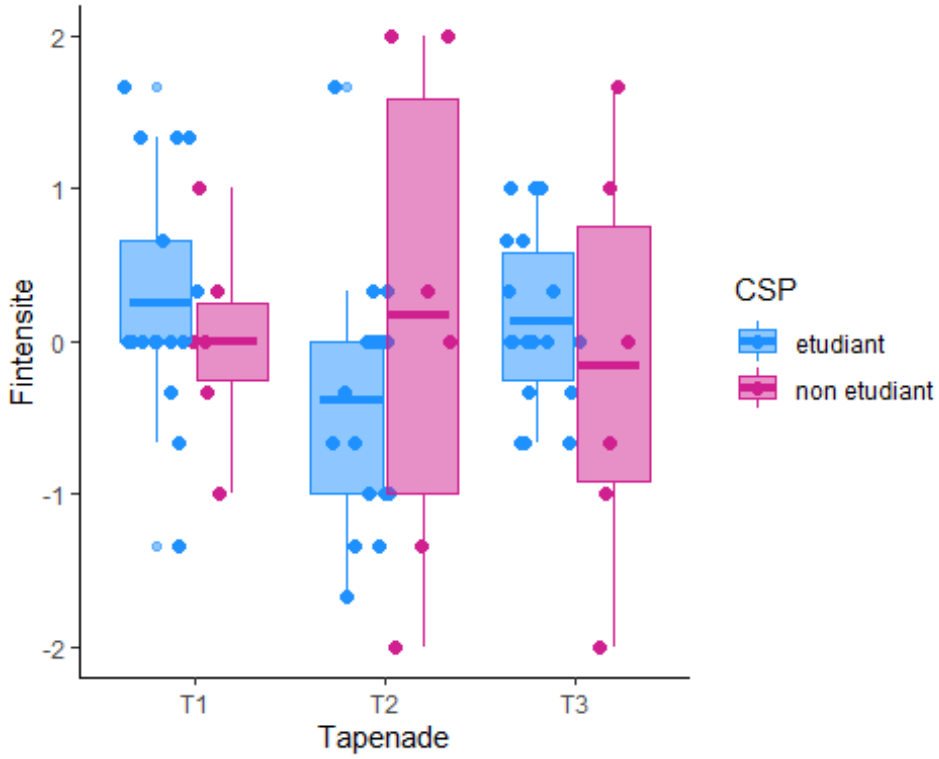
T2
T3
Tapenade
CSP
etudiant
non etudiant


Fintensite
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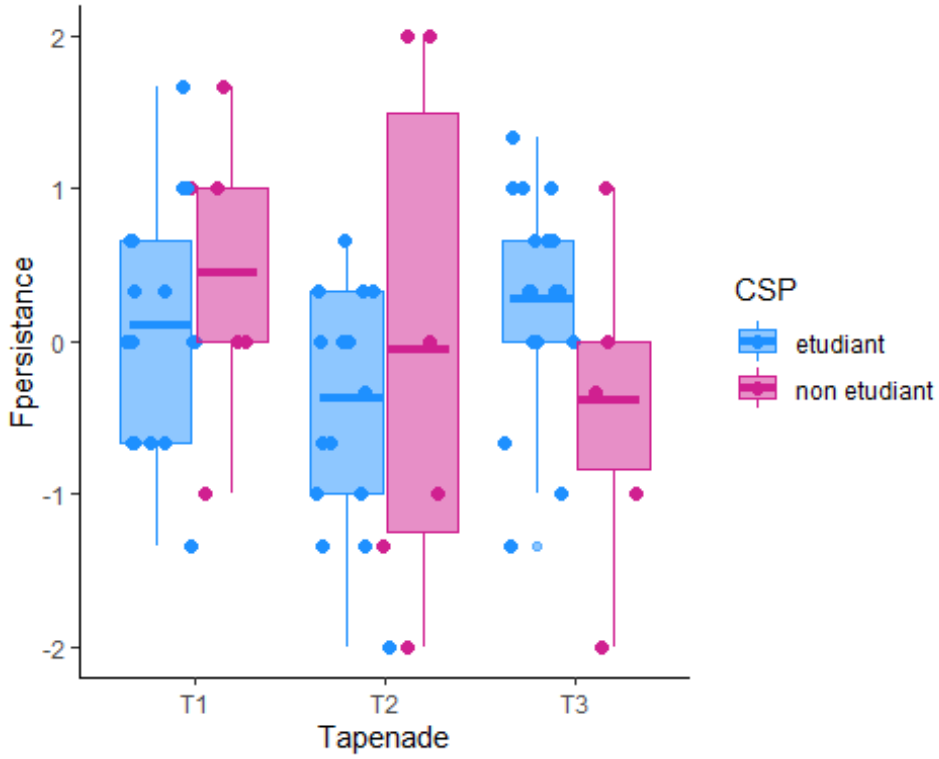
Tapenade
CSP
etudiant
non etudiant


Fpersistance
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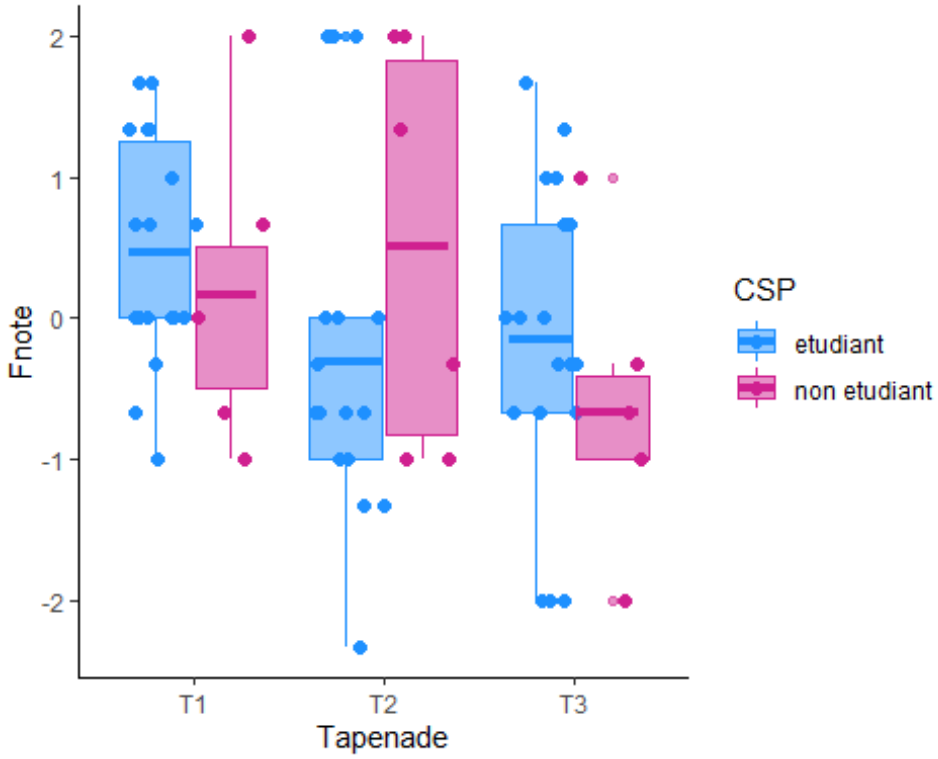
0
-1
-2
T1
T2
T3
Tapenade
CSP
etudiant
non etudiant


Fnote
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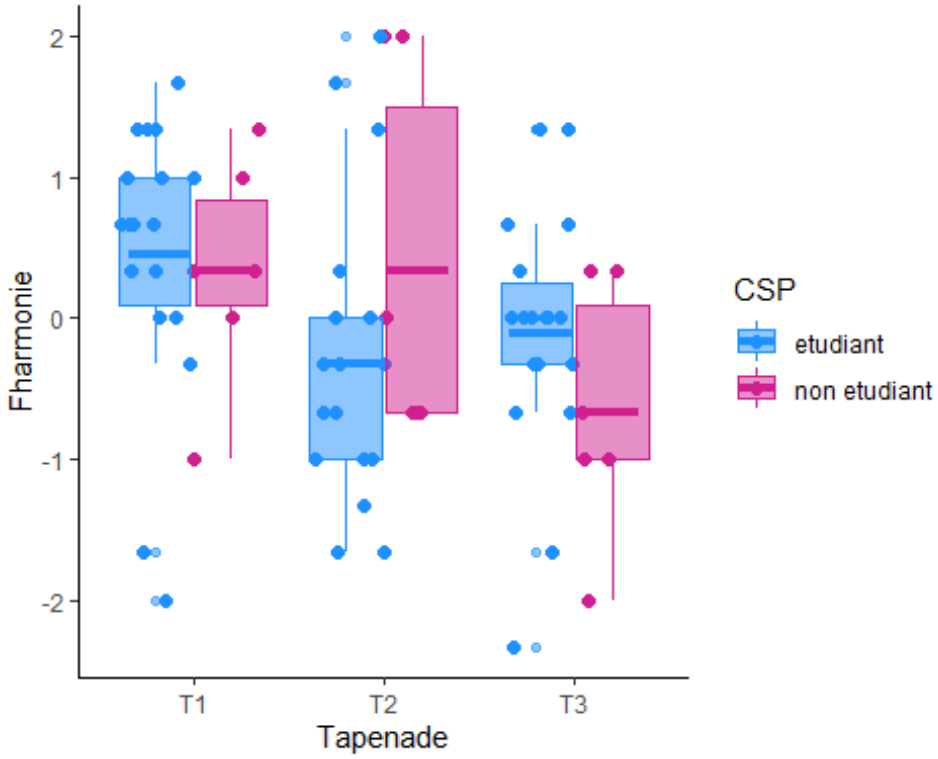
T2
T3
Tapenade
CSP
etudiant
non etudiant


Fharmonie
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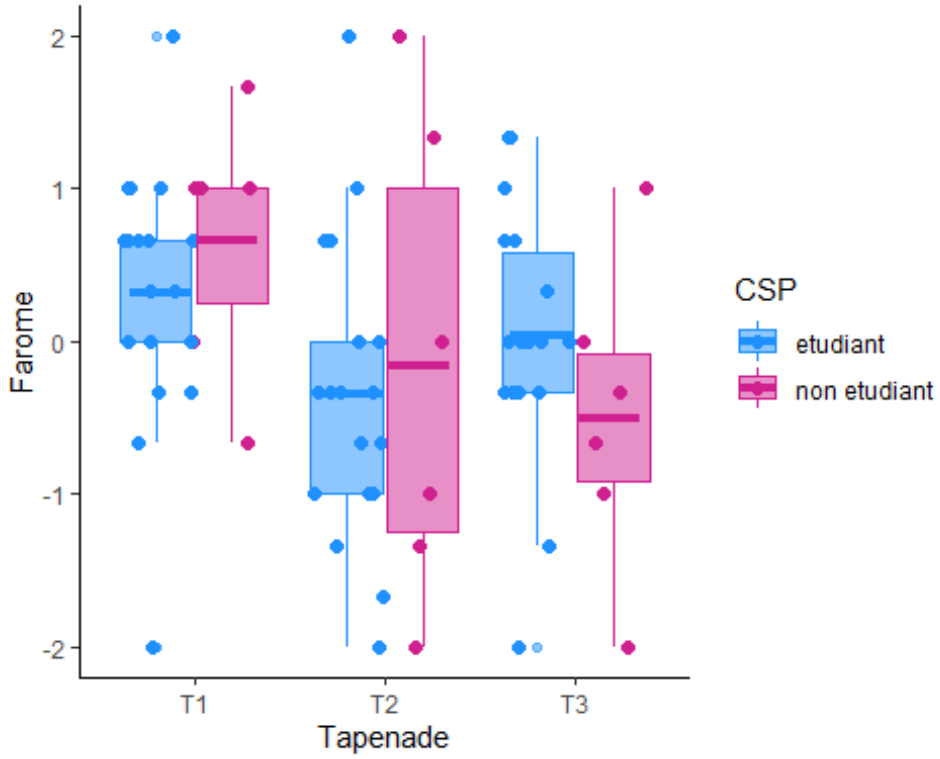
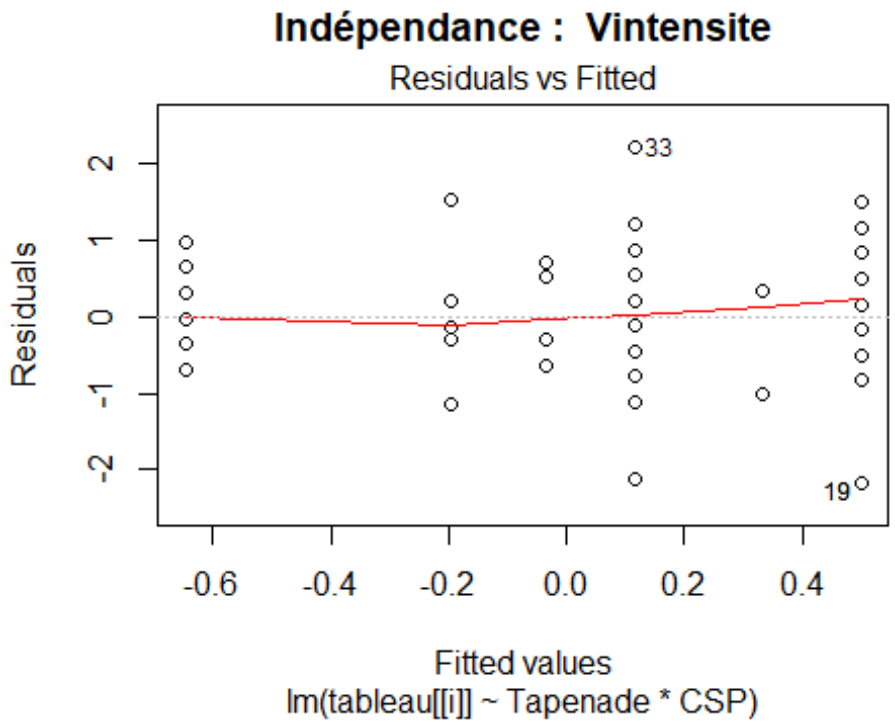
-1
-2
T1
T2
T3
Tapenade
CSP
etudiant
non etudiant

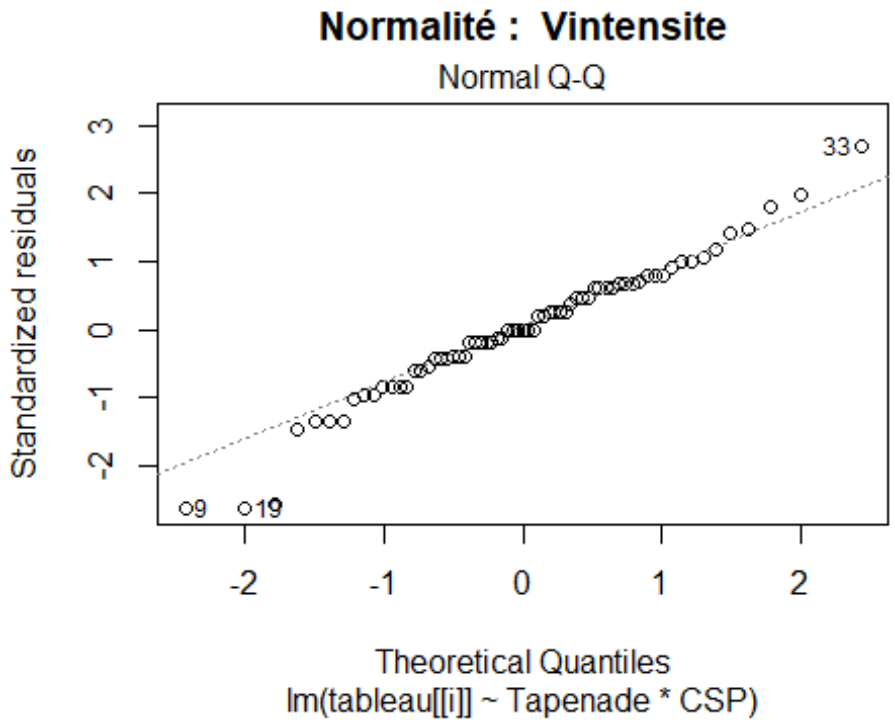



```
# Réalisation de l'ANOVA à 2 facteurs et Visualisation des résultats
## créé une variable “grp” correspondant au croisement des modalités des deux facteurs, grâce à la fonction “interaction”.
group = tableau$grp = interaction(tableau$Tapenade, tableau$CSP, sep="_")

 for (i in 12:37) {

   mod1 = lm(tableau[[i]]~ Tapenade * CSP, contrasts = list(Tapenade=contr.sum, CSP=contr.sum), data=tableau)
res = Anova(mod1,type = 3)
verif_indep = durbinWatsonTest(mod1) # permet de vérifier l'indépendance
verif_norm = shapiro.test(residuals(mod1))  # permet de vérifier la normalité
print(paste("ANOVA pour la variable",colnames(tableau)[i]))
   print(res)
print(paste("Test d'indépendance des residus de la variable",colnames(tableau)[i]))
   print(verif_indep)
    #x11()
    print(plot(mod1,1,main = paste("Indépendance : ",colnames(tableau)[i])))# Visualisation de l'indépendance

print(paste("Test de normalité des residus de la variable",colnames(tableau)[i]))
   print(verif_norm)
   #x11()
    plot(mod1,2,main = paste("Normalité : ",colnames(tableau)[i])) # Visualisation de la normalité

print(paste("Test de d'homogéneité des residus de la variable",colnames(tableau)[i]))
    #x11()
    plot(mod1,3, main = paste("homogéneité : ",colnames(tableau)[i])) # Visualisation de l'homogéneité

 }
```

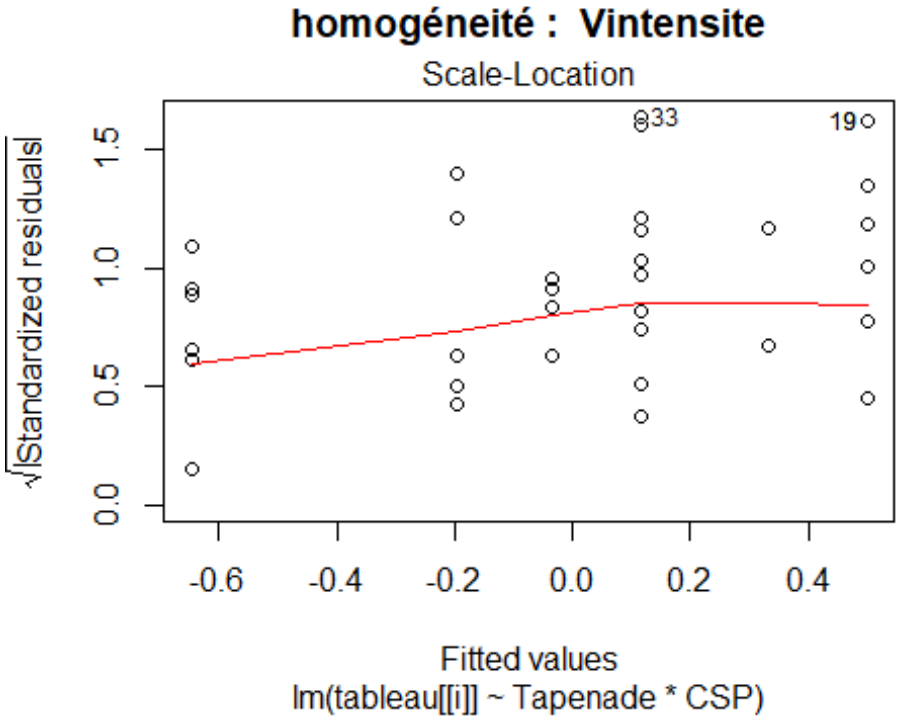
```
## [1] "ANOVA pour la variable Vintensite"
## Anova Table (Type III tests)
##
## Response: tableau[[i]]
##              Sum Sq Df F value  Pr(>F)
## (Intercept)   0.007  1  0.0102 0.91995
## Tapenade      0.726  2  0.5035 0.60690
## CSP           0.023  1  0.0320 0.85863
## Tapenade:CSP  5.346  2  3.7083 0.03021 *
## Residuals    43.970 61
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1


## [1] "Test d'indépendance des residus de la variable Vintensite"
##  lag Autocorrelation D-W Statistic p-value
##    1      -0.0192213      2.029924   0.864
##  Alternative hypothesis: rho != 0
```




```
## NULL
## [1] "Test de normalité des residus de la variable Vintensite"
##
##  Shapiro-Wilk normality test
##
## data:  residuals(mod1)
## W = 0.97068, p-value = 0.1144
```

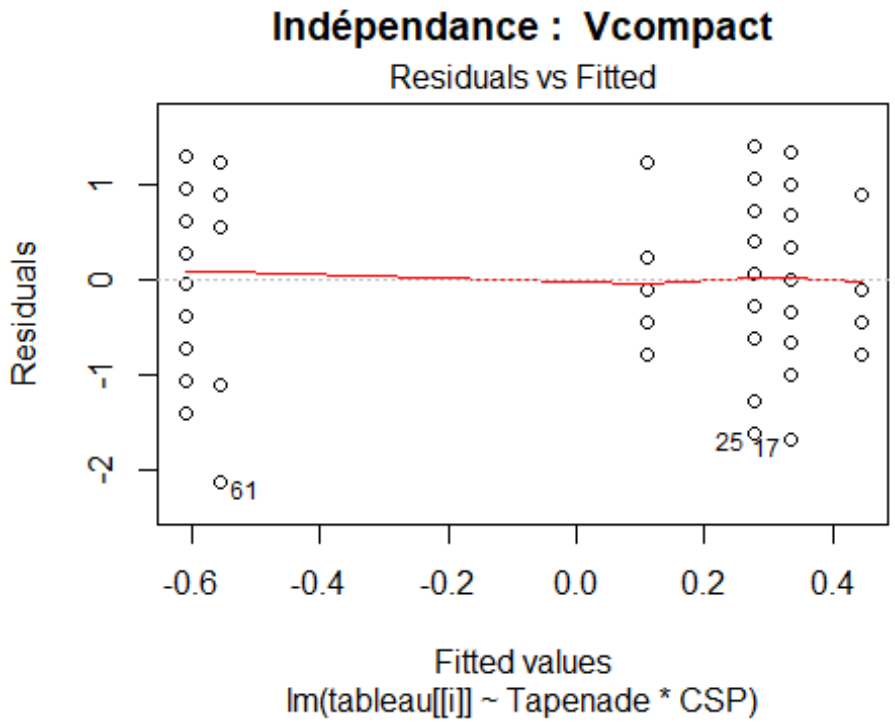



```
## [1] "Test de d'homogéneité des residus de la variable Vintensite"
```

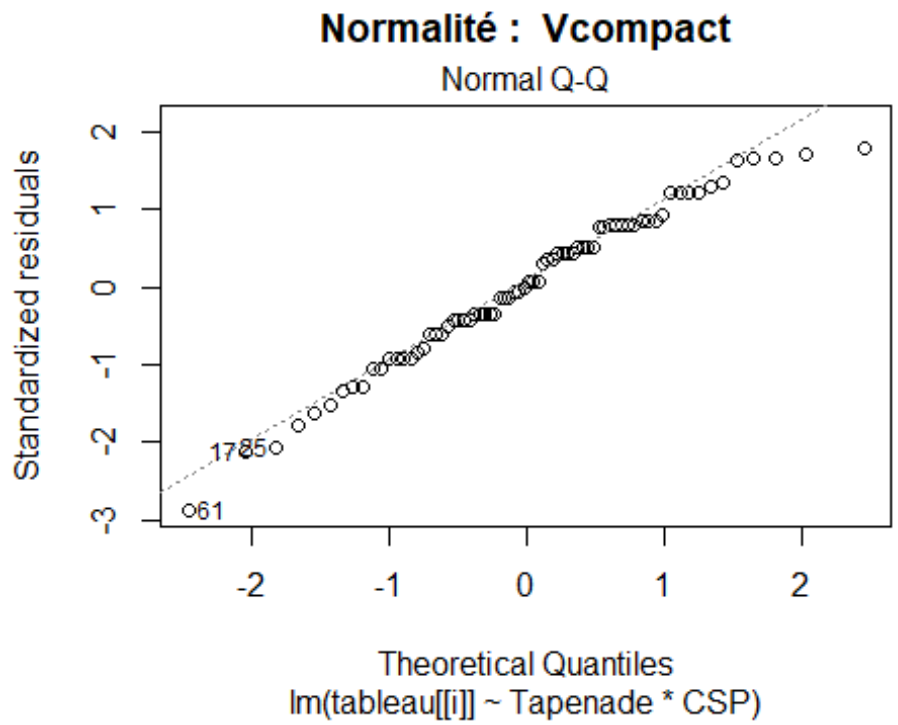



```
## [1] "ANOVA pour la variable Vcompact"
## Anova Table (Type III tests)
##
## Response: tableau[[i]]
##              Sum Sq Df F value   Pr(>F)
## (Intercept)   0.000  1    0.00 1.000000
## Tapenade      9.528  2    7.35 0.001313 **
## CSP           0.000  1    0.00 1.000000
```

