In [1]:
```
from matplotlib import pyplot as plt
import numpy as np
import pandas as pd
```

In [2]:
```
df = pd.read_csv('nutrientcomposition_new.csv')
```

In [3]:
```
df.head()
```

Out[3]:

	S.No	Protein	Fat	vitaminC	Fibre	Product
0	1	0.452369	1.170926	1.079271	1.702960	Amaranth leaves, cooked, boiled, drained, with...
1	2	2.321087	0.706856	0.350088	0.658249	Bacon and beef sticks
2	3	0.884554	1.186571	2.428544	1.984562	Apples, frozen, unsweetened, unheated (Include...
3	4	0.715501	0.577599	0.270925	0.369266	Alcoholic beverage, beer, light, BUD LIGHT
4	5	0.132610	0.544521	0.116884	0.557309	Alcoholic beverage, daiquiri, canned

In [4]:
```
df.iloc[:,1:5].describe()
```

Out[4]:

	Protein	Fat	vitaminC	Fibre
count	1746.000000	1746.000000	1746.000000	1746.000000
mean	0.922470	0.900091	0.900146	0.900830
std	0.627128	0.634617	0.623847	0.626875
min	0.000128	0.000267	0.000029	0.002579
25%	0.435853	0.394784	0.419103	0.389124
50%	0.813025	0.804687	0.796290	0.820783
75%	1.295106	1.298988	1.280870	1.295732
max	4.016890	3.979364	4.013322	3.570331

In [5]:
```
data = df.iloc[:,1:5]
```

In [6]:
```
data.head()
```

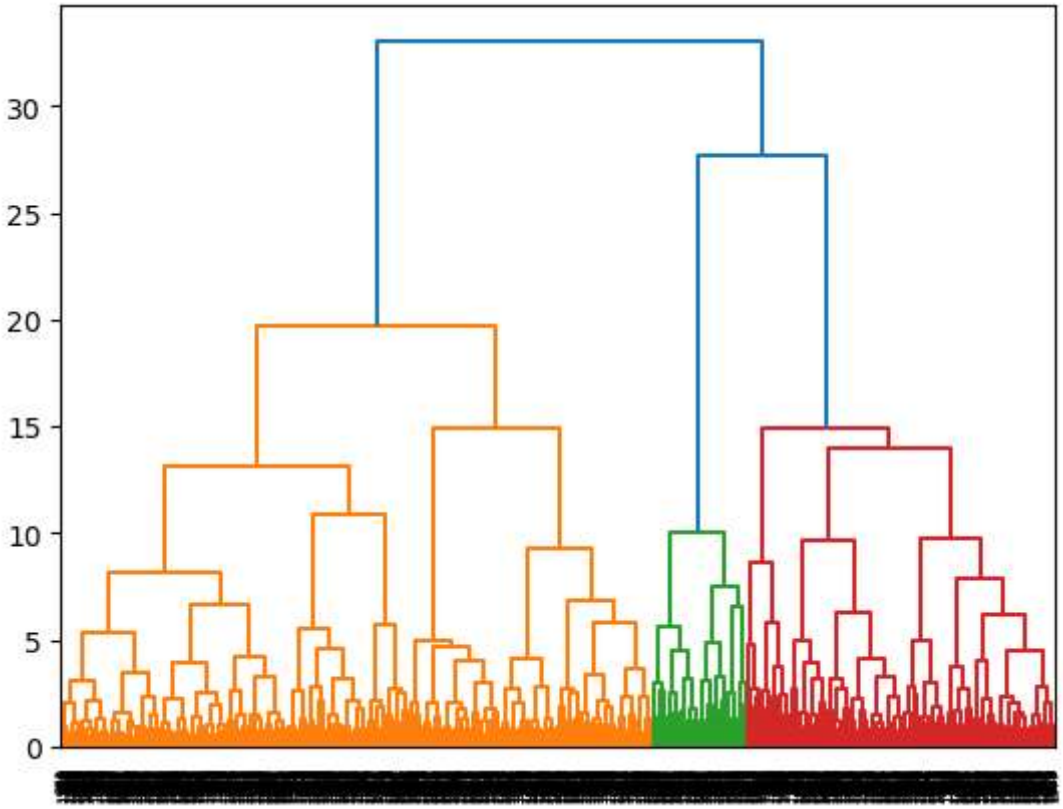
Out[6]:

	Protein	Fat	vitaminC	Fibre
0	0.452369	1.170926	1.079271	1.702960
1	2.321087	0.706856	0.350088	0.658249
2	0.884554	1.186571	2.428544	1.984562
3	0.715501	0.577599	0.270925	0.369266
4	0.132610	0.544521	0.116884	0.557309

