Journée Portes Ouvertes et de la Célébration du 60e Anniversaire
de l'Institut National de la Recherche Agronomique d'Algérie (INRAA)

Oil Fatty Acid Composition of Olive Varieties Cultivated in Algeria

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INTRODUCTION

Olive oil, which is the **main lipid ingredient** in the Mediterranean regimes, has components with **antioxidant properties**. A healthy diet must contain a limited amount of **saturated fatty acids** to reduce the total cholesterol content and a high amount of **monounsaturated fatty acids** which prevent the risk of cardiovascular diseases, reduce the insulin body-requirement and decrease the plasma concentration of glucose.

In this study twenty-two olive varieties, originating from Algeria, and maintained at the olive experimental station of Sidi-Aish were evaluated for their **oil yield** and **fatty acid composition**.

MATERIAL & METHODS

Site and plant material

This study includes **22 cultivated olive varieties** of local population and an introduced (foreign) variety used as a control variety.

The olives of the different cultivars were harvested at the experimental station of the **Technical Institute of Fruit Trees and Vines**, Sidi-Aich, Bejaia (Algeria).

The fruits were picked by hand during the 2018-2019 campaign. About 3 to 5 kg of olives were harvested manually from 2 to 3 trees for each variety at breast height and along the four cardinal points.

Site and plant material

To process our data, an **analysis of variance (ANOVA)** with one factor (cultivar) was carried out using the statistical analysis software XLSTAT version 2016.02 in order to study the significant differences between the different varieties.

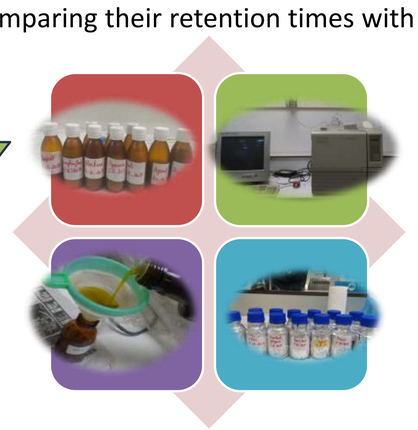
A test of **multiple comparisons** was performed by the Tukey method at the level of 5% significance for the determination of homogeneous groups. The analyses were carried out using the software (XLSTAT) version 2018.02. A hierarchical classification (C.H.A) of the samples was also established.

Fatty acid content

The fatty acid composition of the oils was determined by **gas chromatography (GC)** as fatty acid methyl esters (FAMEs). FAMEs were prepared by **saponification/methylation** with sodium methylate according to European Regulations (EEC 2568/91).

A chromatographic analysis was performed using a Chrompack CP 9002 type device equipped with a 30m x 0.25 mm x 0.25µm film thickness fused Silica capillary column (Innowax) coupled to a flame ionization detector (column temperature 210°C). Both the injector and the detector were maintained at 230 and 250°C, respectively. Nitrogen was used as the carrier gas at 1ml/min with Split injector system (Split ratio 1:100). Fatty acids were identified by comparing their retention times with those of standard compounds.