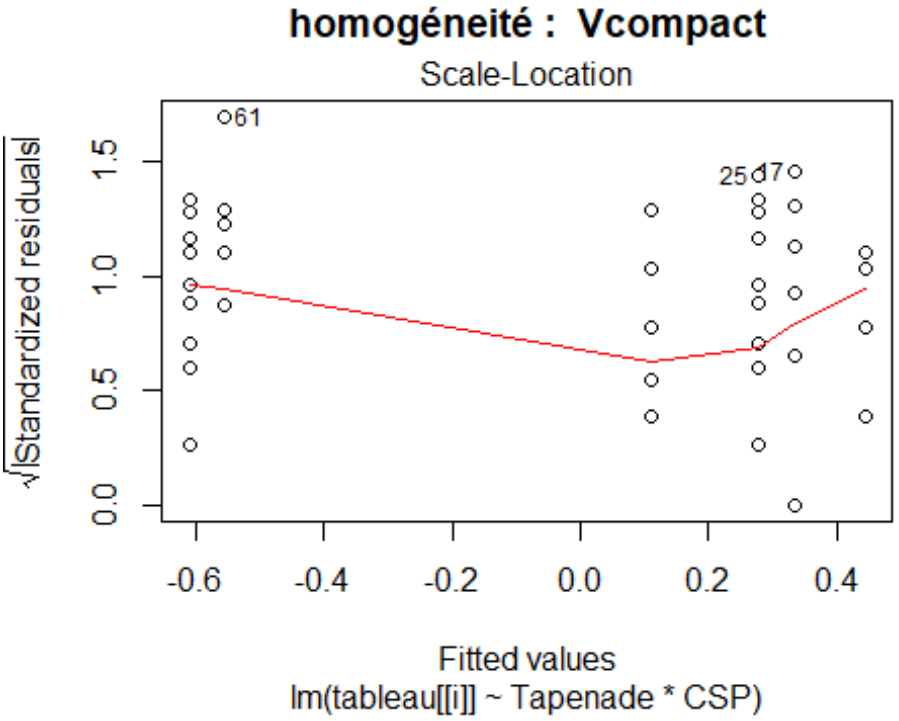
```
## Tapenade:CSP  0.194  2    0.15 0.861001
## Residuals    42.778 66
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## [1] "Test d'indépendance des residus de la variable Vcompact"
##  lag Autocorrelation D-W Statistic p-value
##    1       0.2507215      1.487229   0.012
##  Alternative hypothesis: rho != 0
```




```
## NULL
## [1] "Test de normalité des residus de la variable Vcompact"
##
##  Shapiro-Wilk normality test
##
## data:  residuals(mod1)
## W = 0.98006, p-value = 0.31
```

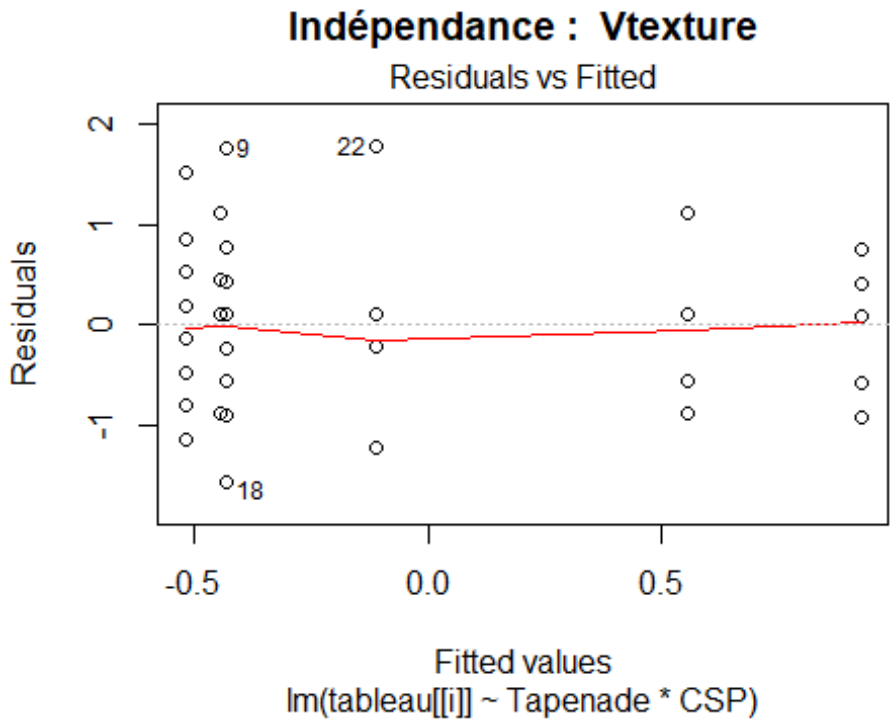



```
## [1] "Test de d'homogéneité des residus de la variable Vcompact"
```

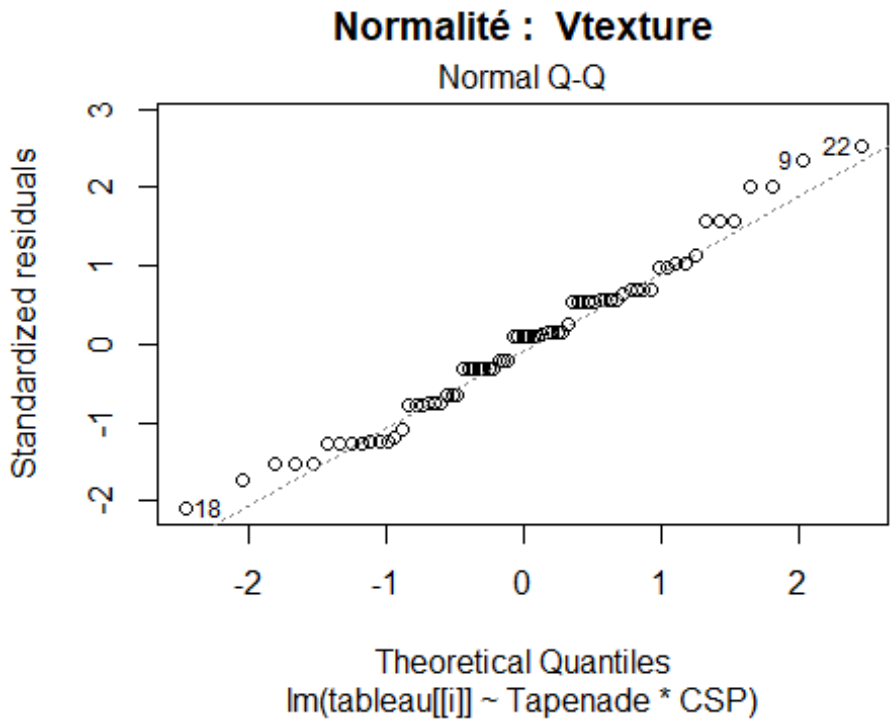



```
## [1] "ANOVA pour la variable Vtexture"
## Anova Table (Type III tests)
##
## Response: tableau[[i]]
##              Sum Sq Df F value    Pr(>F)
## (Intercept)   0.001  1  0.0014    0.9699
## Tapenade     15.354  2 12.8653 1.962e-05 ***
## CSP           0.001  1  0.0014    0.9699
```

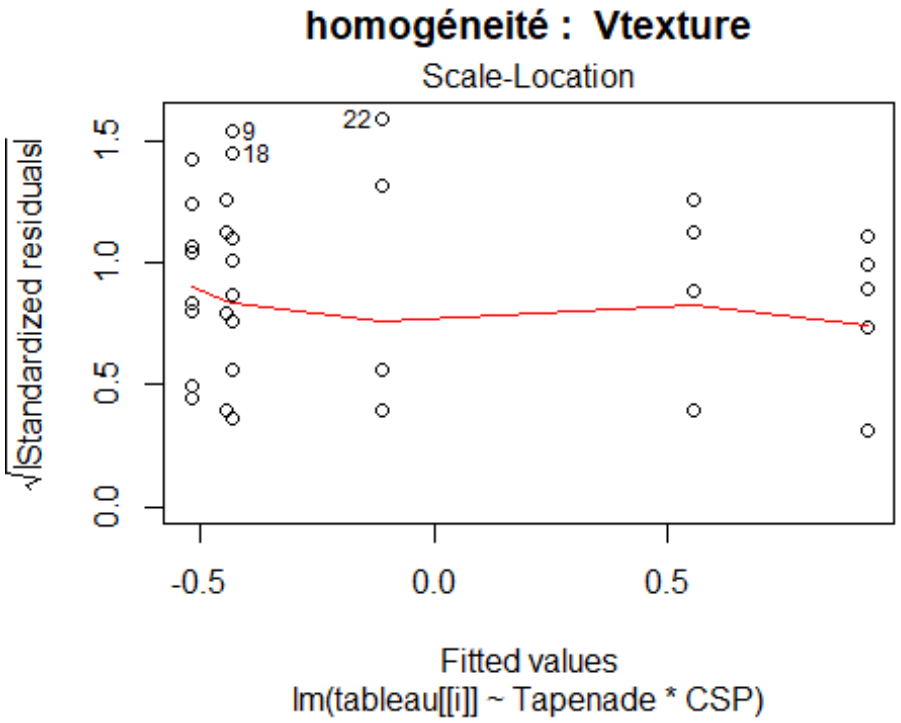
```
## Tapenade:CSP  1.096  2  0.9186    0.4042
## Residuals    38.787 65
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## [1] "Test d'indépendance des residus de la variable Vtexture"
##  lag Autocorrelation D-W Statistic p-value
##    1       0.1201159      1.751563    0.16
##  Alternative hypothesis: rho != 0
```




```
## NULL
## [1] "Test de normalité des residus de la variable Vtexture"
##
##  Shapiro-Wilk normality test
##
## data:  residuals(mod1)
## W = 0.97709, p-value = 0.2198
```

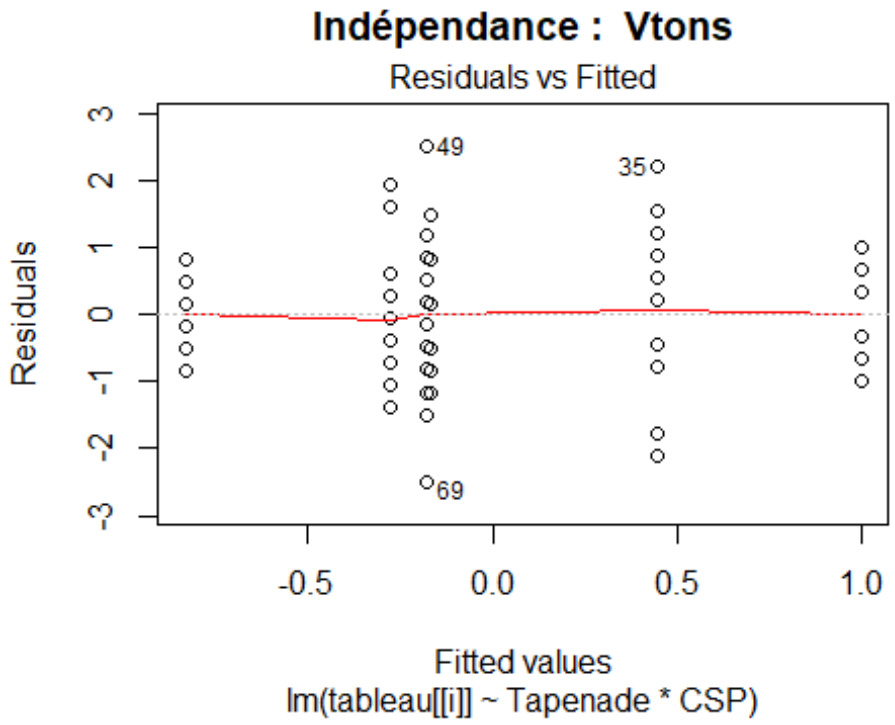



```
## [1] "Test de d'homogéneité des residus de la variable Vtexture"
```

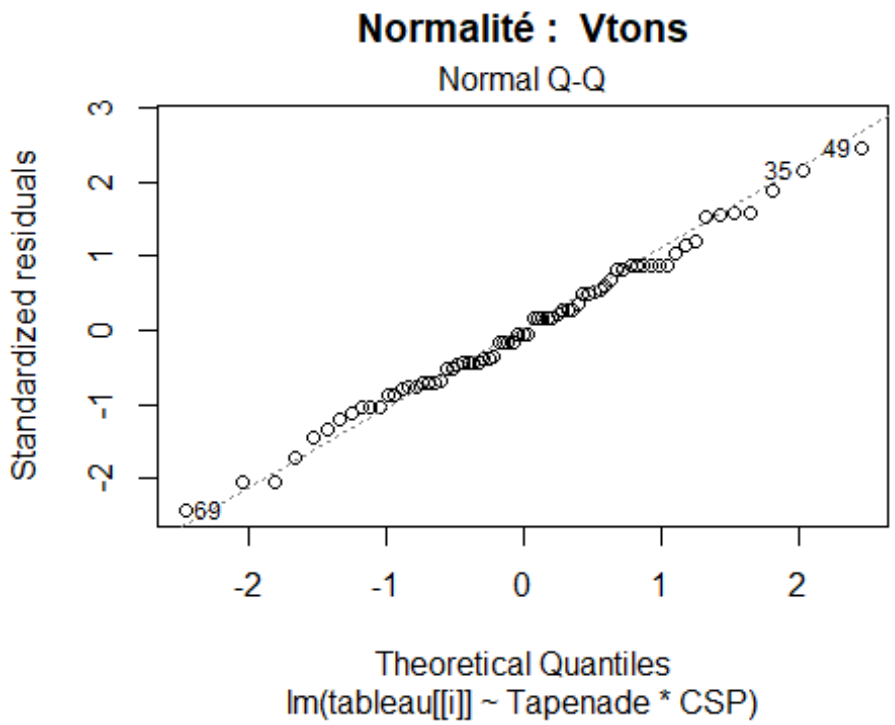



```
## [1] "ANOVA pour la variable Vtons"
## Anova Table (Type III tests)
##
## Response: tableau[[i]]
##              Sum Sq Df F value   Pr(>F)
## (Intercept)   0.000  1  0.0001 0.991008
## Tapenade     14.800  2  6.6017 0.002454 **
## CSP           0.000  1  0.0001 0.991008
```

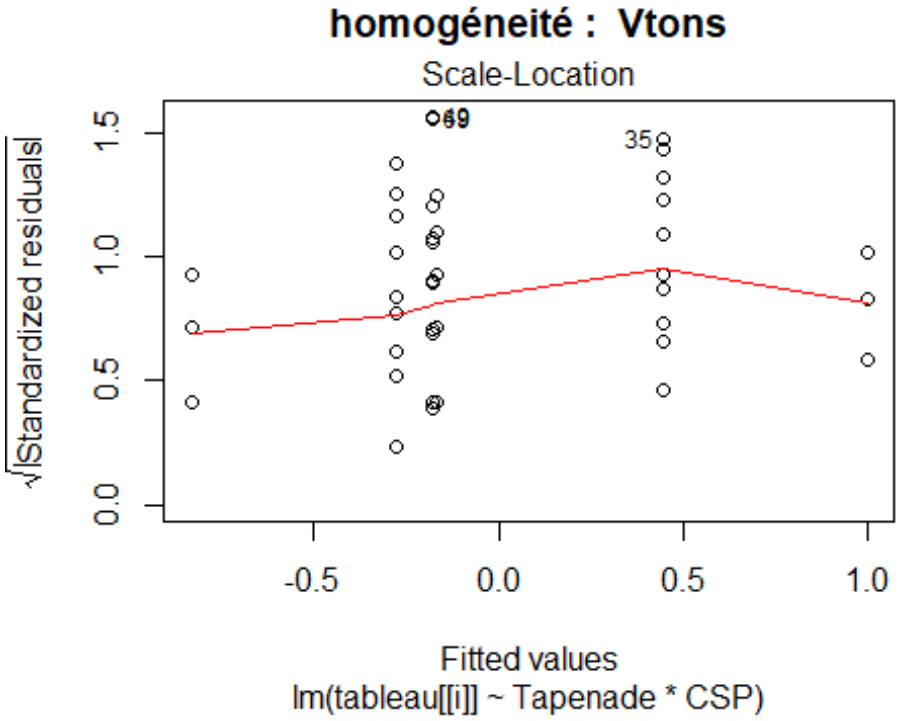
```
## Tapenade:CSP  3.357  2  1.4976 0.231283
## Residuals    72.859 65
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## [1] "Test d'indépendance des residus de la variable Vtons"
##  lag Autocorrelation D-W Statistic p-value
##    1       0.1227015      1.752094   0.162
##  Alternative hypothesis: rho != 0
```




```
## NULL
## [1] "Test de normalité des residus de la variable Vtons"
##
##  Shapiro-Wilk normality test
##
## data:  residuals(mod1)
## W = 0.99211, p-value = 0.9389
```

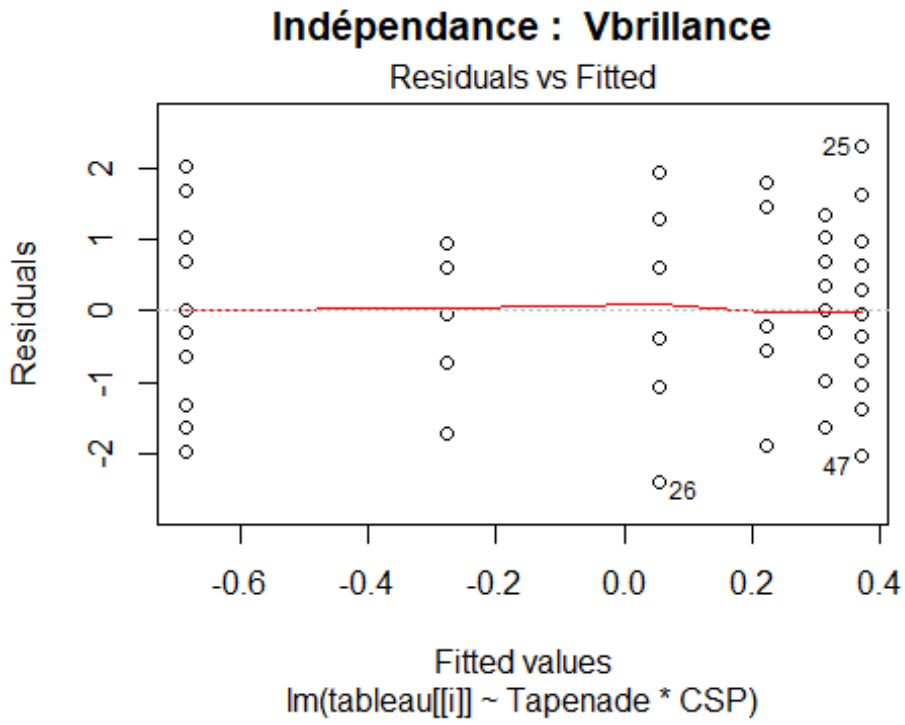



```
## [1] "Test de d'homogéneité des residus de la variable Vtons"
```

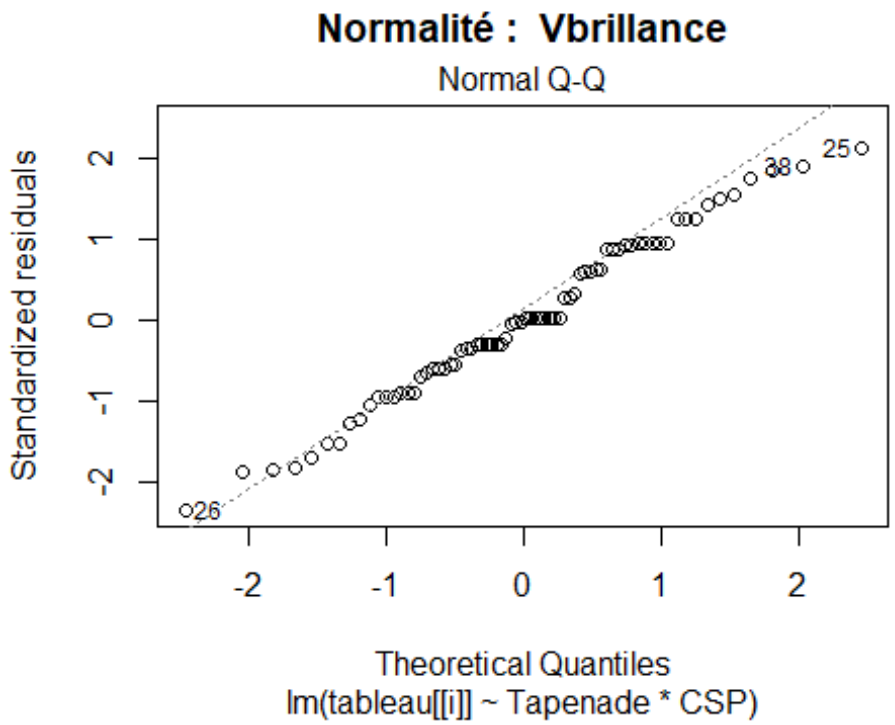



```
## [1] "ANOVA pour la variable Vbrillance"
## Anova Table (Type III tests)
##
## Response: tableau[[i]]
##              Sum Sq Df F value  Pr(>F)
## (Intercept)   0.000  1  0.0000 1.00000
## Tapenade      6.287  2  2.5347 0.08698 .
## CSP           0.000  1  0.0000 1.00000
```

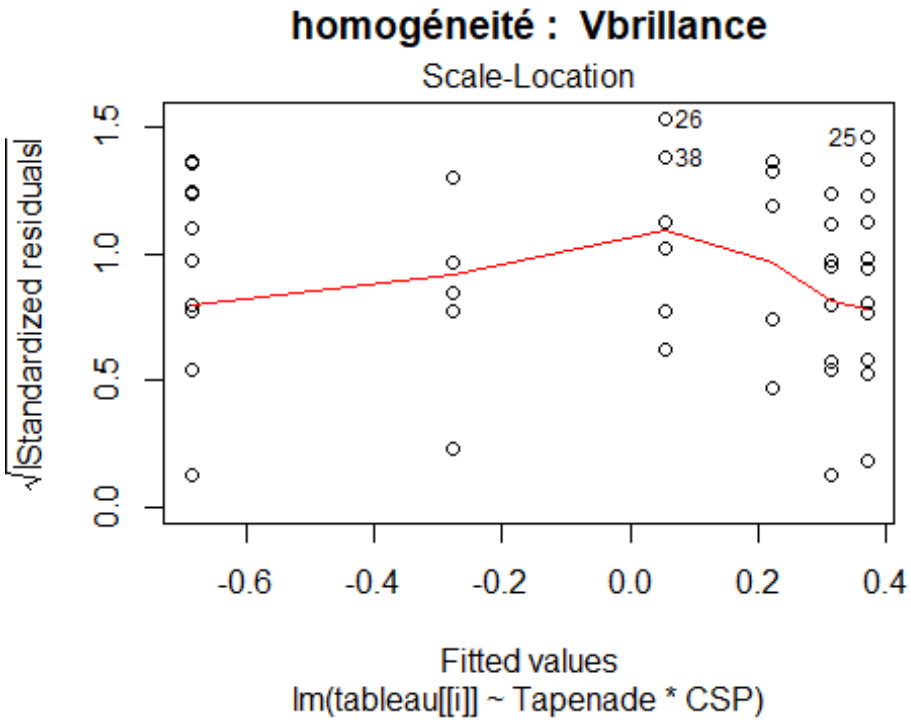
```
## Tapenade:CSP  1.231  2  0.4965 0.61092
## Residuals    81.852 66
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## [1] "Test d'indépendance des residus de la variable Vbrillance"
##  lag Autocorrelation D-W Statistic p-value
##    1      -0.1473521      2.288361   0.356
##  Alternative hypothesis: rho != 0
```




```
## NULL
## [1] "Test de normalité des residus de la variable Vbrillance"
##
##  Shapiro-Wilk normality test
##
## data:  residuals(mod1)
## W = 0.98458, p-value = 0.5253
```

