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Title

Innovative plant for the separation of high quality virgin olive oil (VOO) at industrial scale

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Abstract

Generally the virgin olive oil (VOO) requires a cleaning operation that is performed using a vertical disc stack centrifuge representing the most important source of product oxidation. Natural settling represents an alternative to the oil/water separation but it results unsuitable for modern processes due to great amount of time required to perform the operation. In the present paper are reported the results of VOO cleaning through an enhanced sedimentation plant by hydrocyclone. Treatments have been compared by physical and chemical characterization of VOO both after 48 hours from extraction and after 180 days of shelf-life.

The VOO cleaning by the enhanced sedimentation plant showed the capability to increase both processing capacity and VOO quality with respect to both VOO by vertical disc stack centrifuge and by natural sedimentation plant.

VOO analyzed after 48 h and after 6 months showed a lower oxidation level for oil by enhanced sedimentation, better quality and suitability for prolonged shelf-life than oil by disc stack centrifuge. Moreover, even if disc stack centrifuge plant produces olive oil that is much more clean than oil by enhanced sedimentation plant the latter shows an improved long-term stability.

Principal component analysis shows that storage time effect on VOO is quantifiable as a decrease in colour level and an increase in oxidation level.

The enhanced sedimentation plant produces an olive oil with the highest amount of antioxidants and pigments, whereas the natural sedimentation plant produces an olive oil with lesser antioxidants and pigments and higher value for K270.

Nomenclature

6C	true treatment (Cenoil-Control) after 6 months of storage
6H	true treatment (Hydroil-Control) after 6 months of storage
C	true treatment (Cenoil-Control)
CAR	carotenoid content (mg kg^{-1})
CHLO	chlorophyll content (mg kg^{-1})

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