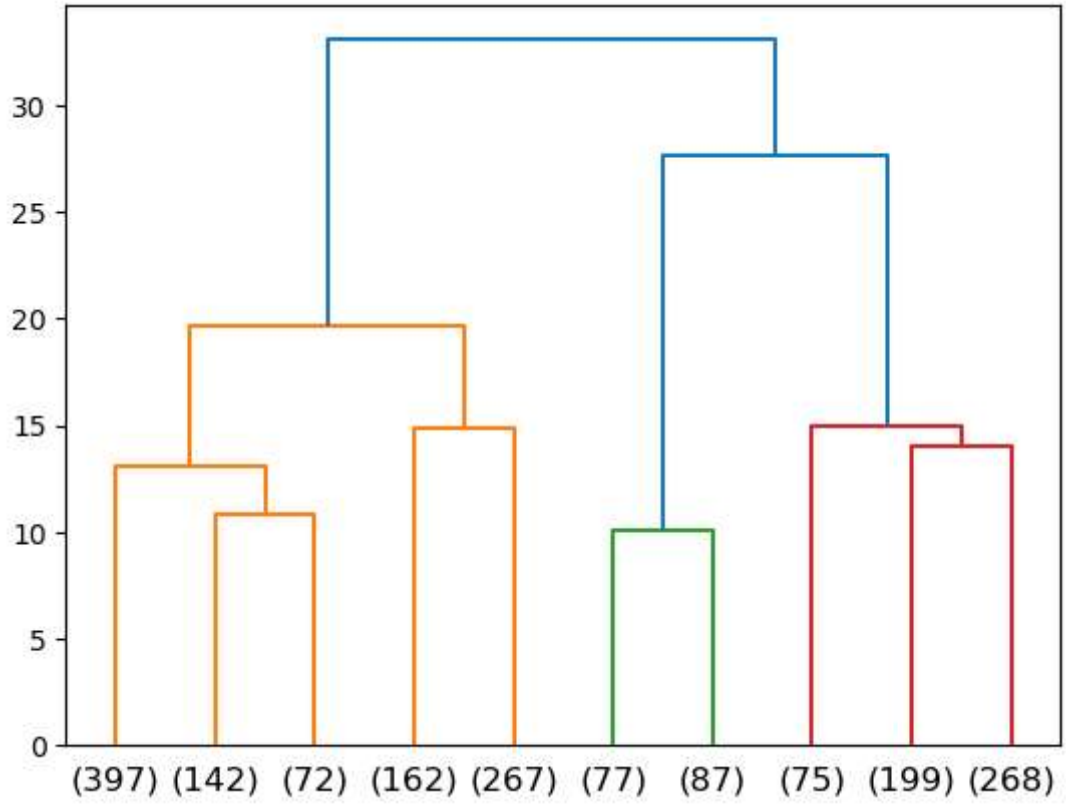
In [7]:
```
from scipy.cluster.hierarchy import dendrogram, linkage
```

In [8]:
```
wardlink = linkage(data, method = 'ward')
```

In [9]:
```
dend = dendrogram(wardlink)
```



In [10]:
```
dend = dendrogram(wardlink,
                  truncate_mode = 'lastp',
                  p = 10,
                  )
```



In [11]:
```
from scipy.cluster.hierarchy import fcluster
```

In [12]:
```
# Method 1

clusters = fcluster(wardlink, 3, criterion = 'maxclust')
clusters
```

Out[12]:
```
array([1, 1, 2, ..., 1, 1, 3], dtype=int32)
```

In [13]:
```
# Methods 2
clusters = fcluster(wardlink, 23, criterion= 'distance')
clusters
```

Out[13]:
```
array([1, 1, 2, ..., 1, 1, 3], dtype=int32)
```

In [14]:
```
df['clusters'] = clusters
```

In [15]:
```
df.head()
```

Out[15]:

	S.No	Protein	Fat	vitaminC	Fibre	Product	clusters
0	1	0.452369	1.170926	1.079271	1.702960	Amaranth leaves, cooked, boiled, drained, with...	1
1	2	2.321087	0.706856	0.350088	0.658249	Bacon and beef sticks	1
2	3	0.884554	1.186571	2.428544	1.984562	Apples, frozen, unsweetened, unheated (Include...	2
3	4	0.715501	0.577599	0.270925	0.369266	Alcoholic beverage, beer, light, BUD LIGHT	1
4	5	0.132610	0.544521	0.116884	0.557309	Alcoholic beverage, daiquiri, canned	1

In [16]:
```
df.to_csv('hc.csv')
```

In [ ]:
```

```