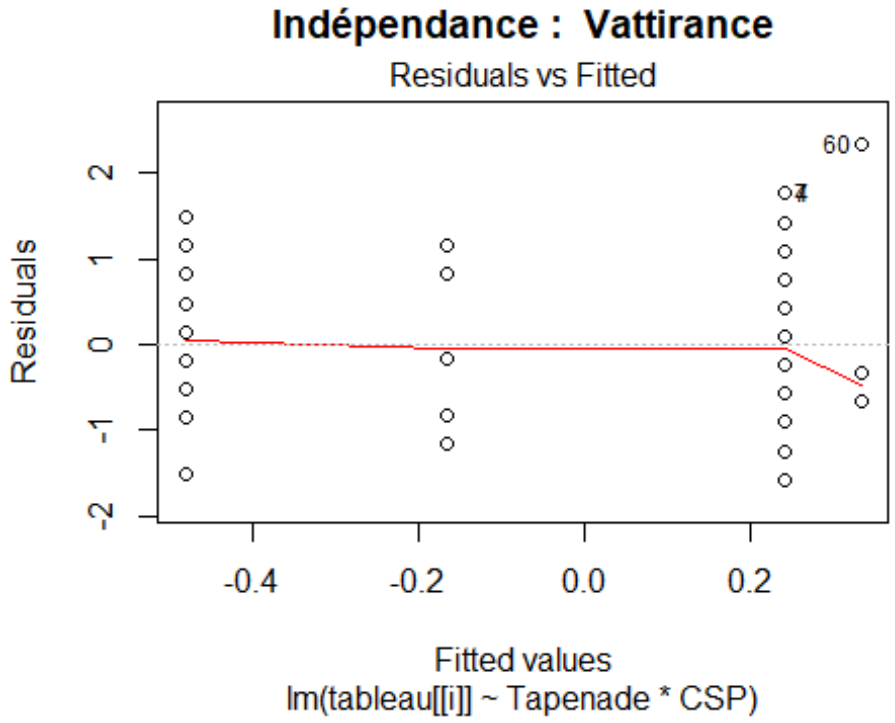



```
## [1] "Test de d'homogéneité des residus de la variable Vbrillance"
```

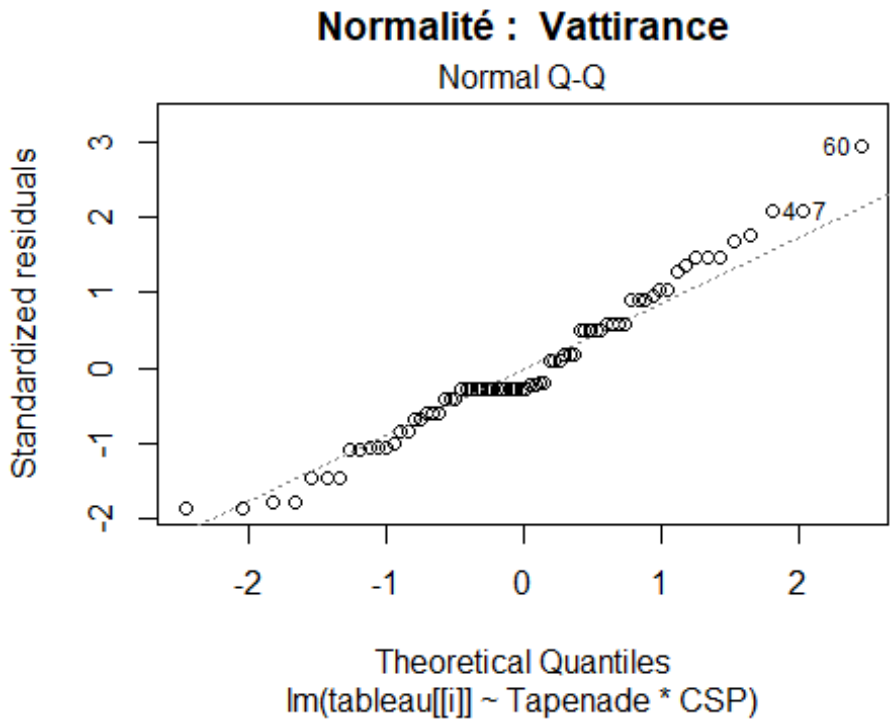



```
## [1] "ANOVA pour la variable Vattirance"
## Anova Table (Type III tests)
##
## Response: tableau[[i]]
##              Sum Sq Df F value Pr(>F)
## (Intercept)   0.000  1  0.0000 1.0000
## Tapenade      3.398  2  2.2395 0.1145
## CSP           0.000  1  0.0000 1.0000
```

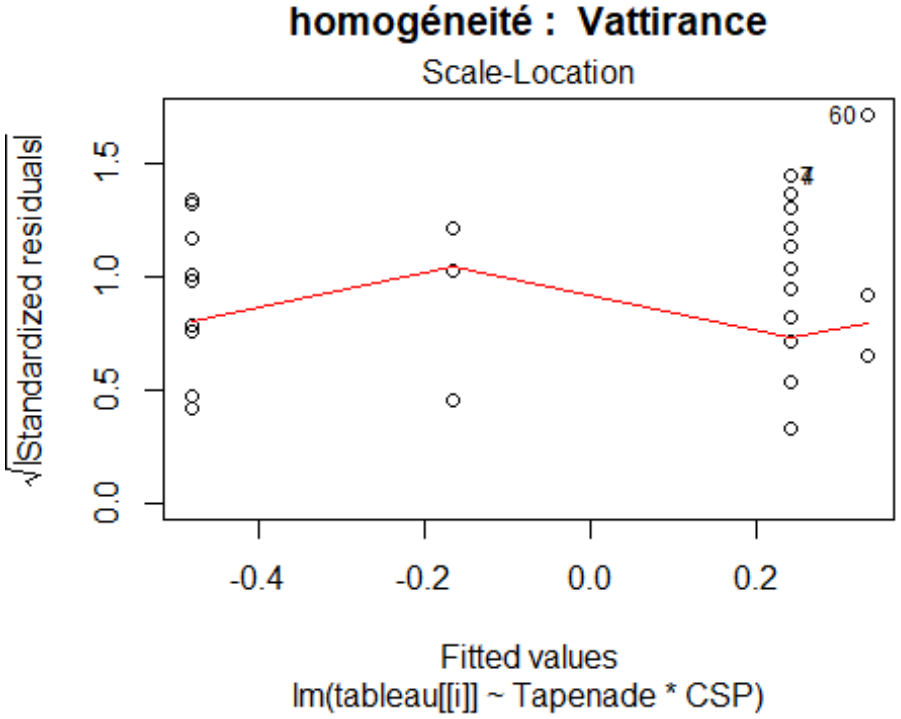
```
## Tapenade:CSP  1.231  2  0.8116 0.4485
## Residuals    50.074 66
## [1] "Test d'indépendance des residus de la variable Vattirance"
##  lag Autocorrelation D-W Statistic p-value
##    1      0.01082073       1.92772   0.602
##  Alternative hypothesis: rho != 0
```




```
## NULL
## [1] "Test de normalité des residus de la variable Vattirance"
##
##  Shapiro-Wilk normality test
##
## data:  residuals(mod1)
## W = 0.97252, p-value = 0.1161
```

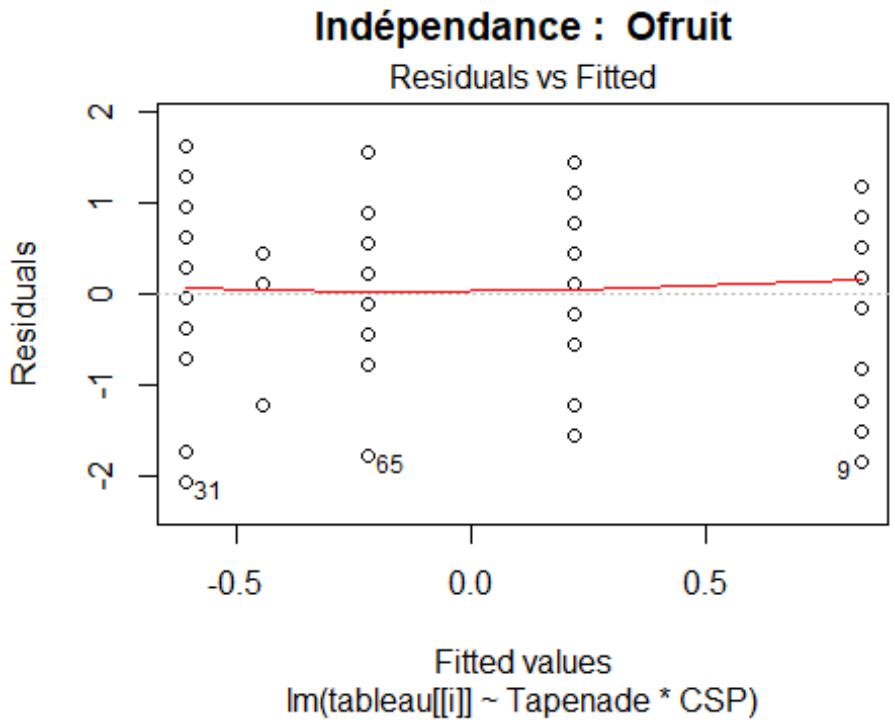



```
## [1] "Test de d'homogéneité des residus de la variable Vattirance"
```

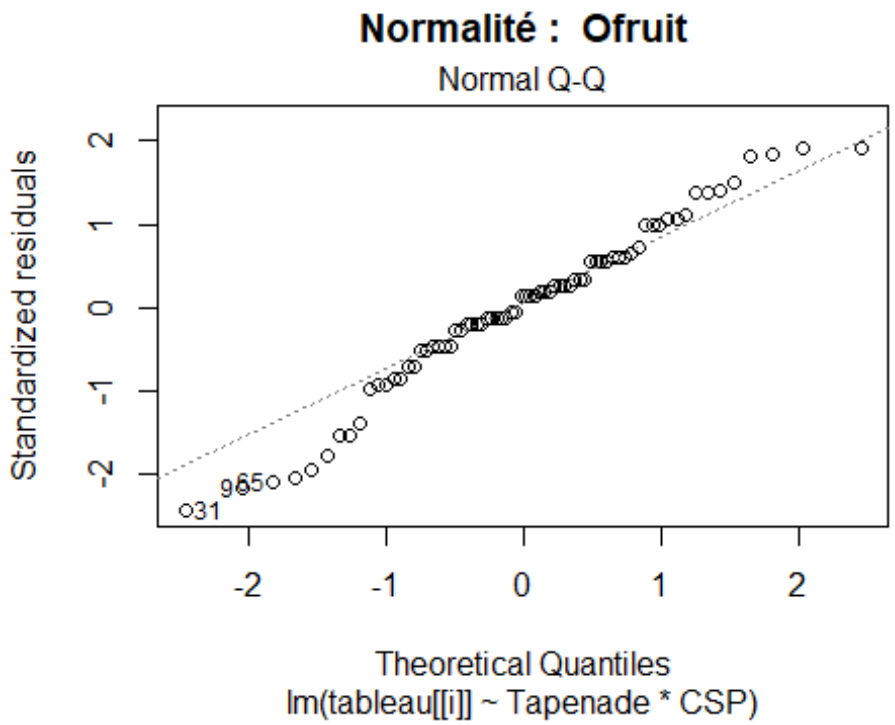



```
## [1] "ANOVA pour la variable Ofruit"
## Anova Table (Type III tests)
##
## Response: tableau[[i]]
##              Sum Sq Df F value  Pr(>F)
## (Intercept)   0.000  1  0.0000 1.00000
## Tapenade     10.028  2  6.6037 0.00243 **
## CSP           0.000  1  0.0000 1.00000
```

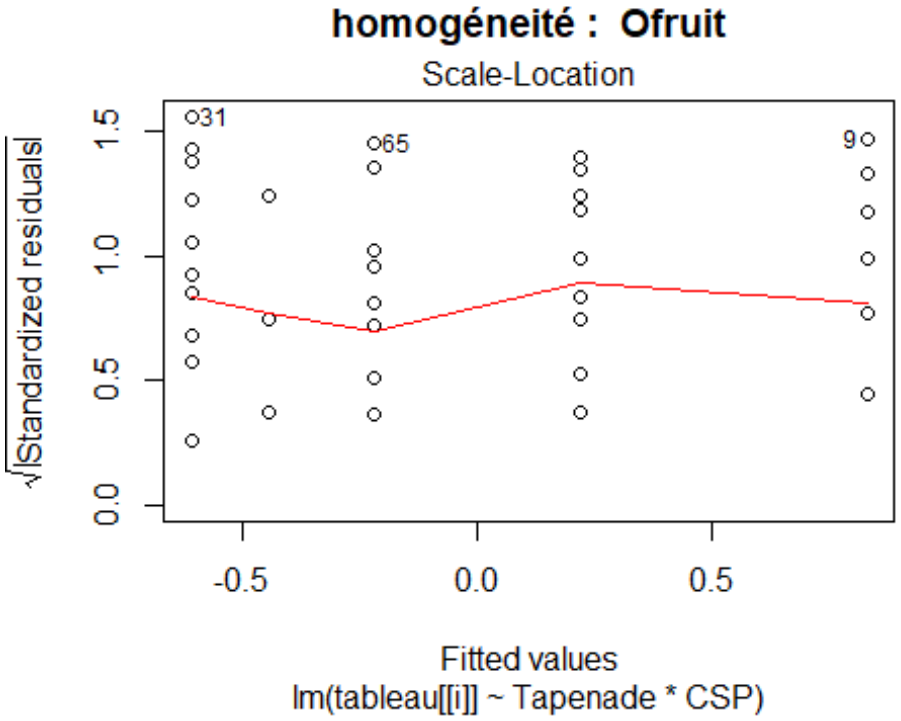
```
## Tapenade:CSP  2.694  2  1.7744 0.17758
## Residuals    50.111 66
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## [1] "Test d'indépendance des residus de la variable Ofruit"
##  lag Autocorrelation D-W Statistic p-value
##    1      -0.0908475      2.138766    0.74
##  Alternative hypothesis: rho != 0
```




```
## NULL
## [1] "Test de normalité des residus de la variable Ofruit"
##
##  Shapiro-Wilk normality test
##
## data:  residuals(mod1)
## W = 0.97535, p-value = 0.1691
```

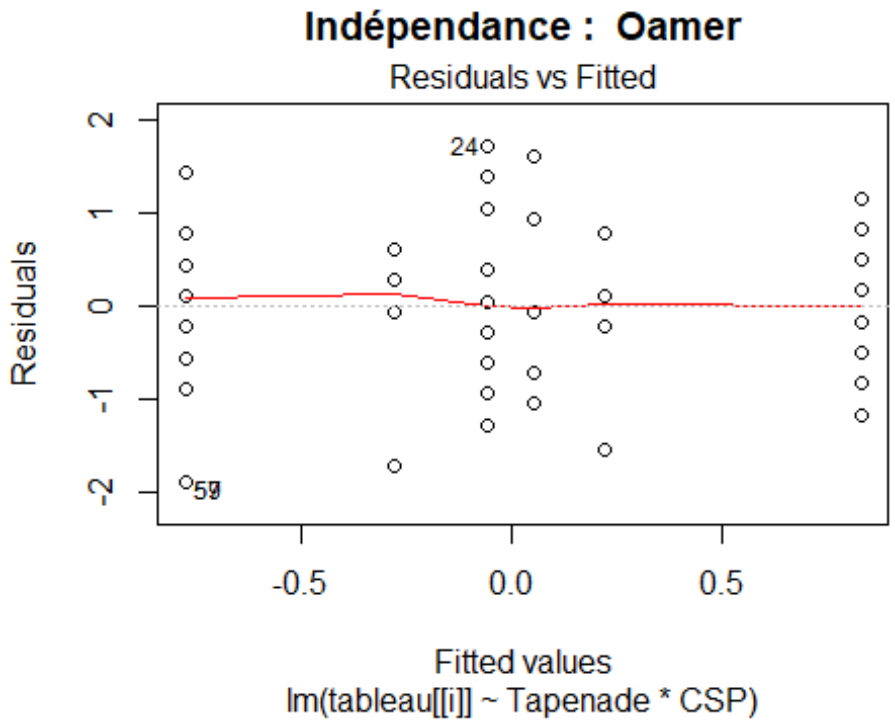



```
## [1] "Test de d'homogéneité des residus de la variable Ofruit"
```

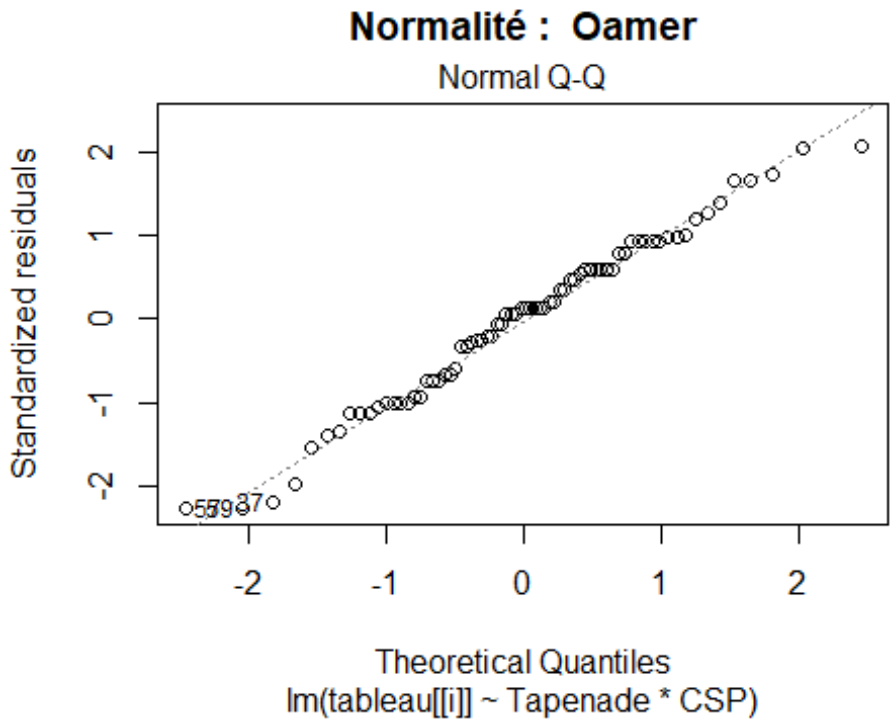



```
## [1] "ANOVA pour la variable Oamer"
## Anova Table (Type III tests)
##
## Response: tableau[[i]]
##              Sum Sq Df F value   Pr(>F)
## (Intercept)   0.000  1  0.0000 1.000000
## Tapenade      2.778  2  1.8665 0.162734
## CSP           0.000  1  0.0000 1.000000
```

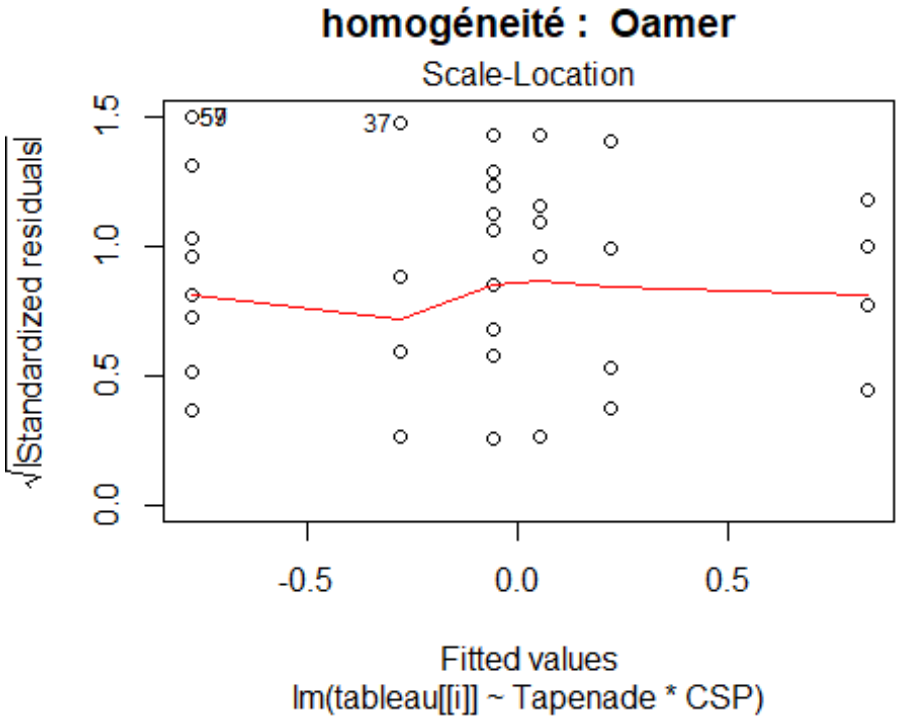
```
## Tapenade:CSP 10.111  2  6.7941 0.002075 **
## Residuals    49.111 66
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## [1] "Test d'indépendance des residus de la variable Oamer"
##  lag Autocorrelation D-W Statistic p-value
##    1      -0.0513449      2.096342   0.944
##  Alternative hypothesis: rho != 0
```




```
## NULL
## [1] "Test de normalité des residus de la variable Oamer"
##
##  Shapiro-Wilk normality test
##
## data:  residuals(mod1)
## W = 0.98347, p-value = 0.465
```

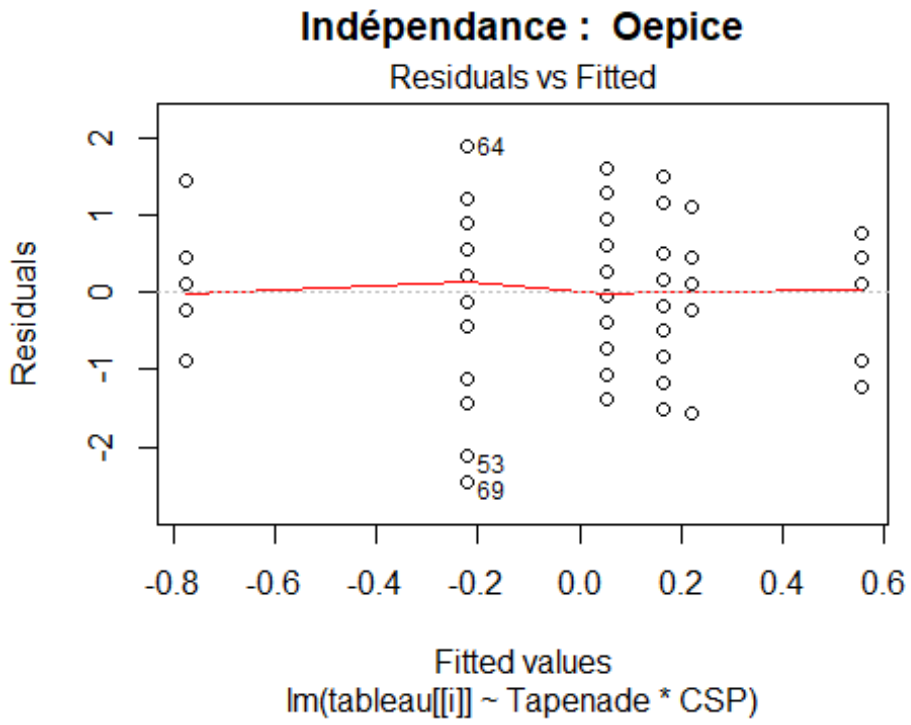



```
## [1] "Test de d'homogéneité des residus de la variable Oamer"
```

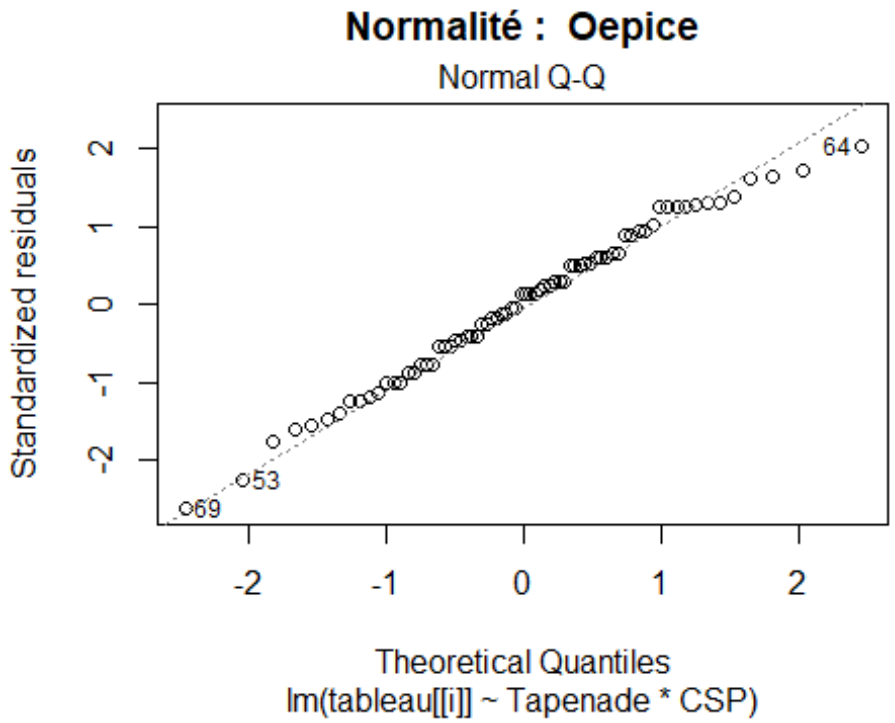



```
## [1] "ANOVA pour la variable Oepice"
## Anova Table (Type III tests)
##
## Response: tableau[[i]]
##              Sum Sq Df F value  Pr(>F)
## (Intercept)   0.000  1  0.0000 1.00000
## Tapenade      3.528  2  1.8947 0.15846
## CSP           0.000  1  0.0000 1.00000
```