each sample in triplicate

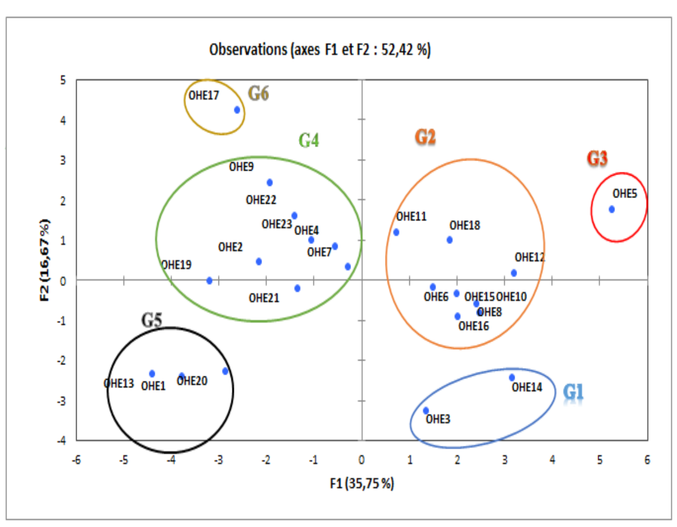


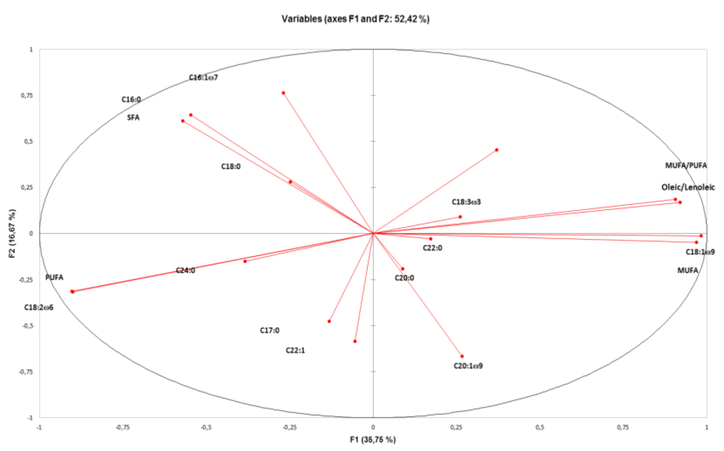
RESULTS & DISCUSSION

The chemical background of **virgin olive oil** is a **saponifiable fraction** rich in monounsaturates **(oleic acid 18:1**) and polyunsaturates mainly **linoleic acid** and **ᾱ-linolenic acid** (**Peñalvo et *al*., 2016)**, thus, the chemical composition of these many health-promoting compounds, such as unsaturated fatty acids (which are also the major compounds, especially **oleic acid**, the total number of fatty acids identified and quantified is twelve which are: **palmitic acid (C16:0), palmitoleic acid (C16:1), margaric acid (C17:0), stearic acid (C18:0), oleic acid (C18:1), linoleic acid (C18:2), linolenic acid (C18:3), arachidic acid (C20:0), gadoleic acid (C20:1), behenic acid (C22:0), gondoic acid (C22:1) and lingoceric acid (C24:0).**

The **main fatty acids** were oleic, linoleic, palmitic and stearic acids, the fatty acid composition of the different varieties. In all cultivars, oleic acid has always been the most abundant compound, accounting for no less than 60% of the total fatty acids.

The statistical analyses showed a **highly significant** for all samples studied, Our results are higher than those reported by (**Issaoui et *al*., 2010; Noorali et *al*., 2014**) for Tunisian varieties at different altitudes.





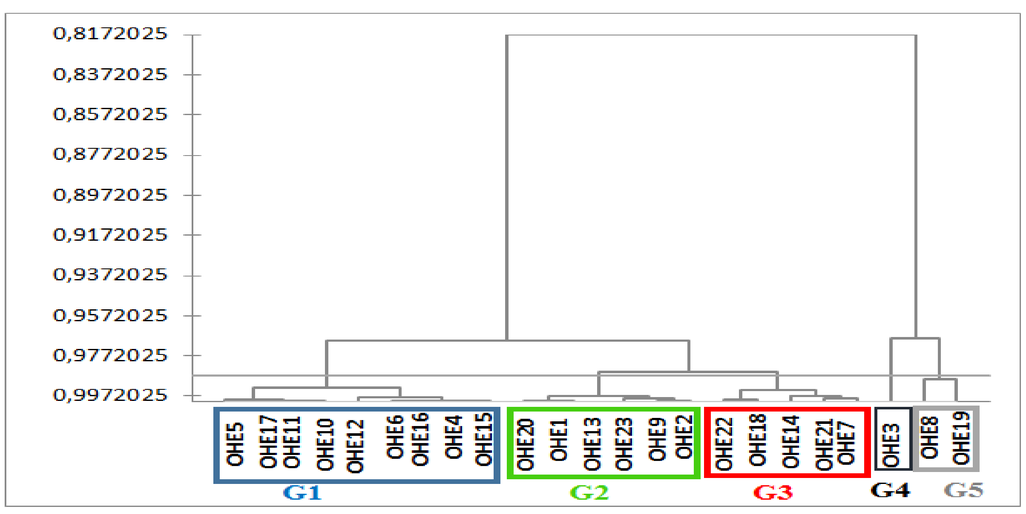


Figure : Representation of the results of the principal component analysis & the Ascendant Hierarchical Classification (AHC) carried out for the different varieties studied

CONCLUSION

Nevertheless, a **varietal parameter** seems to be the most important and determining factor. The punctual description of a specific cultivar on the basis of its **fatty acid content** is important since fatty acid content is one of the **quality parameters** of olive oil.