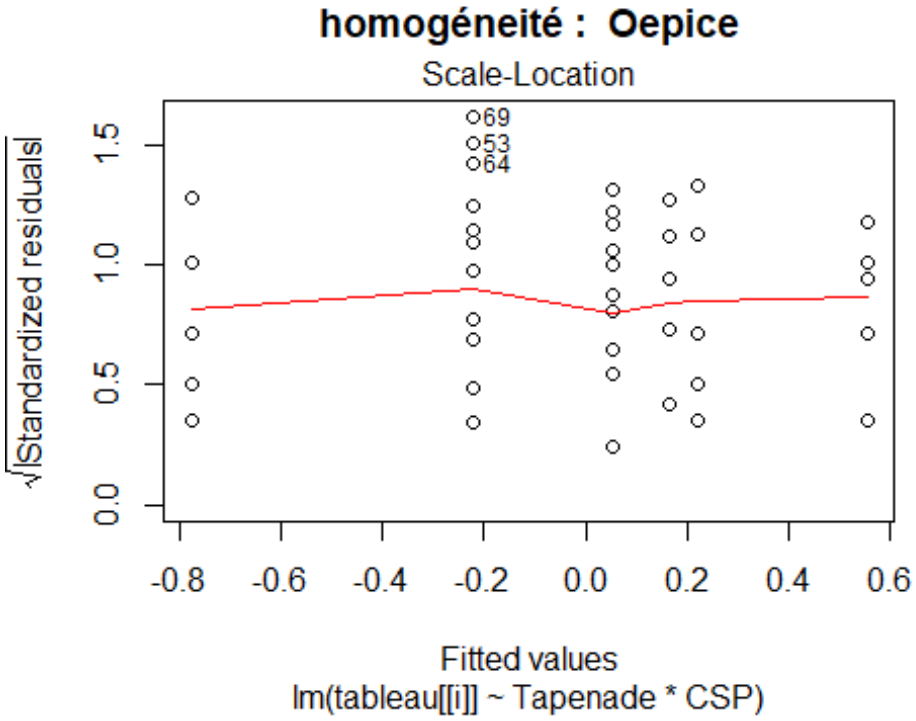
```
## Tapenade:CSP  5.861  2  3.1478 0.04946 *
## Residuals    61.444 66
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## [1] "Test d'indépendance des residus de la variable Oepice"
##  lag Autocorrelation D-W Statistic p-value
##    1      -0.1883163      2.363321   0.228
##  Alternative hypothesis: rho != 0
```




```
## NULL
## [1] "Test de normalité des residus de la variable Oepice"
##
##  Shapiro-Wilk normality test
##
## data:  residuals(mod1)
## W = 0.98714, p-value = 0.6769
```

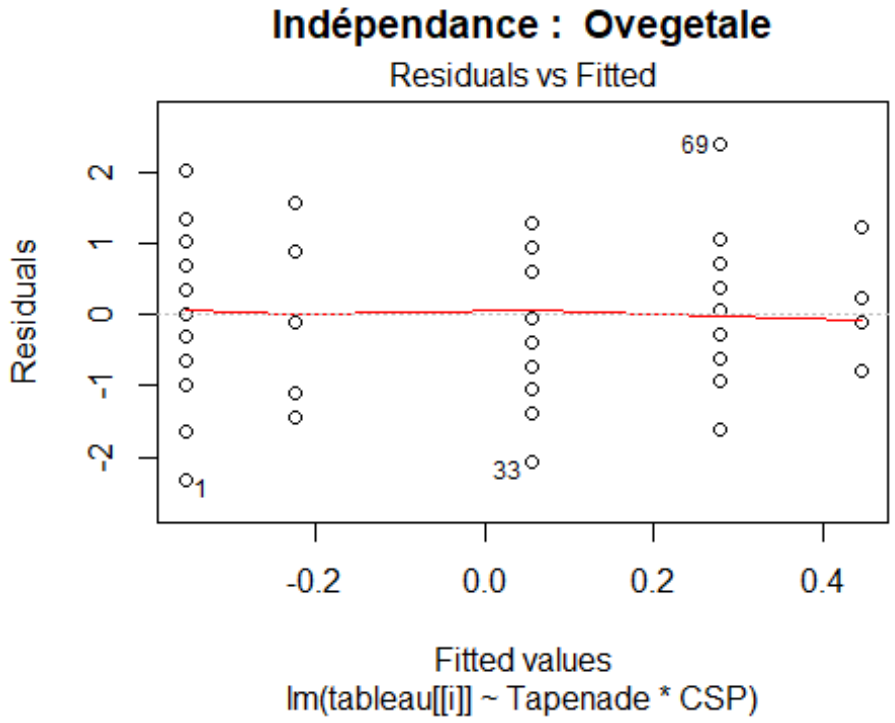



```
## [1] "Test de d'homogéneité des residus de la variable Oepice"
```

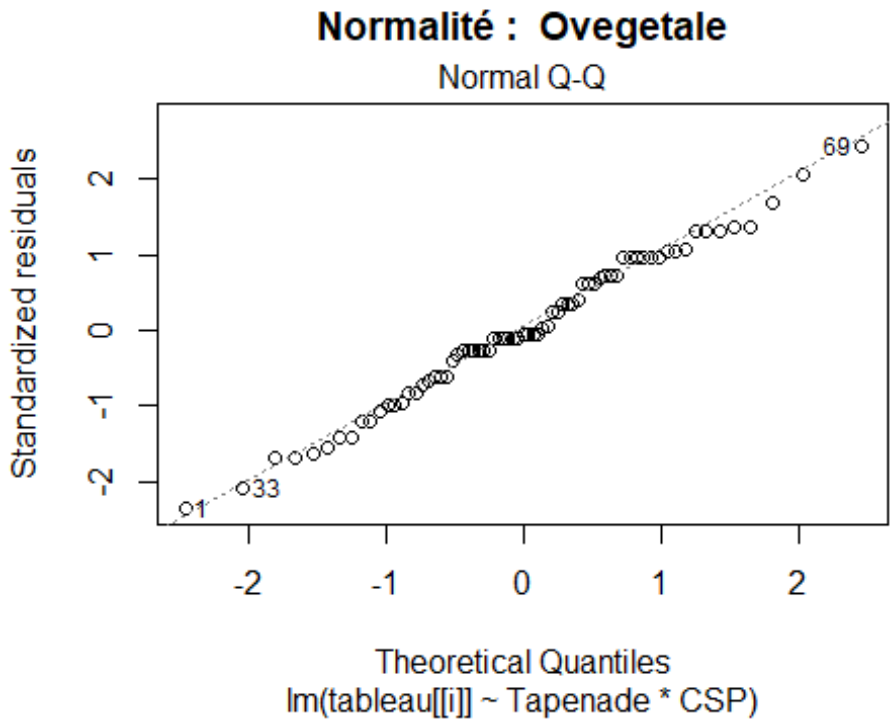



```
## [1] "ANOVA pour la variable Ovegetale"
## Anova Table (Type III tests)
##
## Response: tableau[[i]]
##              Sum Sq Df F value Pr(>F)
## (Intercept)   0.001  1  0.0006 0.9812
## Tapenade      2.606  2  1.2704 0.2876
## CSP           0.001  1  0.0006 0.9812
```

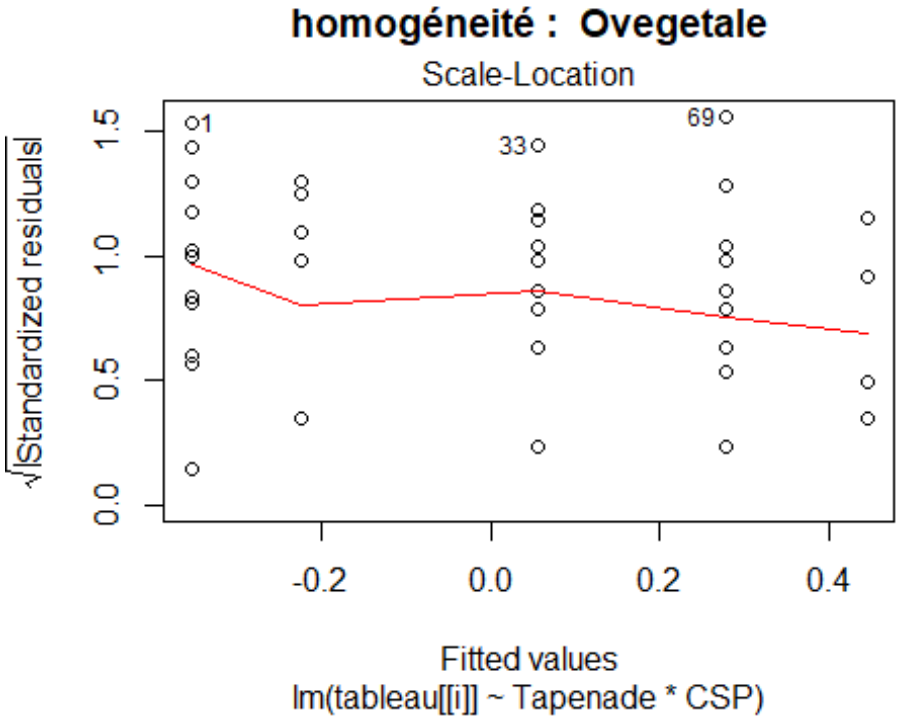
```
## Tapenade:CSP  1.881  2  0.9170 0.4048
## Residuals    66.660 65
## [1] "Test d'indépendance des residus de la variable Ovegetale"
##  lag Autocorrelation D-W Statistic p-value
##    1       0.0342365      1.850062   0.318
##  Alternative hypothesis: rho != 0
```




```
## NULL
## [1] "Test de normalité des residus de la variable Ovegetale"
##
##  Shapiro-Wilk normality test
##
## data:  residuals(mod1)
## W = 0.98978, p-value = 0.8374
```

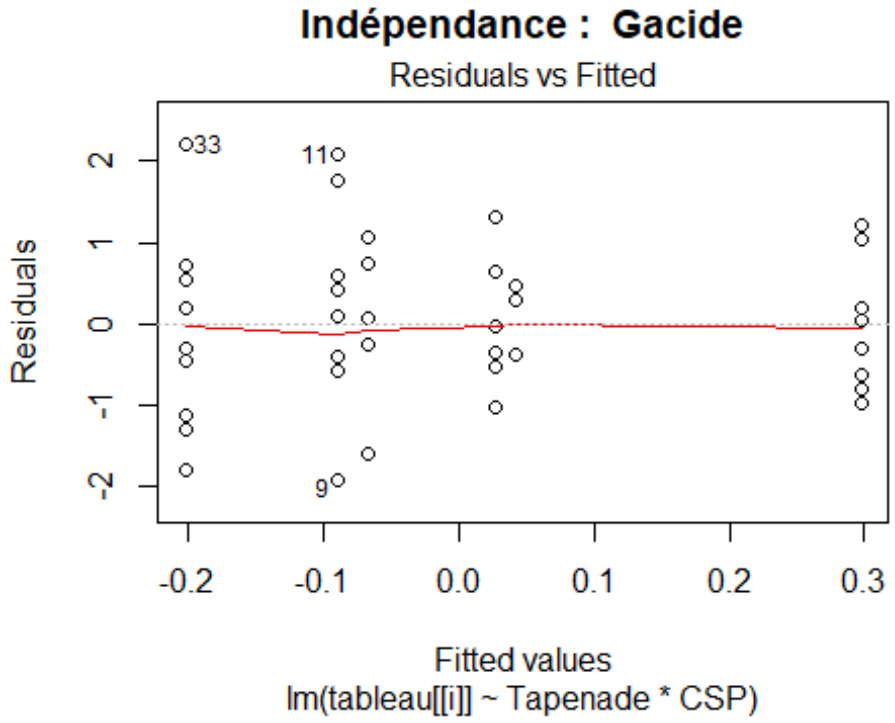



```
## [1] "Test de d'homogéneité des residus de la variable Ovegetale"
```

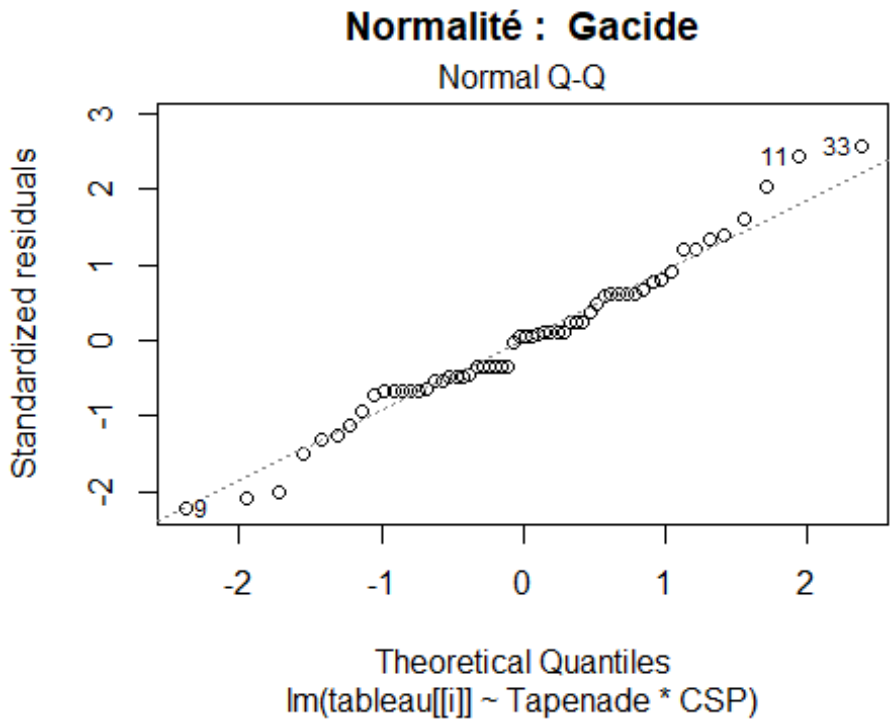



```
## [1] "ANOVA pour la variable Gacide"
## Anova Table (Type III tests)
##
## Response: tableau[[i]]
##              Sum Sq Df F value Pr(>F)
## (Intercept)   0.000  1  0.0001 0.9910
## Tapenade      0.571  2  0.3602 0.6993
## CSP           0.000  1  0.0000 0.9965
```

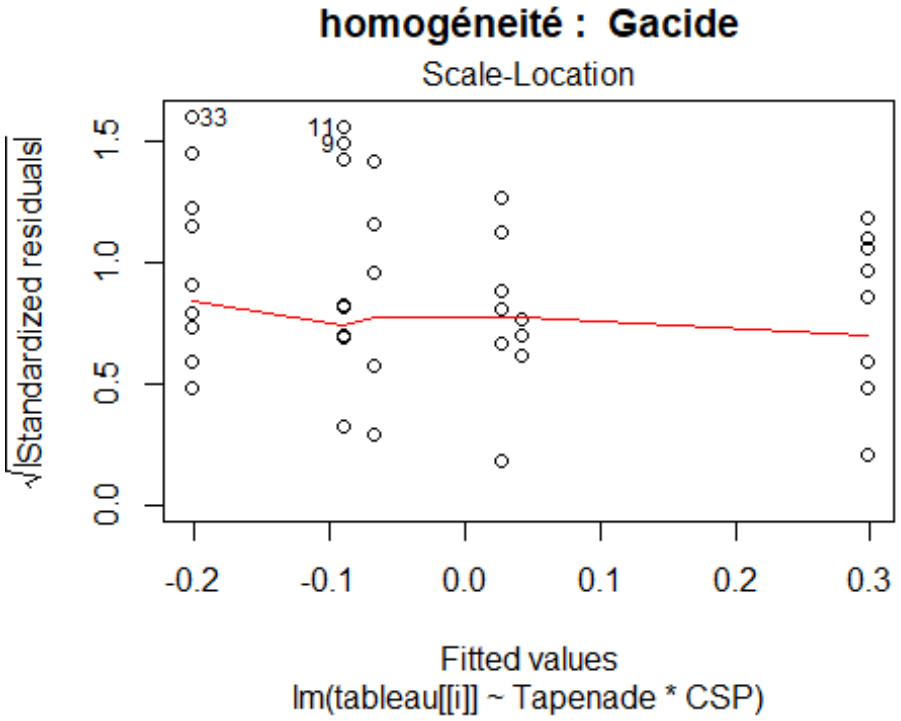
```
## Tapenade:CSP  0.422  2  0.2665 0.7671
## Residuals    41.201 52
## [1] "Test d'indépendance des residus de la variable Gacide"
##  lag Autocorrelation D-W Statistic p-value
##    1      -0.2425706      2.467376   0.132
##  Alternative hypothesis: rho != 0
```




```
## NULL
## [1] "Test de normalité des residus de la variable Gacide"
##
##  Shapiro-Wilk normality test
##
## data:  residuals(mod1)
## W = 0.9774, p-value = 0.3504
```



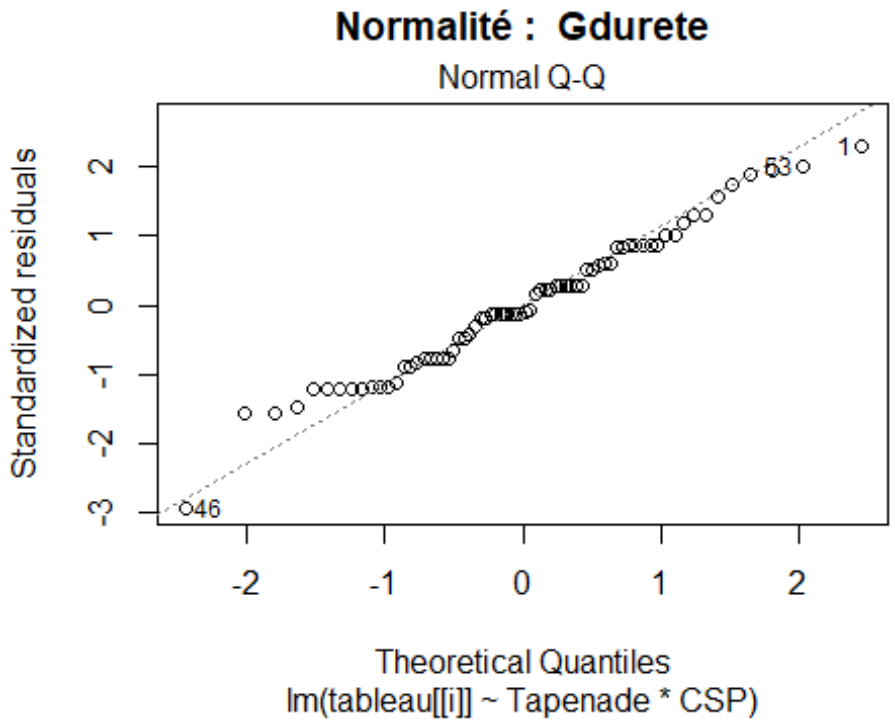

```
## [1] "Test de d'homogéneité des residus de la variable Gacide"
```



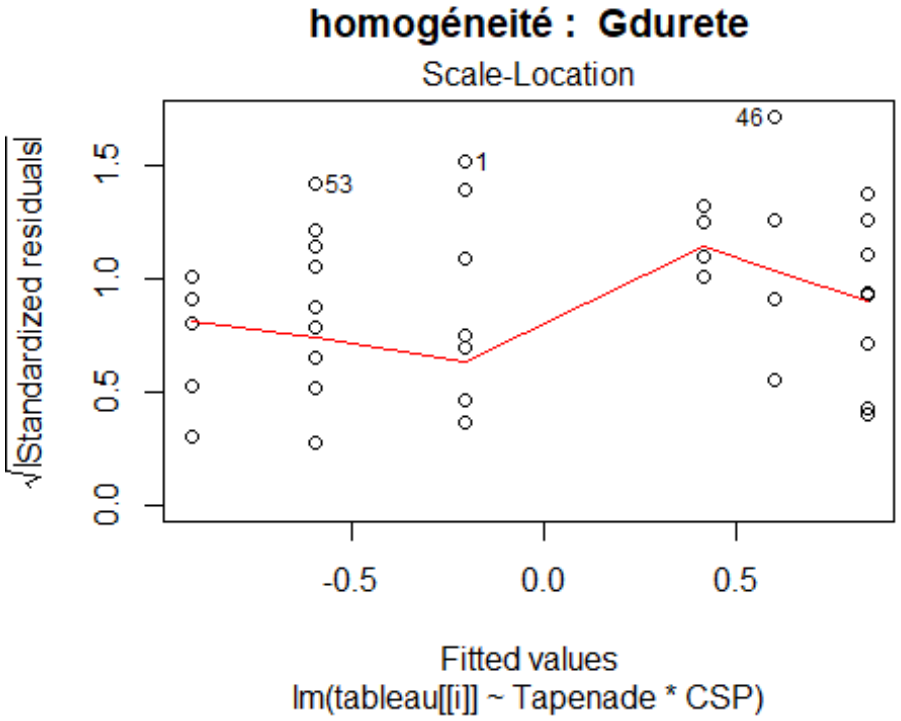

```
## [1] "ANOVA pour la variable Gdurete"
## Anova Table (Type III tests)
##
## Response: tableau[[i]]
##              Sum Sq Df F value    Pr(>F)
## (Intercept)   0.031  1  0.0312 0.8602478
## Tapenade     18.496  2  9.4251 0.0002584 ***
## CSP           0.004  1  0.0041 0.9491748
```

```
## Tapenade:CSP  2.421  2  1.2336 0.2980756
## Residuals    62.797 64
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## [1] "Test d'indépendance des residus de la variable Gdurete"
##  lag Autocorrelation D-W Statistic p-value
##    1      -0.1448941      2.203717    0.57
##  Alternative hypothesis: rho != 0
```


```
## NULL
## [1] "Test de normalité des residus de la variable Gdurete"
##
##  Shapiro-Wilk normality test
##
## data:  residuals(mod1)
## W = 0.98387, p-value = 0.5062
```

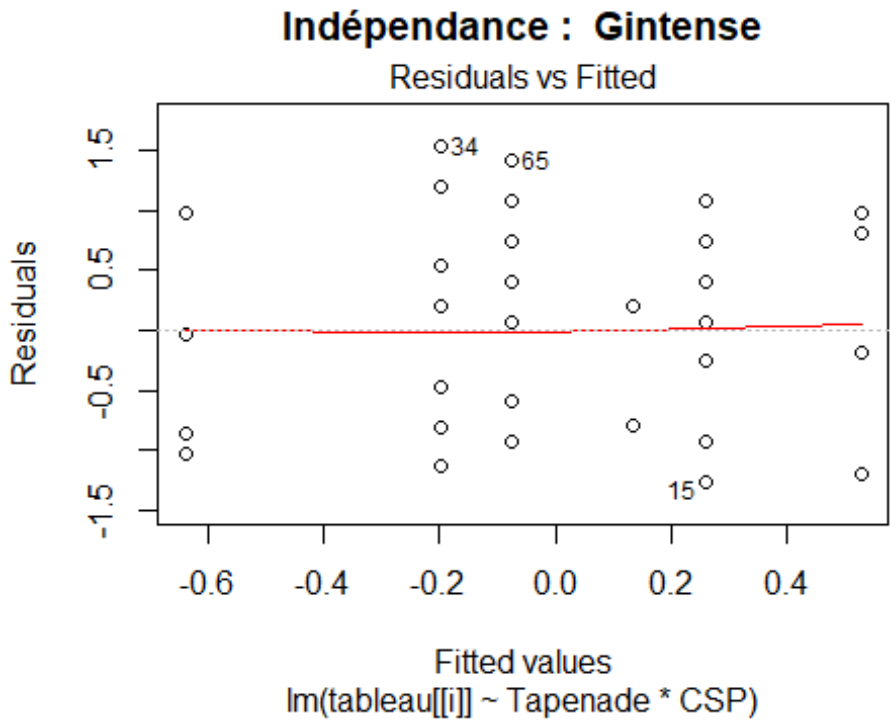



```
## [1] "Test de d'homogéneité des residus de la variable Gdurete"
```

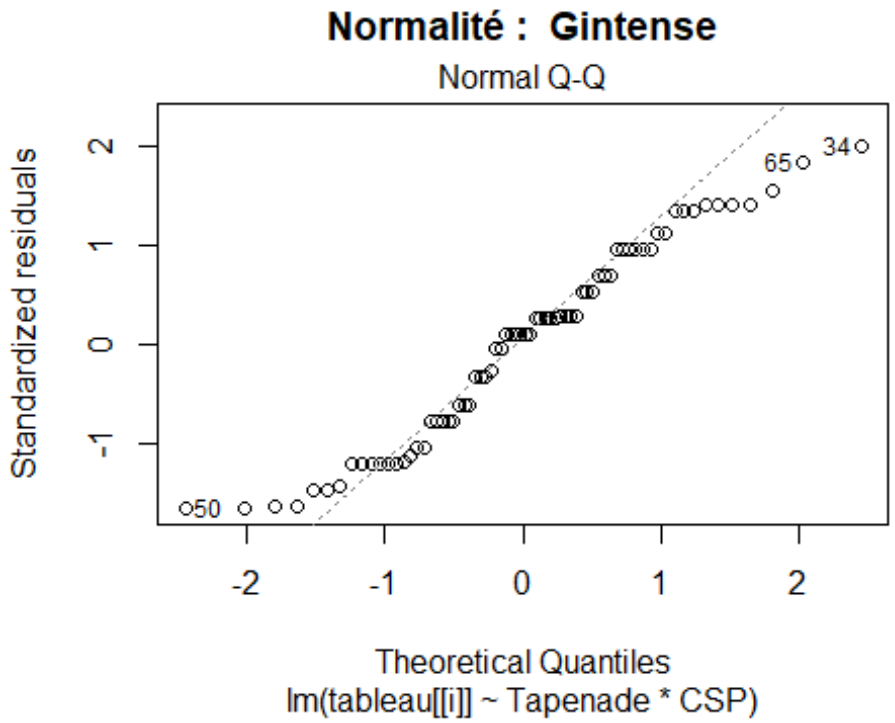



```
## [1] "ANOVA pour la variable Gintense"
## Anova Table (Type III tests)
##
## Response: tableau[[i]]
##              Sum Sq Df F value  Pr(>F)
## (Intercept)   0.000  1  0.0003 0.98636
## Tapenade      4.620  2  3.7275 0.02942 *
## CSP           0.002  1  0.0025 0.96015
```

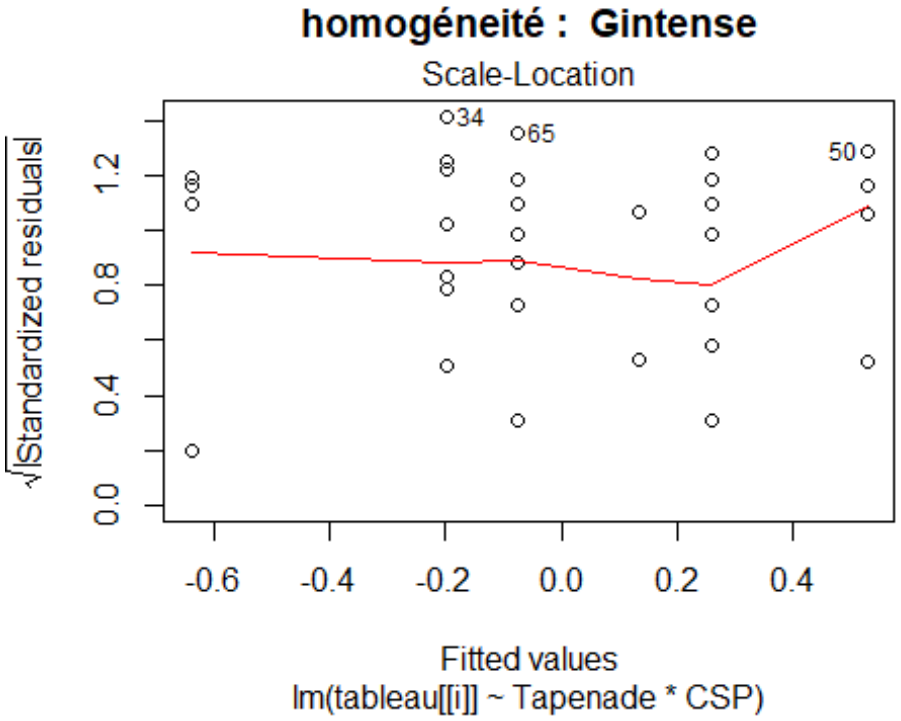
```
## Tapenade:CSP  2.557  2  2.0628 0.13546
## Residuals    39.662 64
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## [1] "Test d'indépendance des residus de la variable Gintense"
##  lag Autocorrelation D-W Statistic p-value
##    1        0.416258      1.153511       0
##  Alternative hypothesis: rho != 0
```




```
## NULL
## [1] "Test de normalité des residus de la variable Gintense"
##
##  Shapiro-Wilk normality test
##
## data:  residuals(mod1)
## W = 0.95671, p-value = 0.01653
```

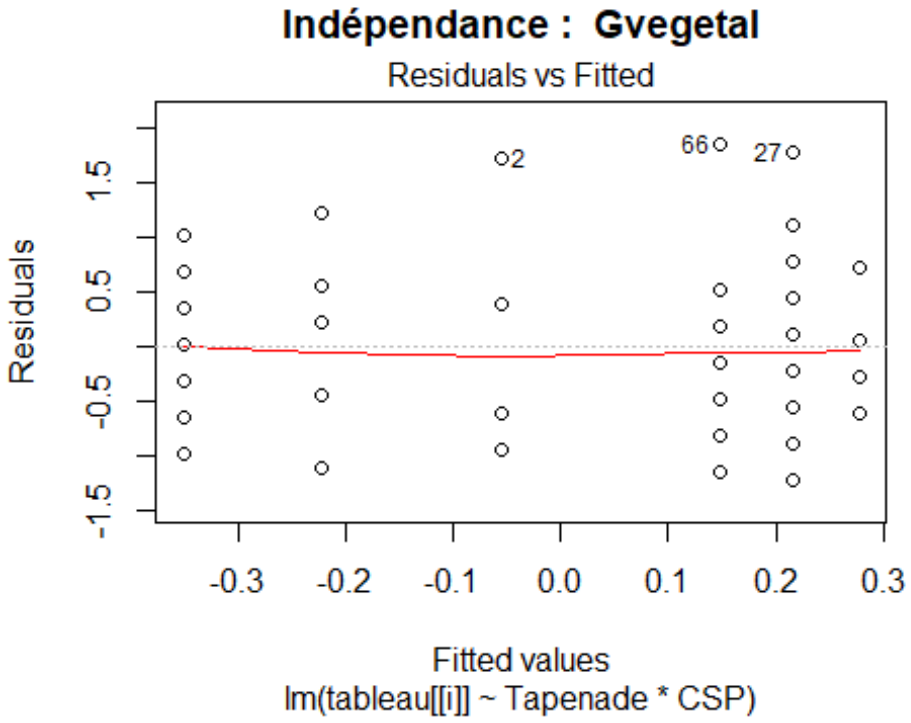



```
## [1] "Test de d'homogéneité des residus de la variable Gintense"
```

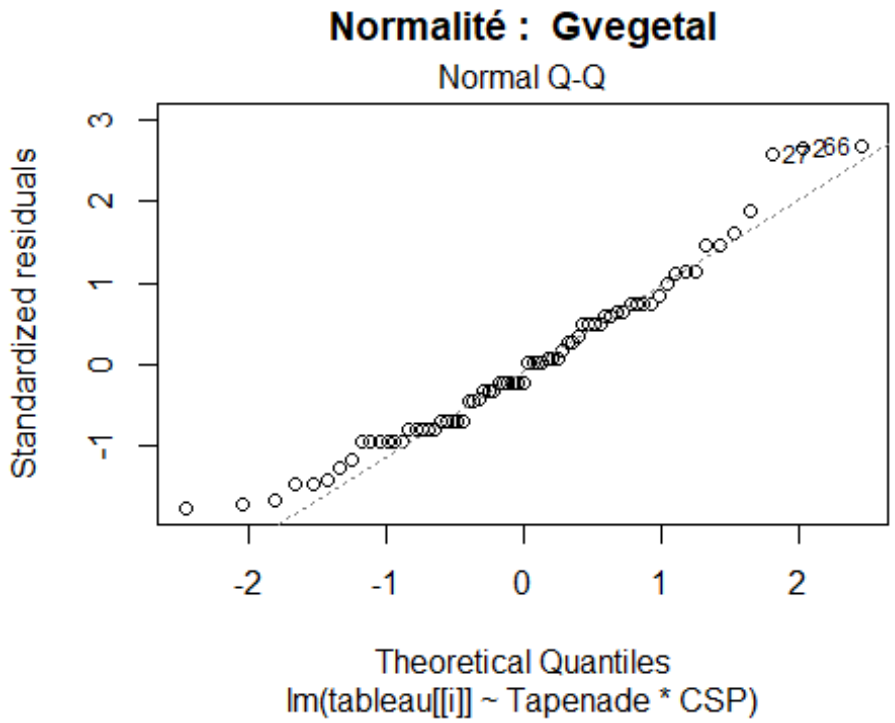



```
## [1] "ANOVA pour la variable Gvegetal"
## Anova Table (Type III tests)
##
## Response: tableau[[i]]
##              Sum Sq Df F value Pr(>F)
## (Intercept)   0.000  1  0.0004 0.9837
## Tapenade      1.851  2  1.8156 0.1709
## CSP           0.000  1  0.0004 0.9837
```

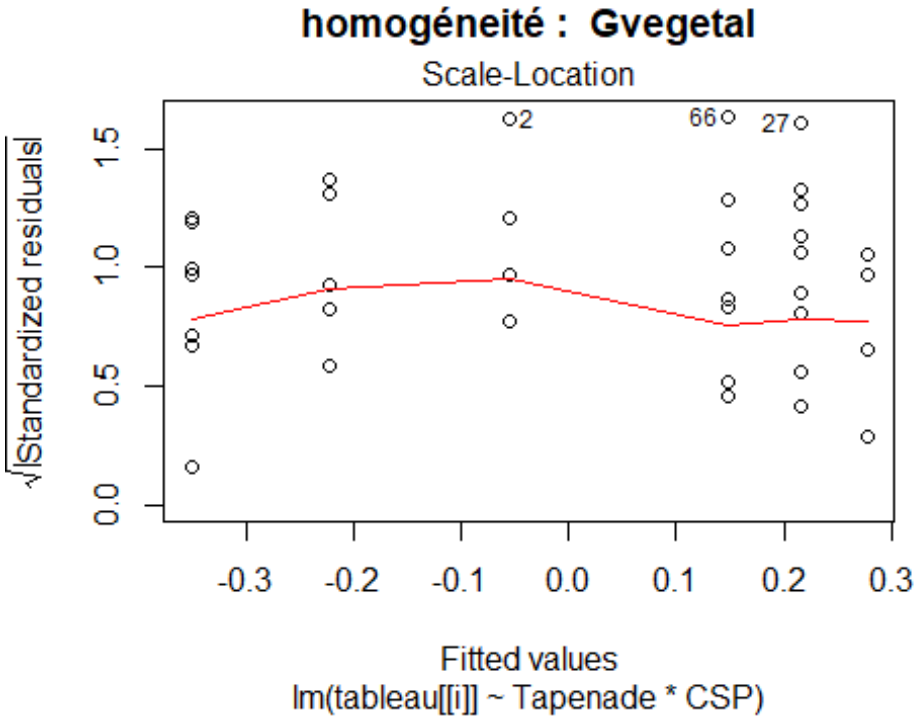
```
## Tapenade:CSP  1.029  2  1.0093 0.3701
## Residuals    33.141 65
## [1] "Test d'indépendance des residus de la variable Gvegetal"
##  lag Autocorrelation D-W Statistic p-value
##    1      0.07646187      1.842678   0.328
##  Alternative hypothesis: rho != 0
```




```
## NULL
## [1] "Test de normalité des residus de la variable Gvegetal"
##
##  Shapiro-Wilk normality test
##
## data:  residuals(mod1)
## W = 0.96512, p-value = 0.04569
```

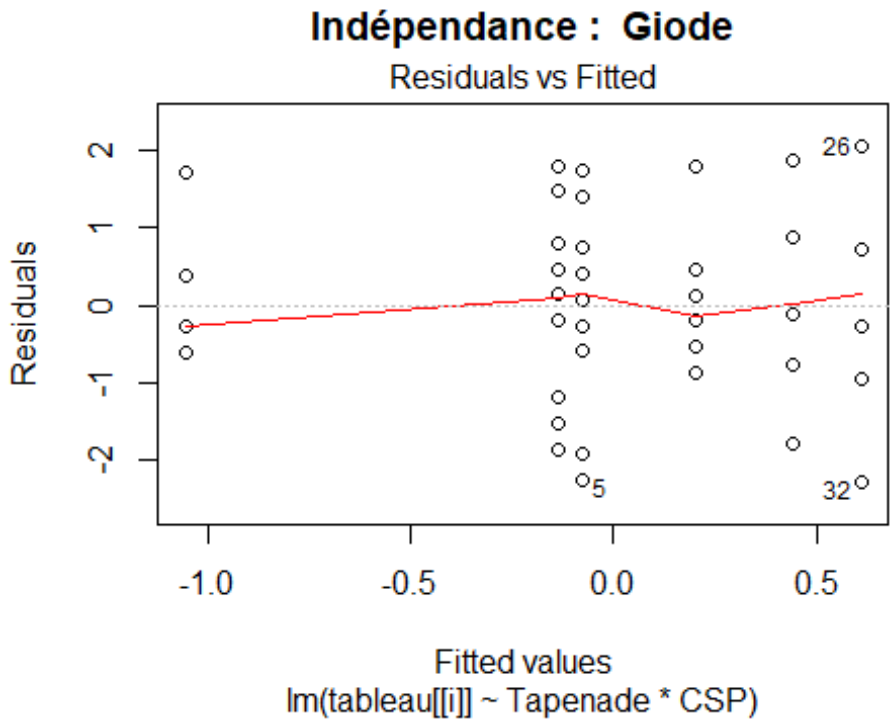



```
## [1] "Test de d'homogéneité des residus de la variable Gvegetal"
```

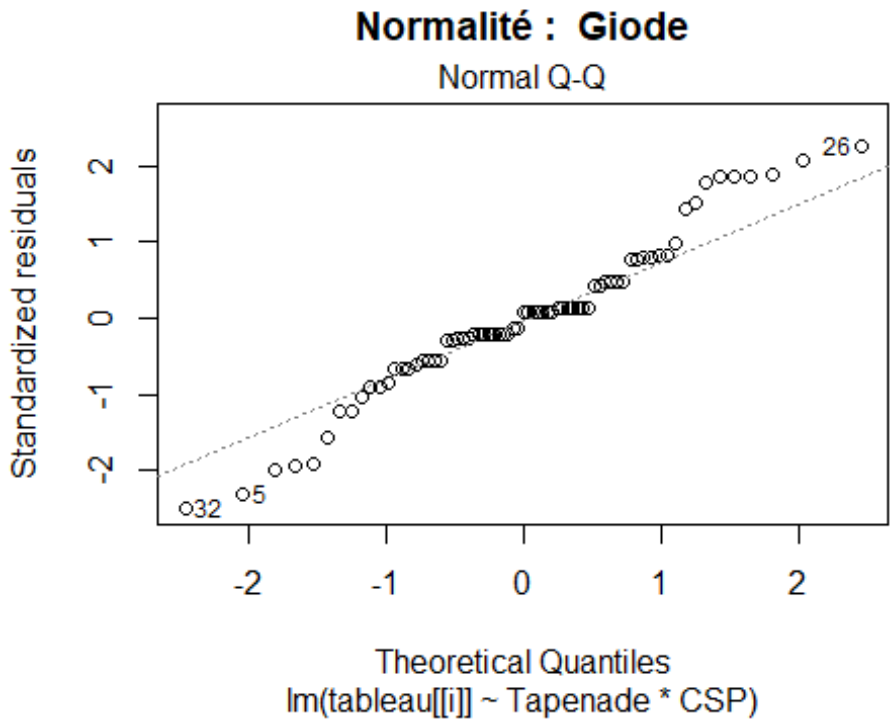



```
## [1] "ANOVA pour la variable Giode"
## Anova Table (Type III tests)
##
## Response: tableau[[i]]
##              Sum Sq Df F value  Pr(>F)
## (Intercept)   0.000  1  0.0001 0.99262
## Tapenade      8.628  2  4.2884 0.01781 *
## CSP           0.000  1  0.0001 0.99262
```

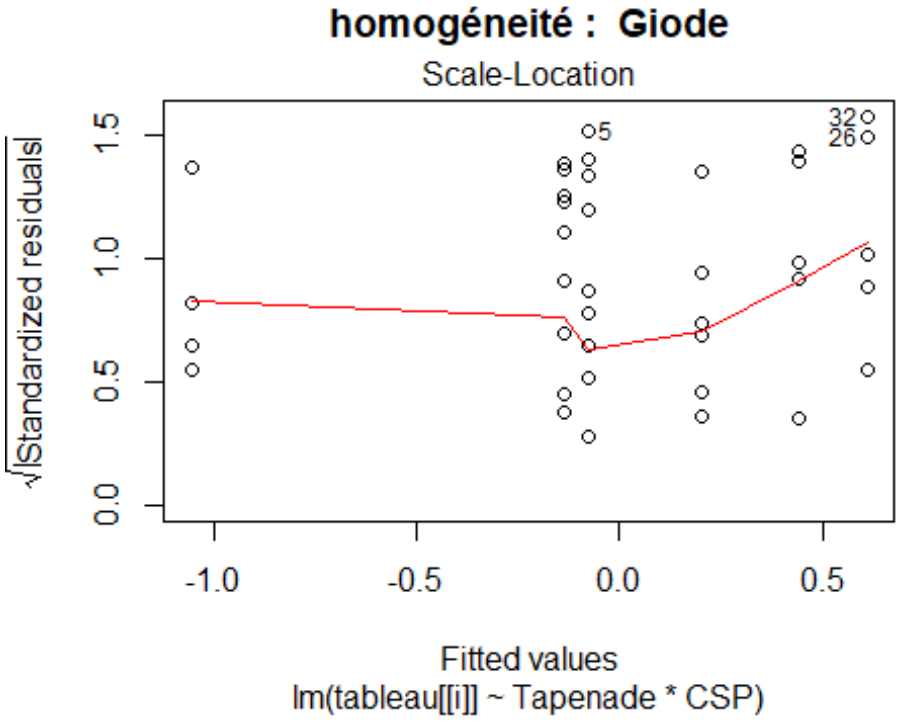
```
## Tapenade:CSP  7.079  2  3.5186 0.03541 *
## Residuals    65.390 65
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## [1] "Test d'indépendance des residus de la variable Giode"
##  lag Autocorrelation D-W Statistic p-value
##    1      -0.1352088      2.269699   0.404
##  Alternative hypothesis: rho != 0
```




```
## NULL
## [1] "Test de normalité des residus de la variable Giode"
##
##  Shapiro-Wilk normality test
##
## data:  residuals(mod1)
## W = 0.9614, p-value = 0.02817
```

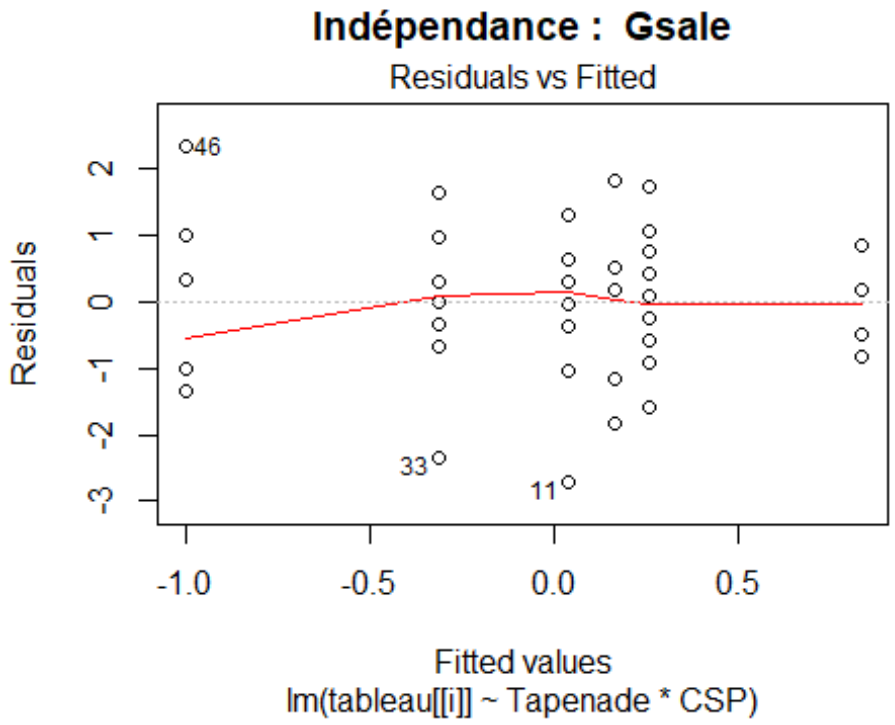



```
## [1] "Test de d'homogéneité des residus de la variable Giode"
```

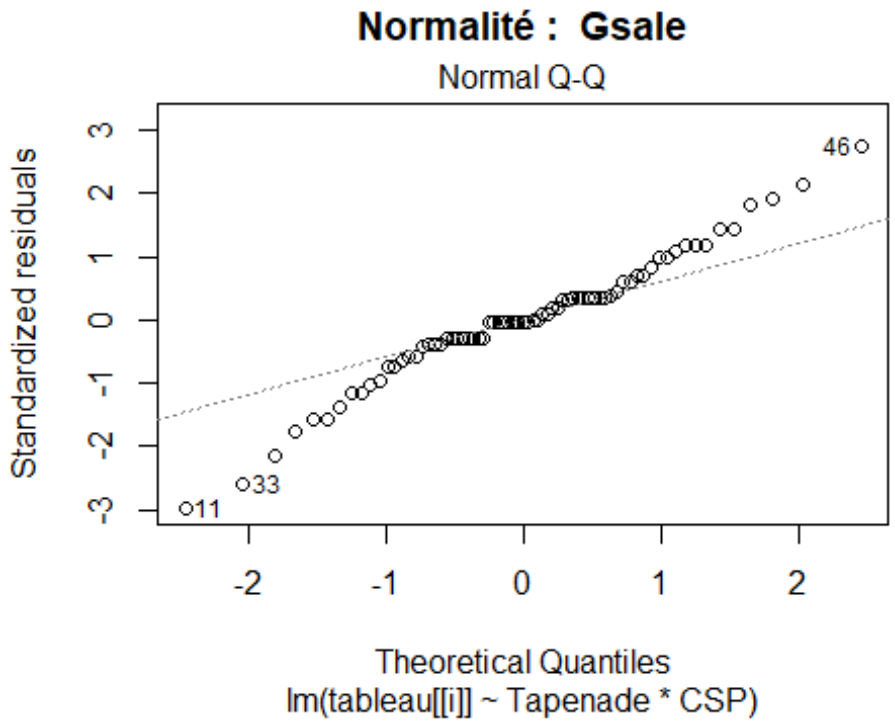



```
## [1] "ANOVA pour la variable Gsale"
## Anova Table (Type III tests)
##
## Response: tableau[[i]]
##              Sum Sq Df F value   Pr(>F)
## (Intercept)   0.000  1  0.0005 0.981889
## Tapenade     13.213  2  7.5655 0.001112 **
## CSP           0.000  1  0.0005 0.981889
```

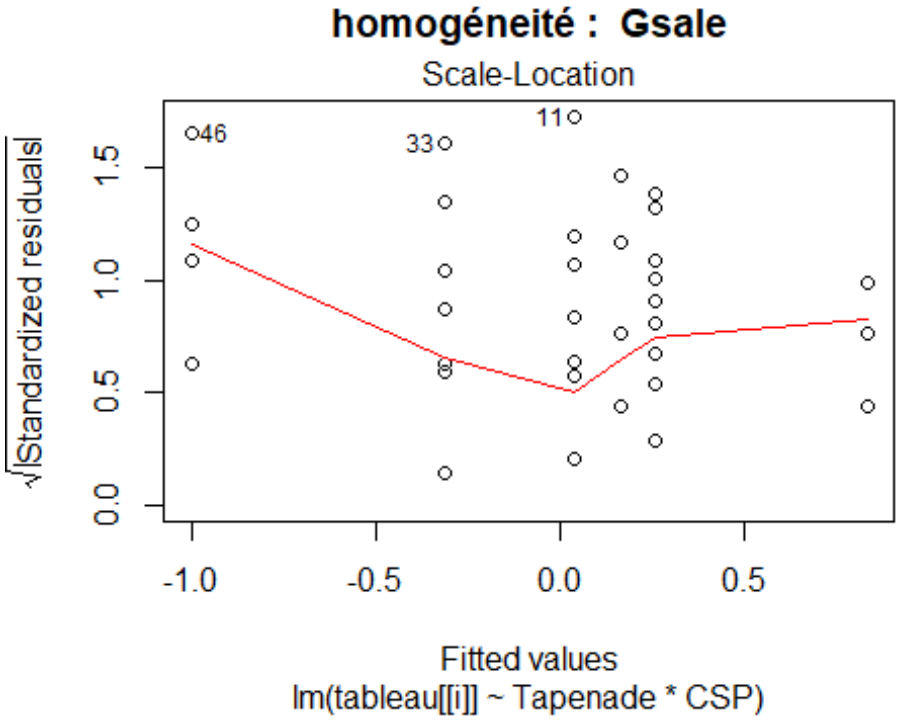
```
## Tapenade:CSP  3.646  2  2.0878 0.132196
## Residuals    56.759 65
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## [1] "Test d'indépendance des residus de la variable Gsale"
##  lag Autocorrelation D-W Statistic p-value
##    1      0.07814604        1.8425   0.314
##  Alternative hypothesis: rho != 0
```




```
## NULL
## [1] "Test de normalité des residus de la variable Gsale"
##
##  Shapiro-Wilk normality test
##
## data:  residuals(mod1)
## W = 0.97134, p-value = 0.1038
```

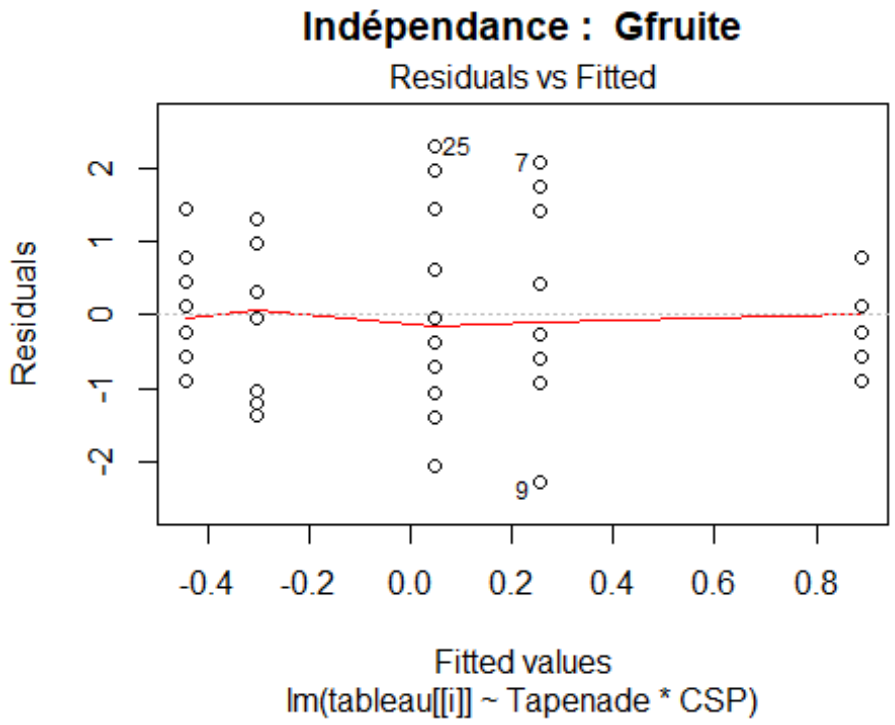



```
## [1] "Test de d'homogéneité des residus de la variable Gsale"
```

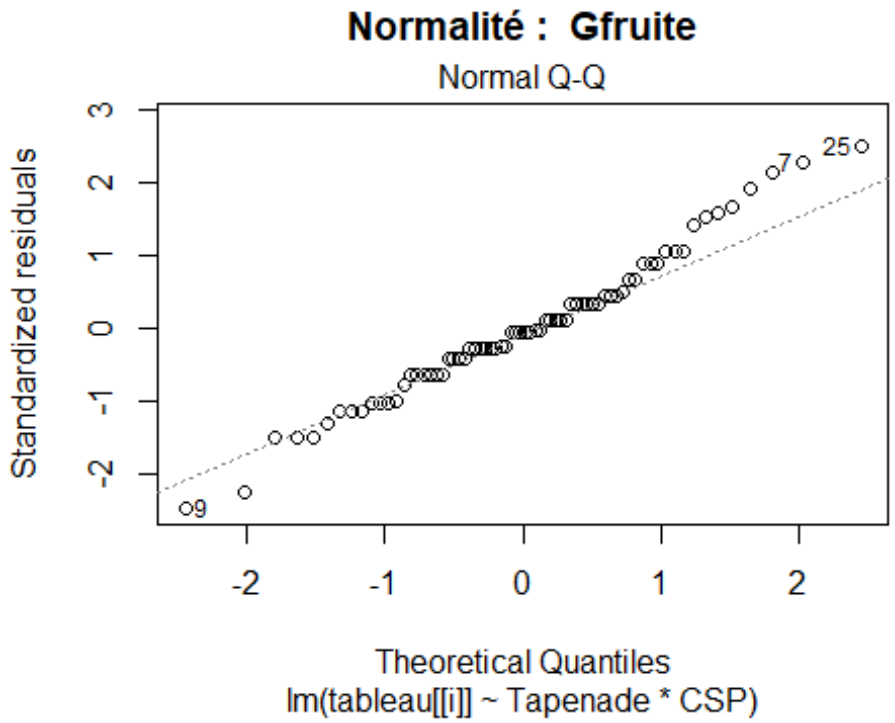



```
## [1] "ANOVA pour la variable Gfruite"
## Anova Table (Type III tests)
##
## Response: tableau[[i]]
##              Sum Sq Df F value   Pr(>F)
## (Intercept)   0.000  1  0.0000 0.997213
## Tapenade      2.390  2  1.3338 0.270698
## CSP           0.000  1  0.0000 0.997213
```

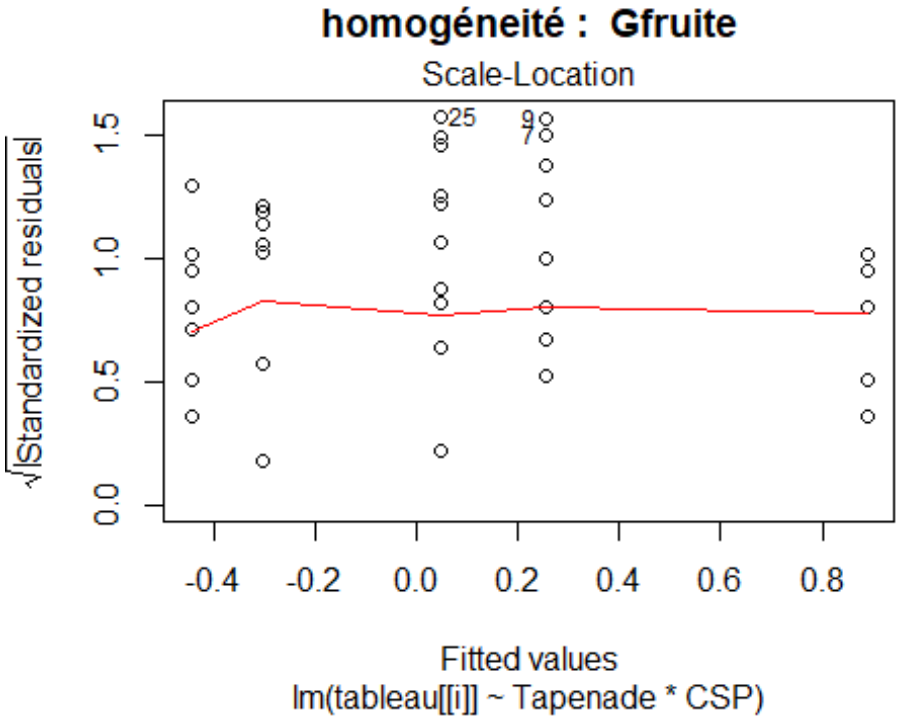
```
## Tapenade:CSP  9.562  2  5.3364 0.007187 **
## Residuals    57.342 64
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## [1] "Test d'indépendance des residus de la variable Gfruite"
##  lag Autocorrelation D-W Statistic p-value
##    1     0.007492928      1.968592   0.688
##  Alternative hypothesis: rho != 0
```




```
## NULL
## [1] "Test de normalité des residus de la variable Gfruite"
##
##  Shapiro-Wilk normality test
##
## data:  residuals(mod1)
## W = 0.98271, p-value = 0.446
```

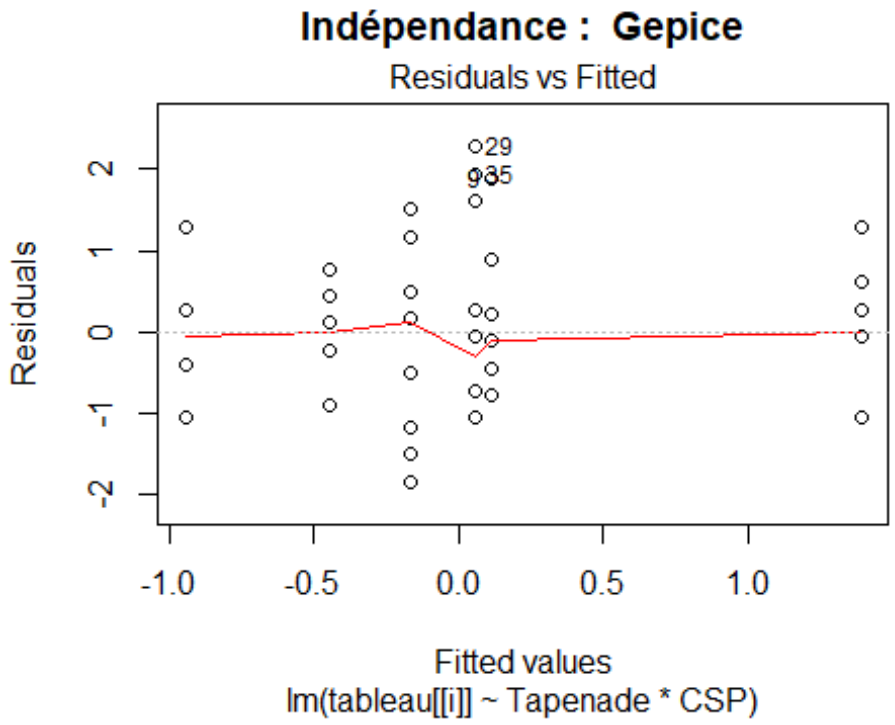



```
## [1] "Test de d'homogéneité des residus de la variable Gfruite"
```

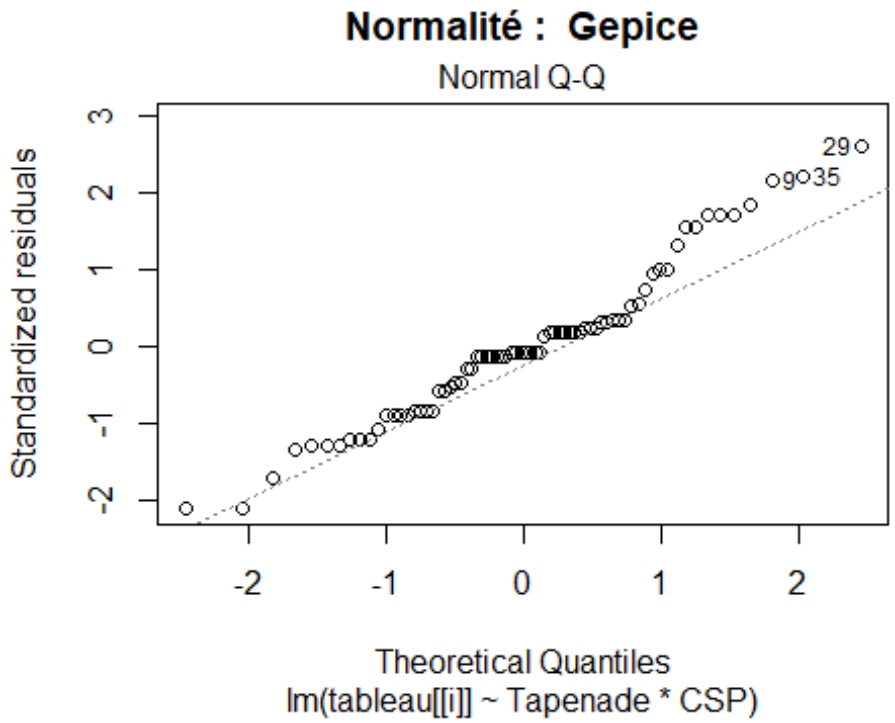



```
## [1] "ANOVA pour la variable Gepice"
## Anova Table (Type III tests)
##
## Response: tableau[[i]]
##              Sum Sq Df F value    Pr(>F)
## (Intercept)   0.000  1  0.0000 1.0000000
## Tapenade     10.778  2  6.6136 0.0024104 **
## CSP           0.000  1  0.0000 1.0000000
```

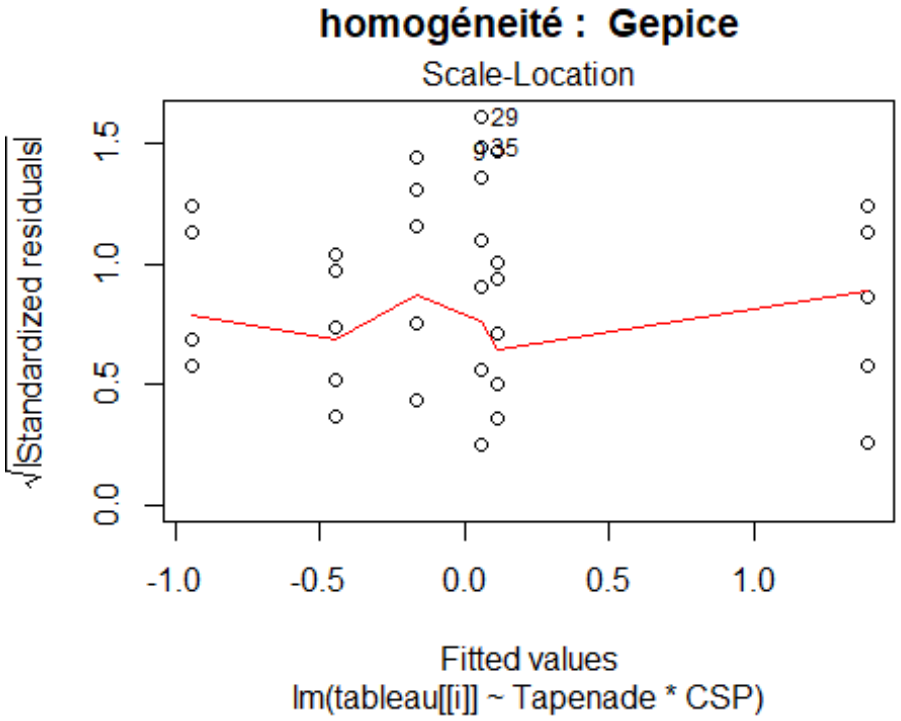
```
## Tapenade:CSP 16.778  2 10.2955 0.0001283 ***
## Residuals    53.778 66
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## [1] "Test d'indépendance des residus de la variable Gepice"
##  lag Autocorrelation D-W Statistic p-value
##    1      0.03380395      1.931646    0.52
##  Alternative hypothesis: rho != 0
```




```
## NULL
## [1] "Test de normalité des residus de la variable Gepice"
##
##  Shapiro-Wilk normality test
##
## data:  residuals(mod1)
## W = 0.96457, p-value = 0.04023
```

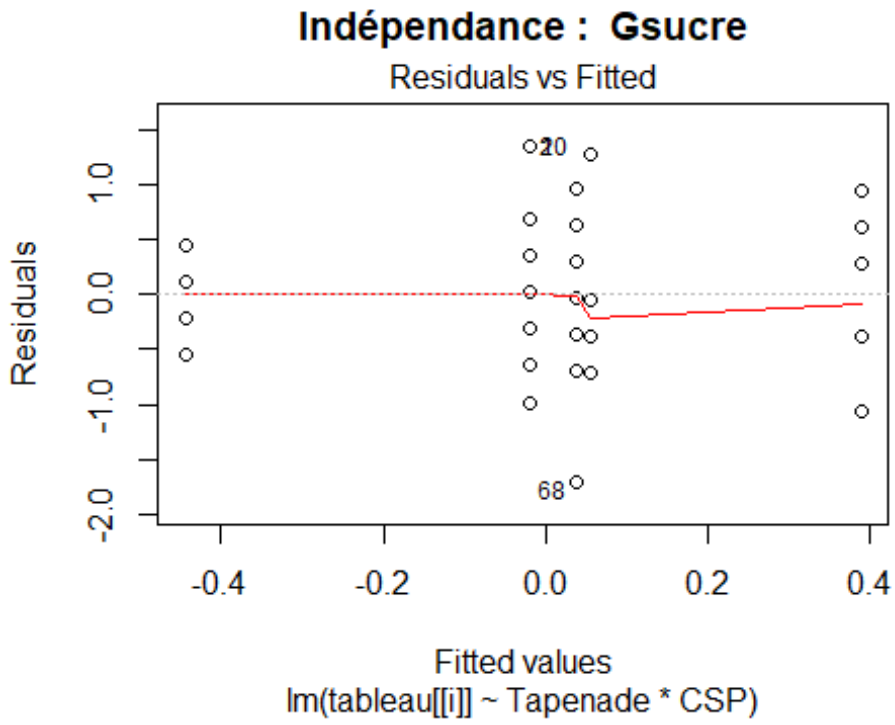



```
## [1] "Test de d'homogéneité des residus de la variable Gepice"
```

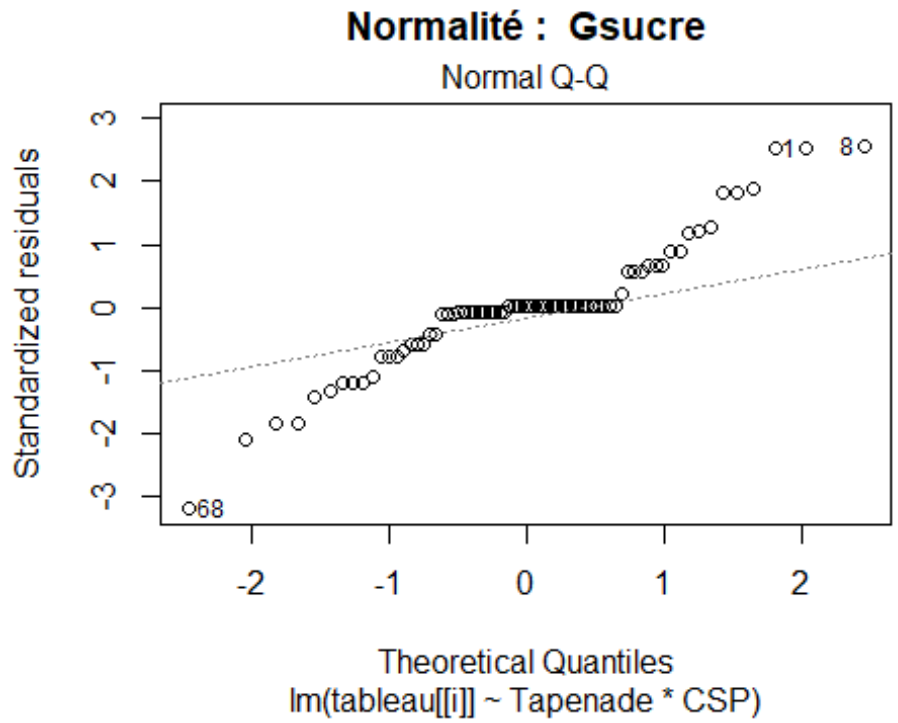



```
## [1] "ANOVA pour la variable Gsucre"
## Anova Table (Type III tests)
##
## Response: tableau[[i]]
##               Sum Sq Df F value  Pr(>F)
## (Intercept)   0.0000  1  0.0000 1.00000
## Tapenade      1.7870  2  2.9706 0.05817 .
## CSP           0.0000  1  0.0000 1.00000
```

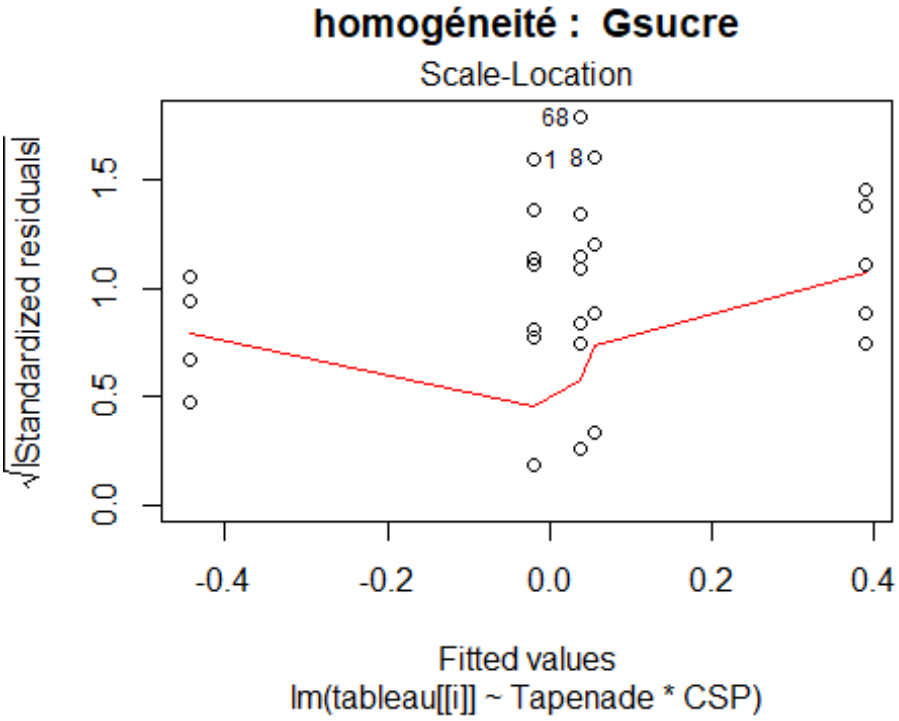
```
## Tapenade:CSP  1.3981  2  2.3242 0.10583
## Residuals    19.8519 66
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## [1] "Test d'indépendance des residus de la variable Gsucre"
##  lag Autocorrelation D-W Statistic p-value
##    1      -0.2729236      2.453721   0.102
##  Alternative hypothesis: rho != 0
```




```
## NULL
## [1] "Test de normalité des residus de la variable Gsucre"
##
##  Shapiro-Wilk normality test
##
## data:  residuals(mod1)
## W = 0.91465, p-value = 0.0001245
```

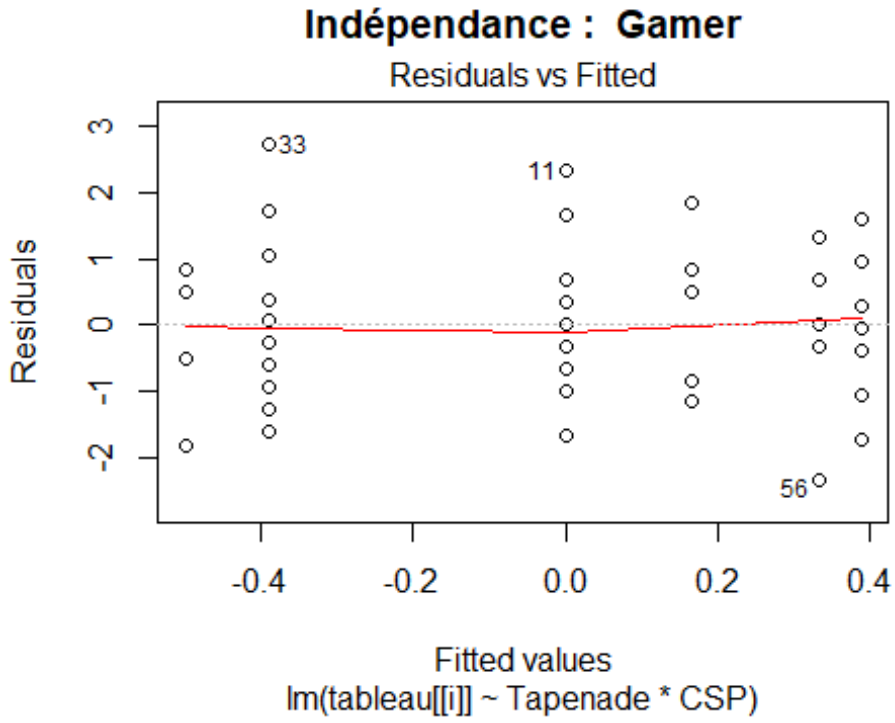



```
## [1] "Test de d'homogéneité des residus de la variable Gsucre"
```

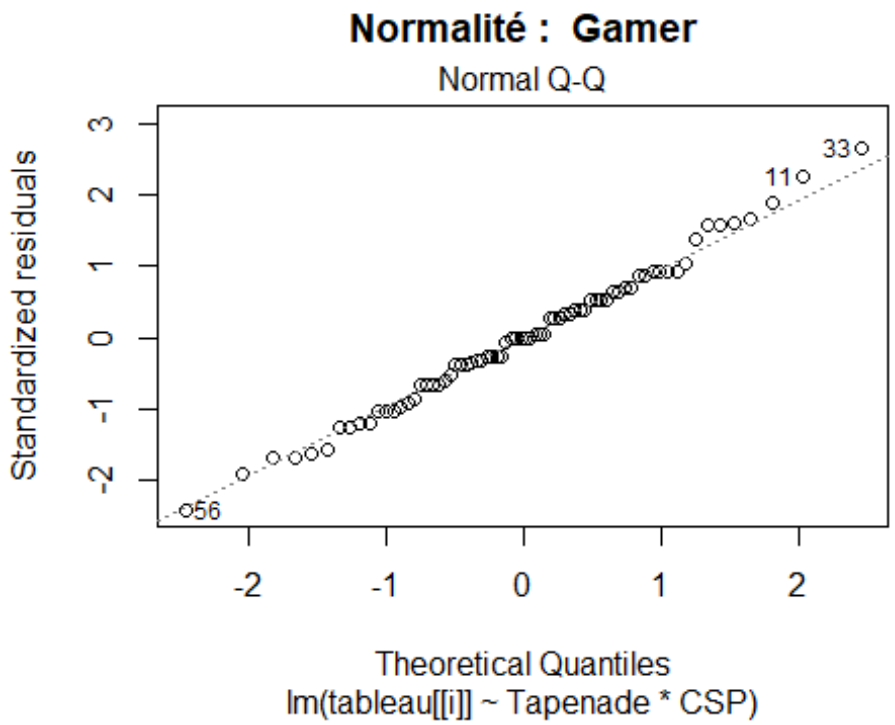



```
## [1] "ANOVA pour la variable Gamer"
## Anova Table (Type III tests)
##
## Response: tableau[[i]]
##              Sum Sq Df F value Pr(>F)
## (Intercept)   0.000  1  0.0000 1.0000
## Tapenade      3.694  2  1.6426 0.2013
## CSP           0.000  1  0.0000 1.0000
```

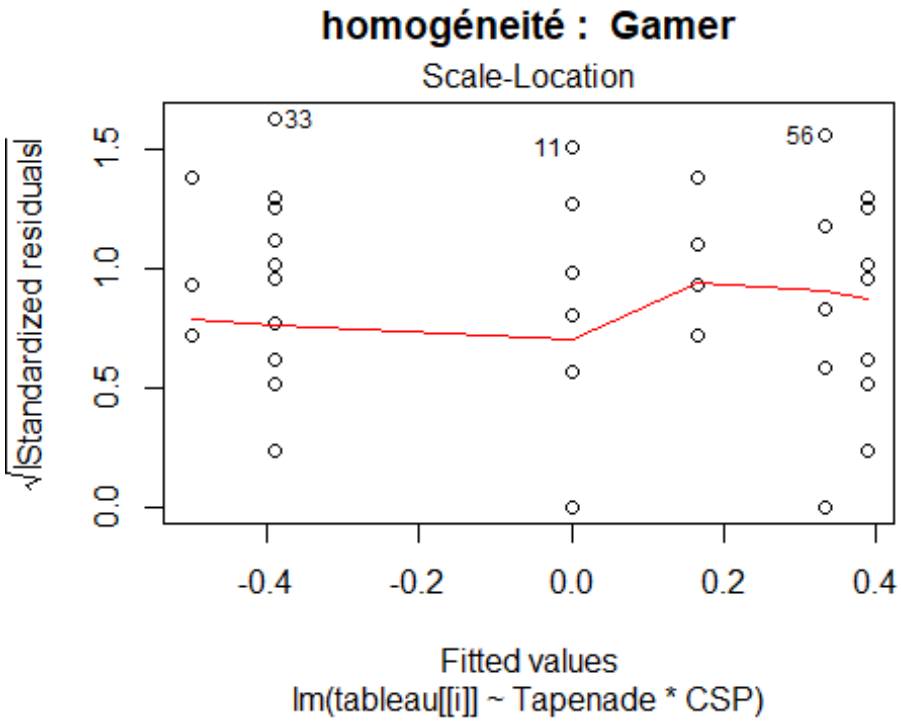
```
## Tapenade:CSP  2.528  2  1.1239 0.3312
## Residuals    74.222 66
## [1] "Test d'indépendance des residus de la variable Gamer"
##  lag Autocorrelation D-W Statistic p-value
##    1       0.1402611       1.71744   0.152
##  Alternative hypothesis: rho != 0
```




```
## NULL
## [1] "Test de normalité des residus de la variable Gamer"
##
##  Shapiro-Wilk normality test
##
## data:  residuals(mod1)
## W = 0.99092, p-value = 0.8881
```

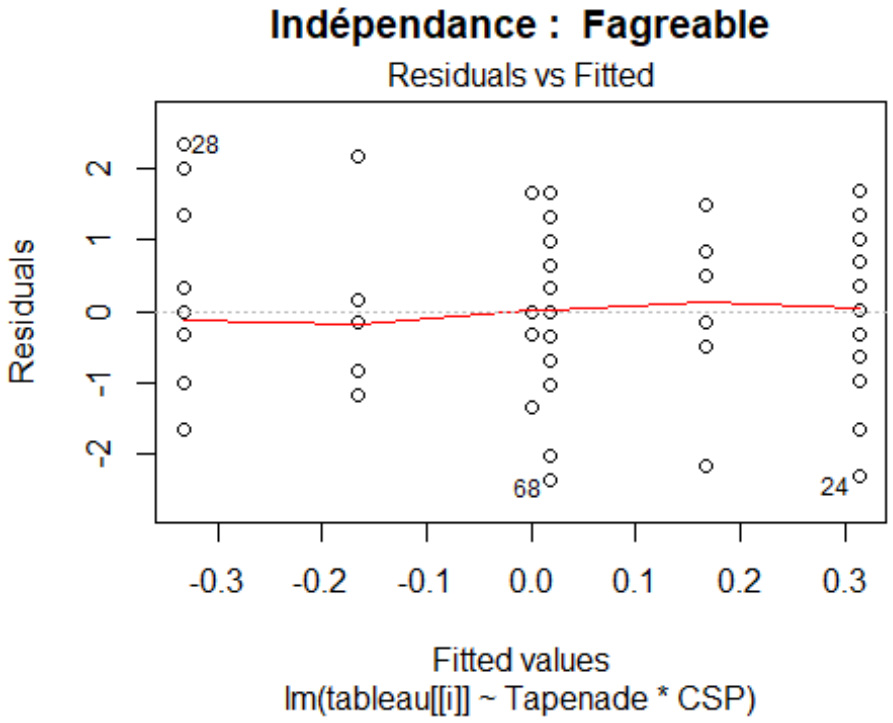



```
## [1] "Test de d'homogéneité des residus de la variable Gamer"
```

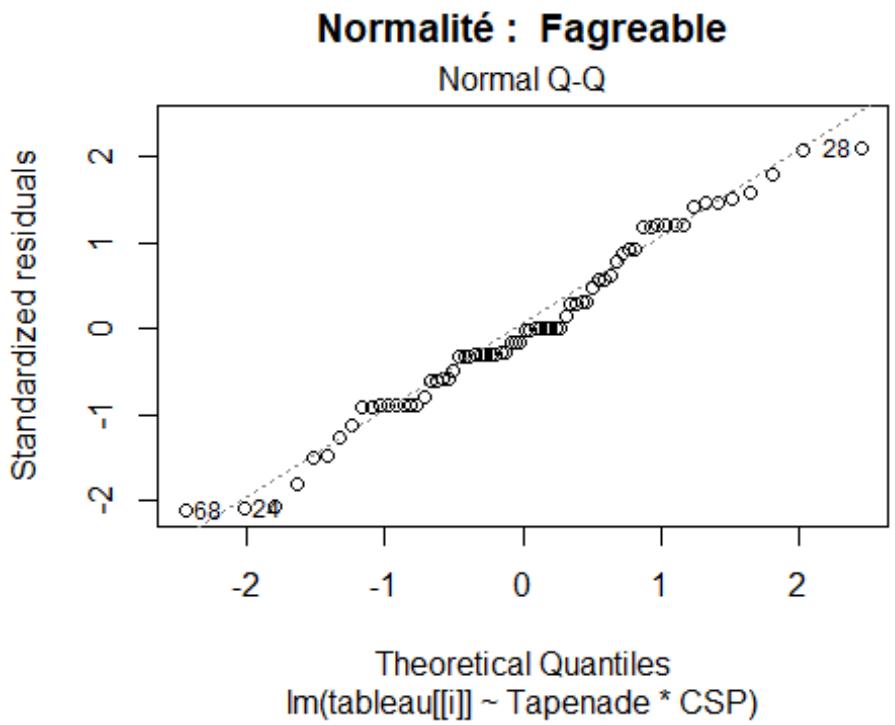



```
## [1] "ANOVA pour la variable Fagreable"
## Anova Table (Type III tests)
##
## Response: tableau[[i]]
##              Sum Sq Df F value Pr(>F)
## (Intercept)   0.000  1  0.0000 0.9991
## Tapenade      1.700  2  0.6467 0.5272
## CSP           0.000  1  0.0000 0.9991
```

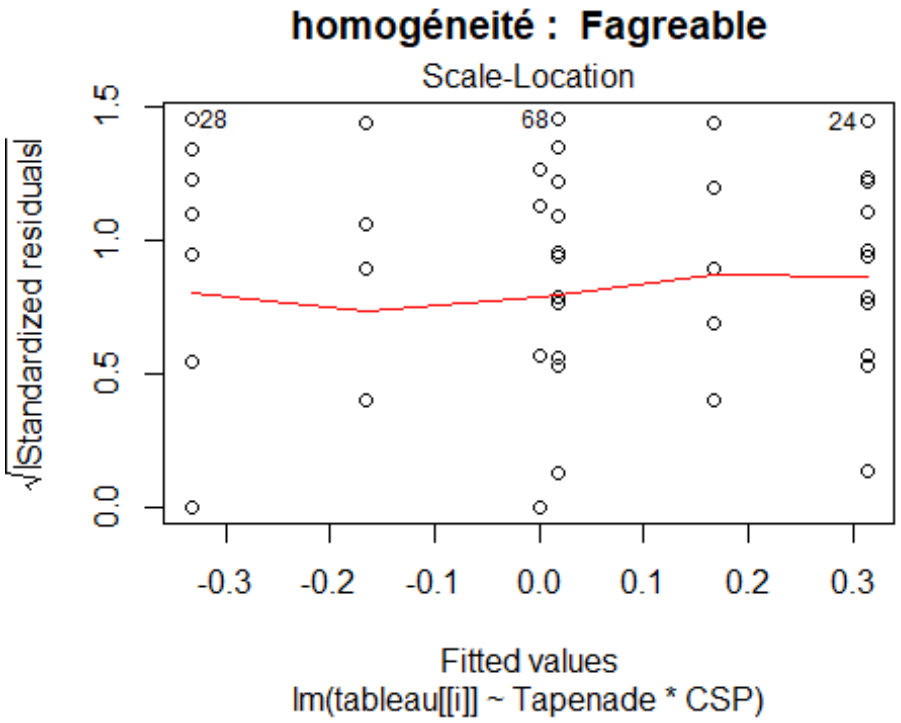
```
## Tapenade:CSP  0.658  2  0.2505 0.7791
## Residuals    84.098 64
## [1] "Test d'indépendance des residus de la variable Fagreable"
##  lag Autocorrelation D-W Statistic p-value
##    1      -0.1574951      2.270506   0.386
##  Alternative hypothesis: rho != 0
```




```
## NULL
## [1] "Test de normalité des residus de la variable Fagreable"
##
##  Shapiro-Wilk normality test
##
## data:  residuals(mod1)
## W = 0.97766, p-value = 0.2444
```

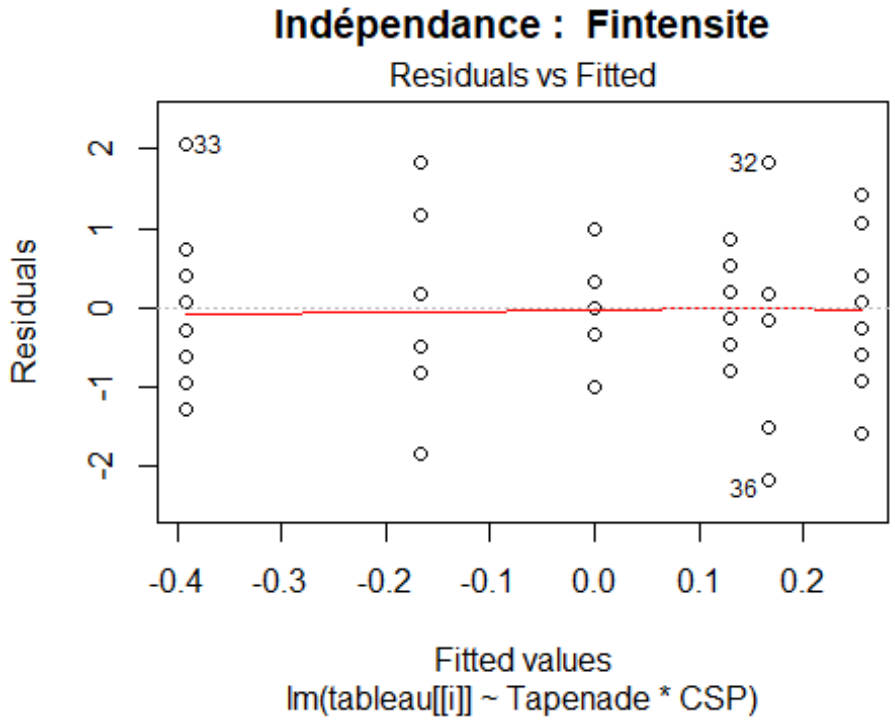



```
## [1] "Test de d'homogéneité des residus de la variable Fagreable"
```

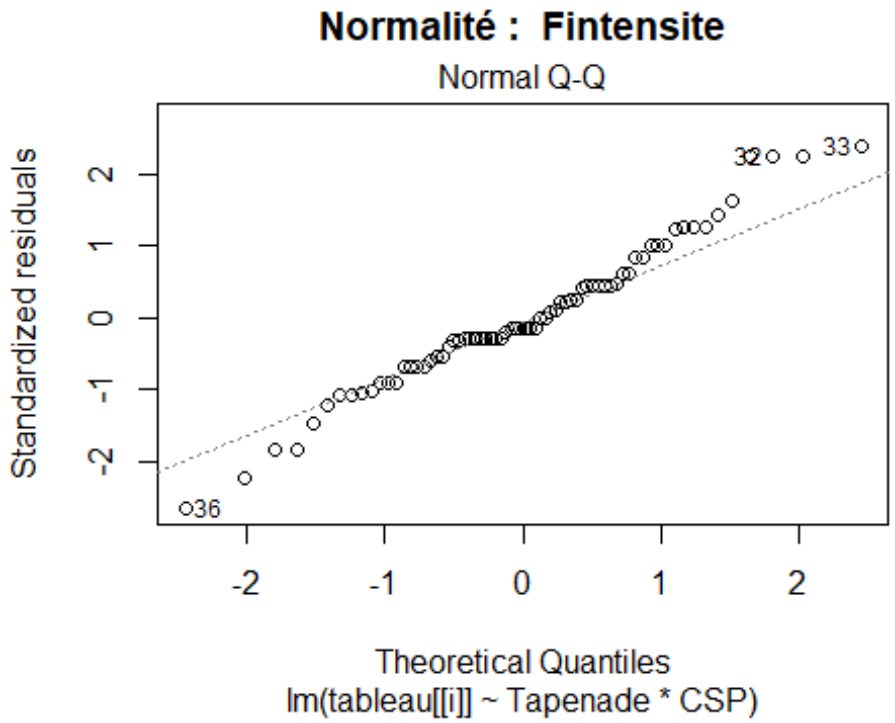



```
## [1] "ANOVA pour la variable Fintensite"
## Anova Table (Type III tests)
##
## Response: tableau[[i]]
##              Sum Sq Df F value Pr(>F)
## (Intercept)   0.000  1  0.0001 0.9917
## Tapenade      0.520  2  0.3262 0.7228
## CSP           0.000  1  0.0001 0.9917
```

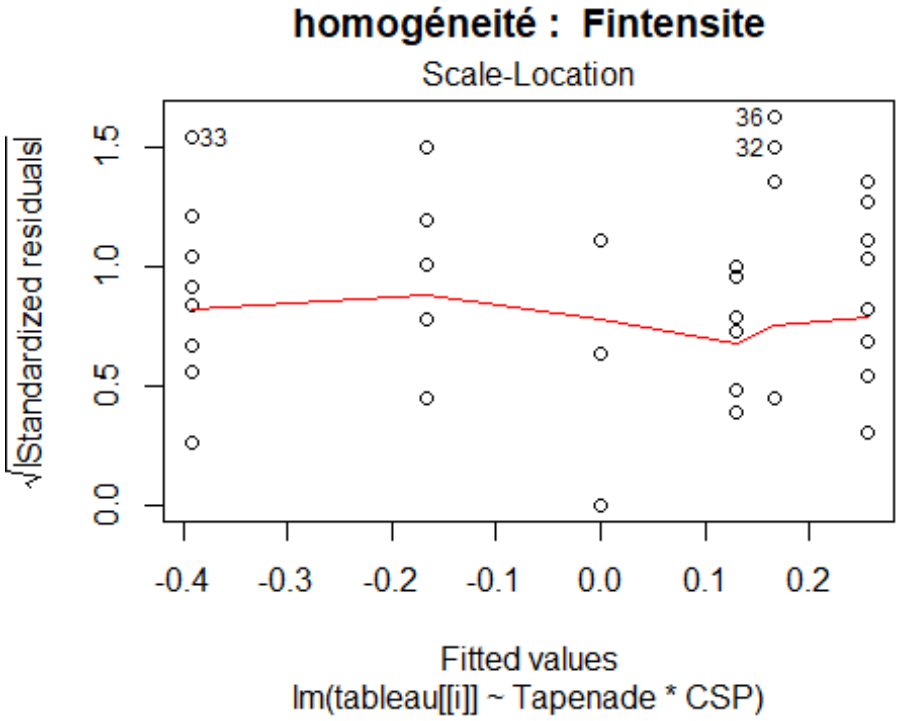
```
## Tapenade:CSP  2.068  2  1.2982 0.2801
## Residuals    50.979 64
## [1] "Test d'indépendance des residus de la variable Fintensite"
##  lag Autocorrelation D-W Statistic p-value
##    1       0.2280831      1.541325   0.016
##  Alternative hypothesis: rho != 0
```




```
## NULL
## [1] "Test de normalité des residus de la variable Fintensite"
##
##  Shapiro-Wilk normality test
##
## data:  residuals(mod1)
## W = 0.9815, p-value = 0.3886
```

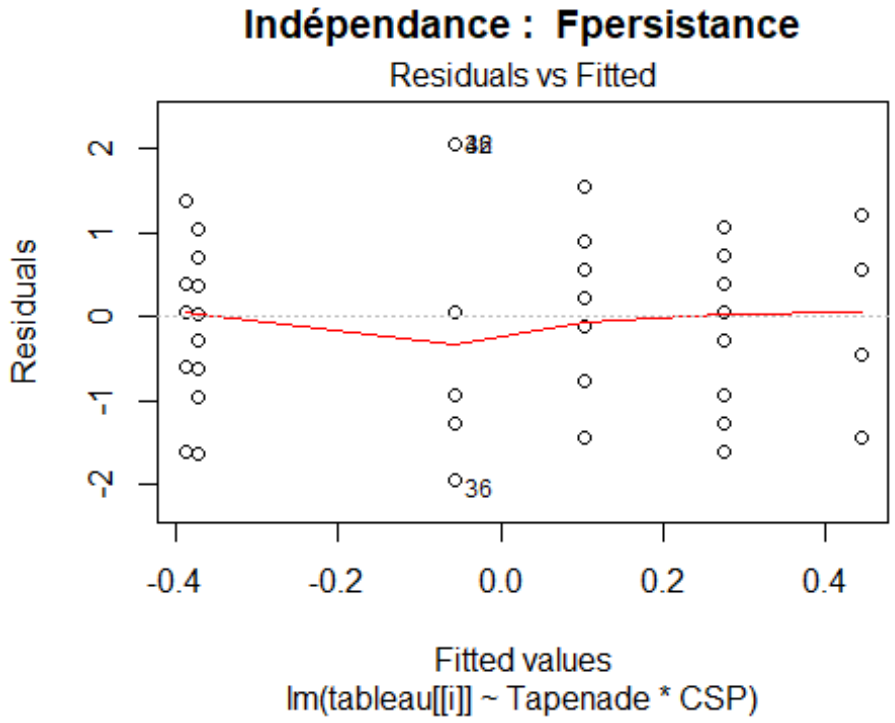



```
## [1] "Test de d'homogéneité des residus de la variable Fintensite"
```

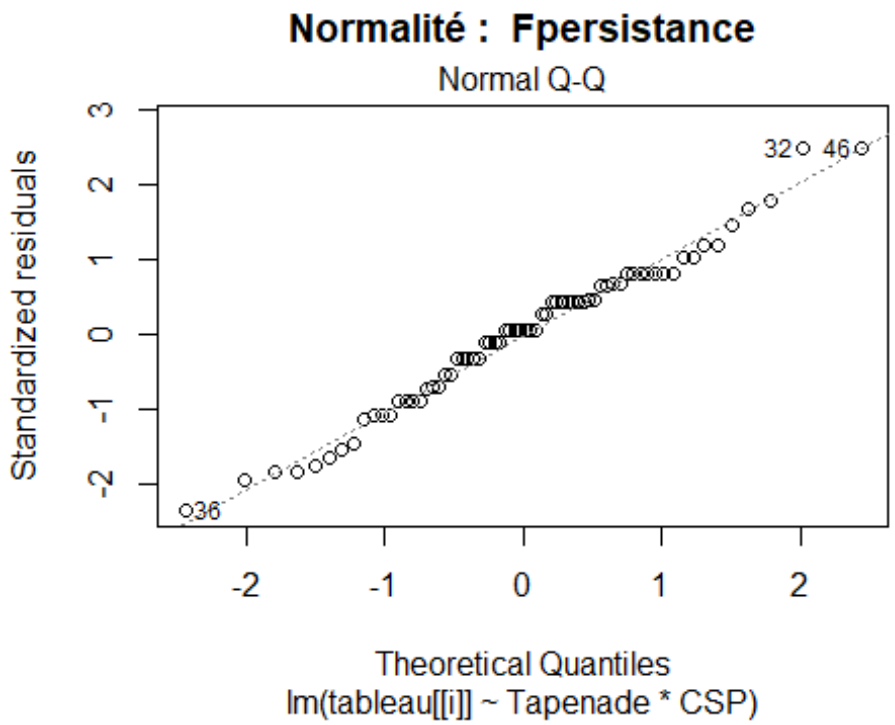



```
## [1] "ANOVA pour la variable Fpersistance"
## Anova Table (Type III tests)
##
## Response: tableau[[i]]
##              Sum Sq Df F value Pr(>F)
## (Intercept)   0.000  1  0.0001 0.9935
## Tapenade      2.184  2  1.3171 0.2753
## CSP           0.000  1  0.0001 0.9935
```

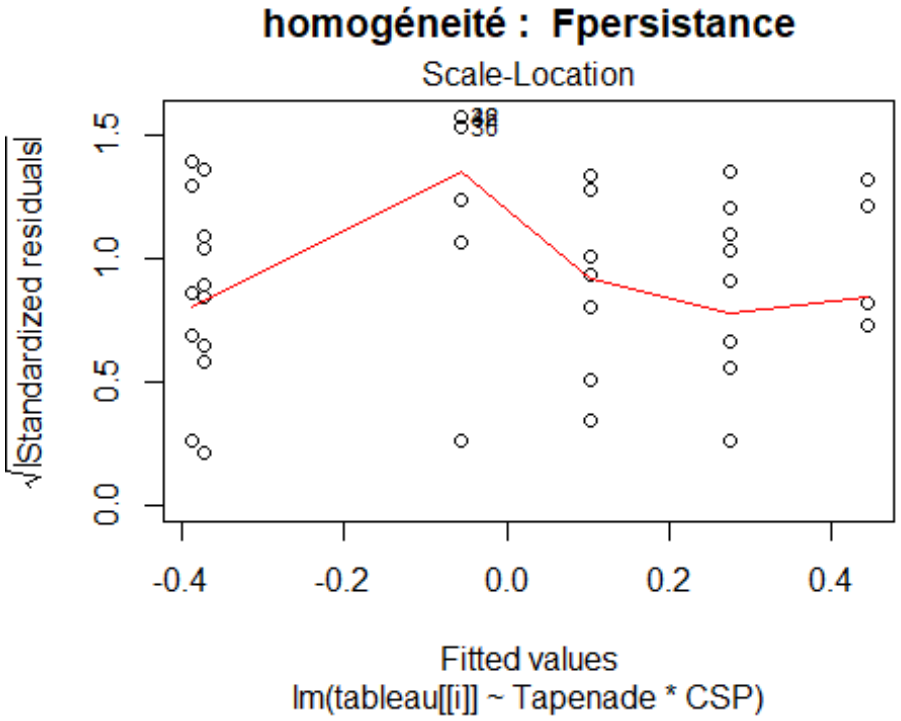
```
## Tapenade:CSP  2.902  2  1.7502 0.1822
## Residuals    51.408 62
## [1] "Test d'indépendance des residus de la variable Fpersistance"
##  lag Autocorrelation D-W Statistic p-value
##    1       0.2398943      1.512742   0.028
##  Alternative hypothesis: rho != 0
```




```
## NULL
## [1] "Test de normalité des residus de la variable Fpersistance"
##
##  Shapiro-Wilk normality test
##
## data:  residuals(mod1)
## W = 0.98251, p-value = 0.4565
```

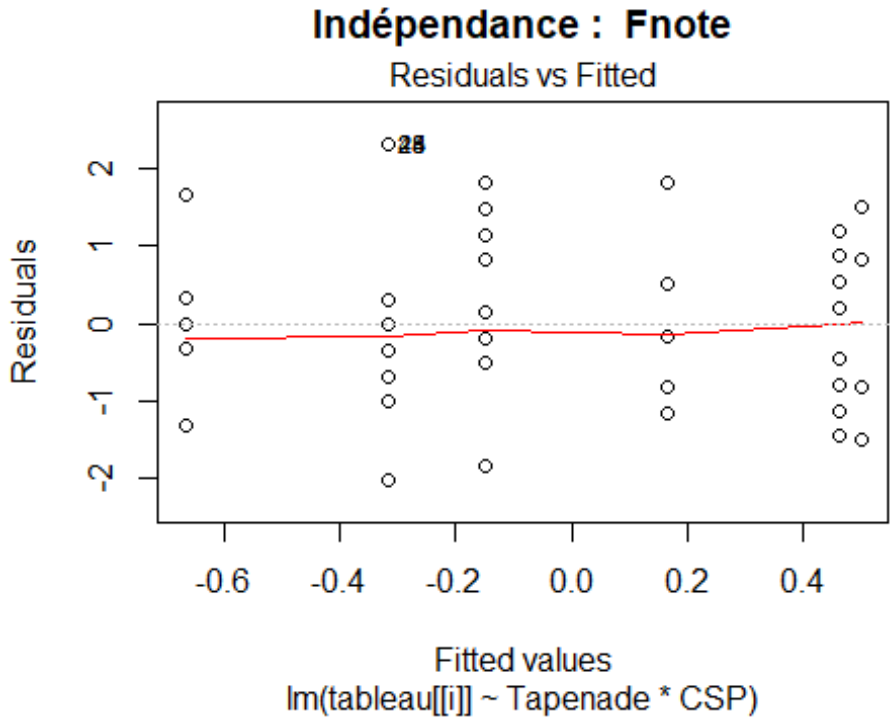



```
## [1] "Test de d'homogéneité des residus de la variable Fpersistance"
```

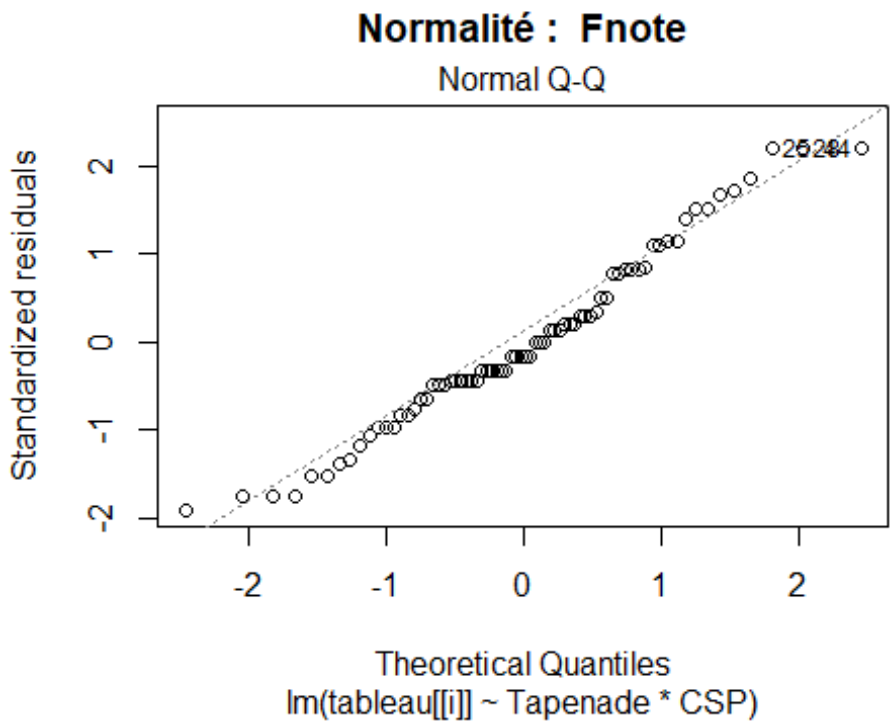



```
## [1] "ANOVA pour la variable Fnote"
## Anova Table (Type III tests)
##
## Response: tableau[[i]]
##              Sum Sq Df F value Pr(>F)
## (Intercept)   0.000  1  0.0000 1.0000
## Tapenade      4.926  2  2.0940 0.1313
## CSP           0.000  1  0.0000 1.0000
```

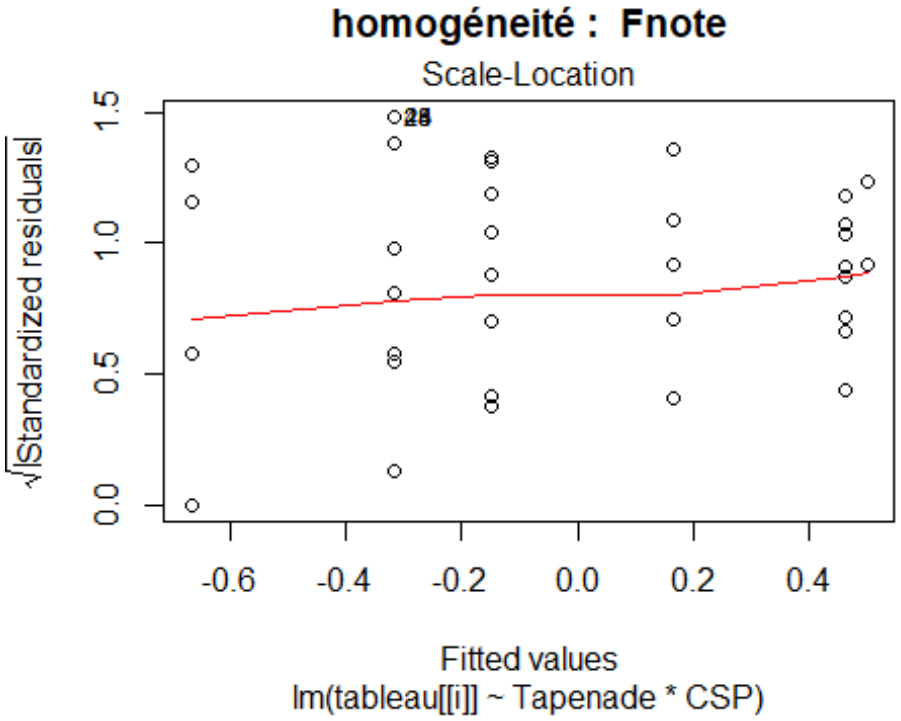
```
## Tapenade:CSP  4.593  2  1.9523 0.1501
## Residuals    77.630 66
## [1] "Test d'indépendance des residus de la variable Fnote"
##  lag Autocorrelation D-W Statistic p-value
##    1      -0.1144817       2.22592   0.504
##  Alternative hypothesis: rho != 0
```




```
## NULL
## [1] "Test de normalité des residus de la variable Fnote"
##
##  Shapiro-Wilk normality test
##
## data:  residuals(mod1)
## W = 0.97518, p-value = 0.1652
```

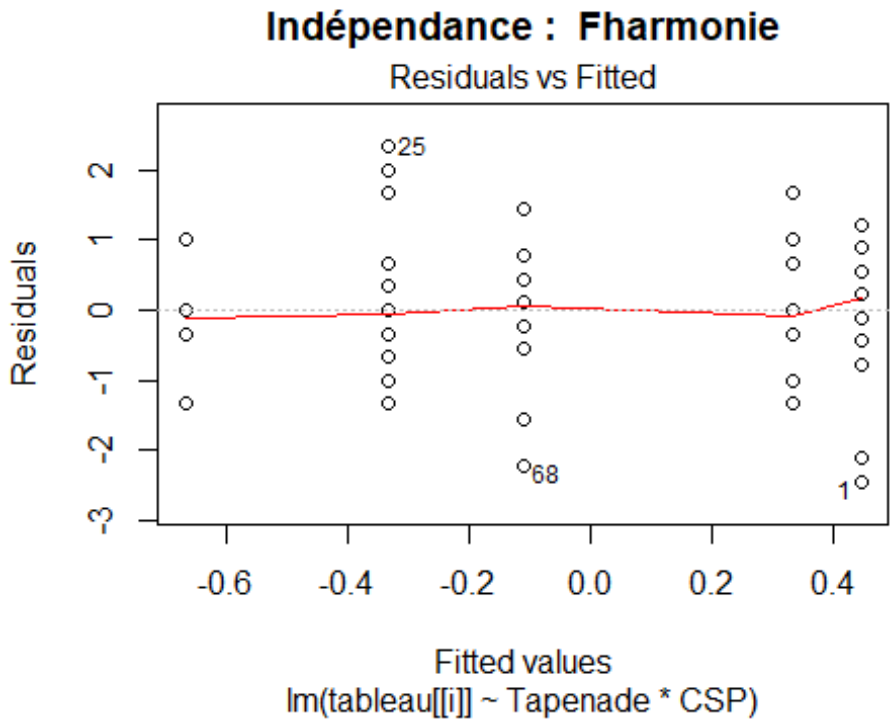



```
## [1] "Test de d'homogéneité des residus de la variable Fnote"
```

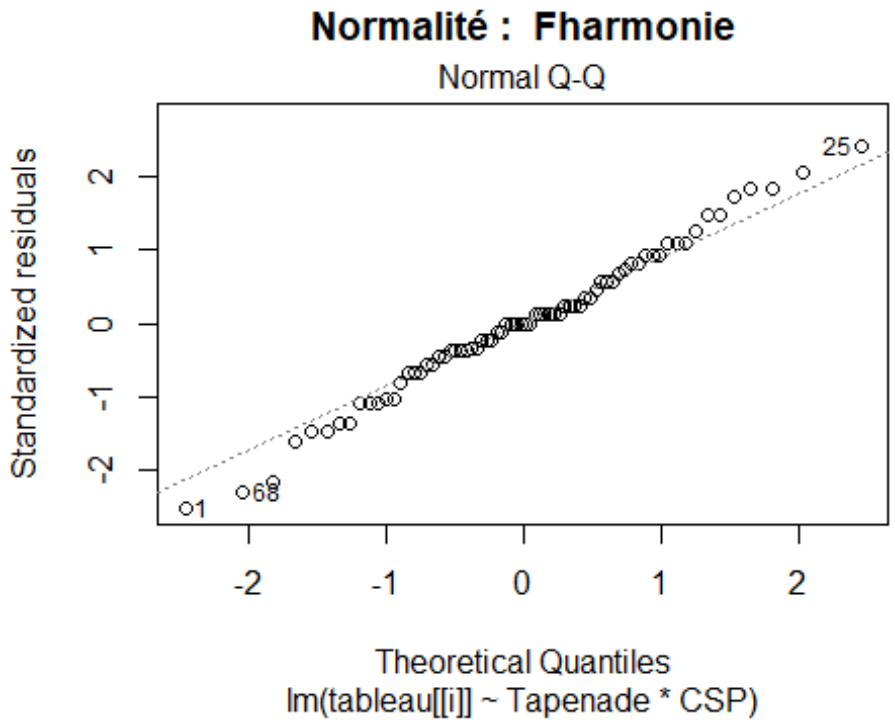



```
## [1] "ANOVA pour la variable Fharmonie"
## Anova Table (Type III tests)
##
## Response: tableau[[i]]
##              Sum Sq Df F value  Pr(>F)
## (Intercept)   0.000  1  0.0000 1.00000
## Tapenade      5.444  2  2.7131 0.07373 .
## CSP           0.000  1  0.0000 1.00000
```

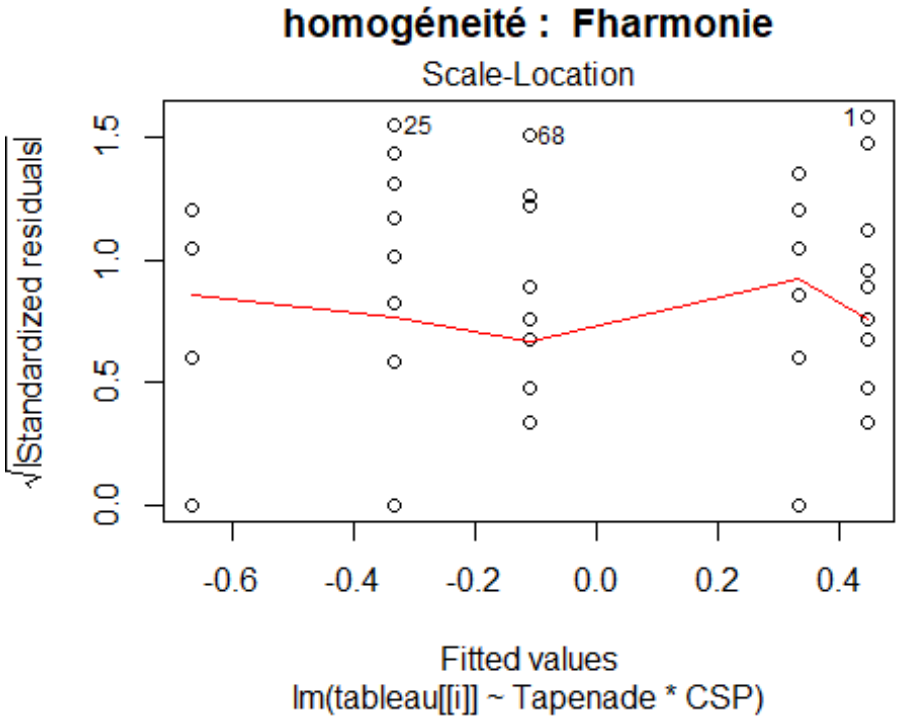
```
## Tapenade:CSP  3.444  2  1.7164 0.18763
## Residuals    66.222 66
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## [1] "Test d'indépendance des residus de la variable Fharmonie"
##  lag Autocorrelation D-W Statistic p-value
##    1      -0.1181954      2.145973    0.74
##  Alternative hypothesis: rho != 0
```




```
## NULL
## [1] "Test de normalité des residus de la variable Fharmonie"
##
##  Shapiro-Wilk normality test
##
## data:  residuals(mod1)
## W = 0.98847, p-value = 0.7573
```

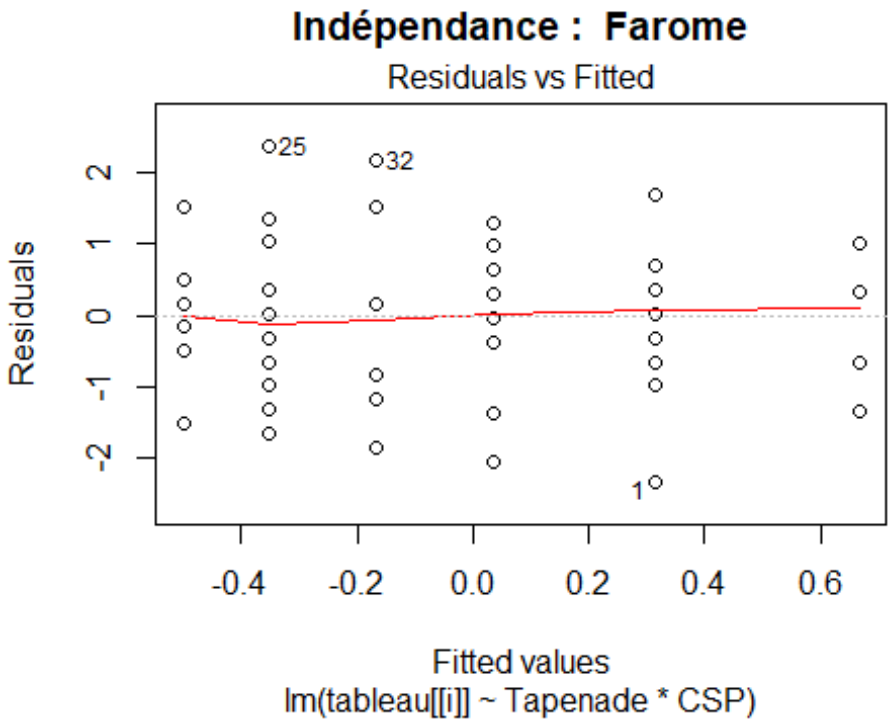



```
## [1] "Test de d'homogéneité des residus de la variable Fharmonie"
```

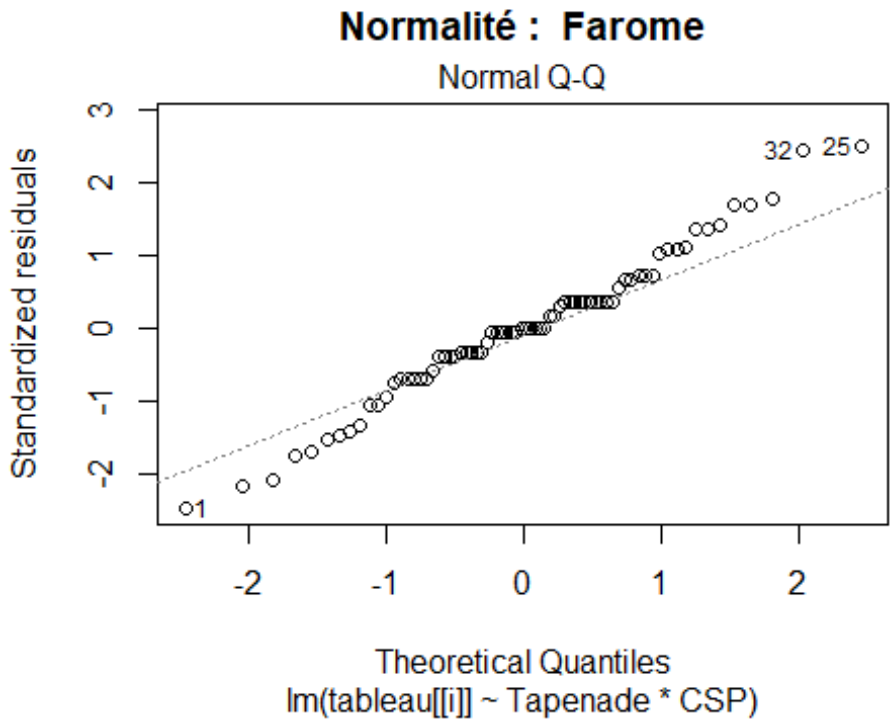



```
## [1] "ANOVA pour la variable Farome"
## Anova Table (Type III tests)
##
## Response: tableau[[i]]
##              Sum Sq Df F value  Pr(>F)
## (Intercept)   0.000  1  0.0000 1.00000
## Tapenade      6.509  2  3.4854 0.03639 *
## CSP           0.000  1  0.0000 1.00000
```

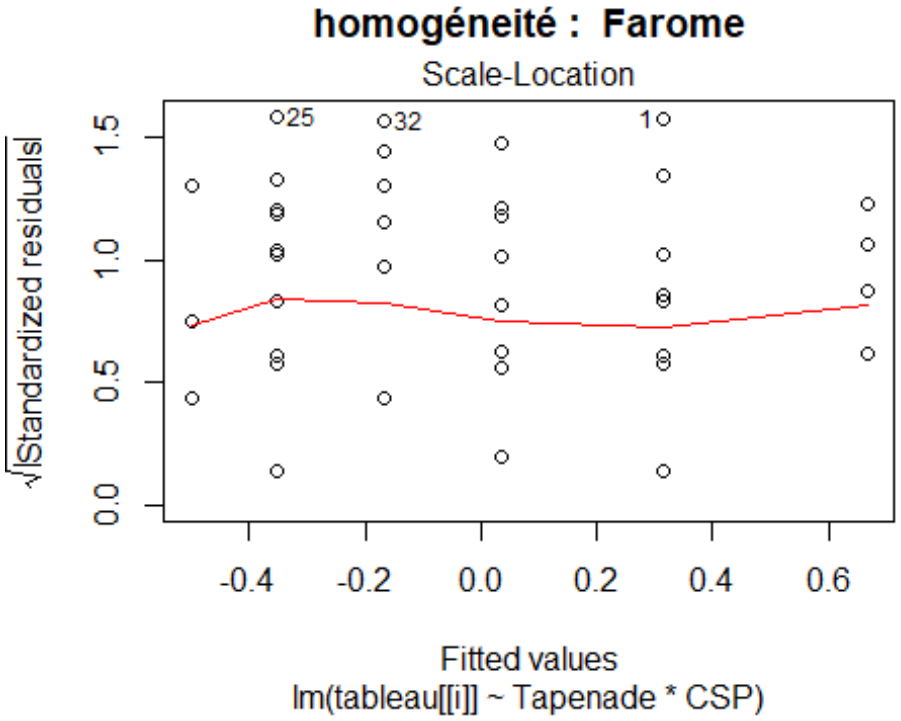
```
## Tapenade:CSP  2.009  2  1.0759 0.34690
## Residuals    61.630 66
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
## [1] "Test d'indépendance des residus de la variable Farome"
##  lag Autocorrelation D-W Statistic p-value
##    1     -0.08931513      2.091663    0.91
##  Alternative hypothesis: rho != 0
```




```
## NULL
## [1] "Test de normalité des residus de la variable Farome"
##
##  Shapiro-Wilk normality test
##
## data:  residuals(mod1)
## W = 0.98637, p-value = 0.6304
```




```
## "Test de d'homogéneité des residus de la variable Farome"
```




```
  # verif_homo <- leveneTest(residuals(mod1)~tableau$grp)# permet de vérifier l'homogén
eité

# Conclusion générale sur l'ANOVA2 : le facteur CSP n'a pas d'effet sur les notes des t
apenades.
```