Hi-power Ultrasound Machine to improve the efficiency of olive oil extraction process

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**Abstract.**

The present research aimed to improve the performance of the olive oil extraction plant, using an innovative hi-power ultrasound machine. Starting from the positive results obtained in other researches carried out by the same authors,[1,2,3] an automated hi-power ultrasound machine (HUM) has been developed and installed in an existing olive oil extraction plant, placed between crusher and malaxer machine. The machine was composed by 4 treatment cells in series arrangement, housing a sonotrode each one. Each sonotrode was controlled by a power unit and a control panel. A PLC controlled all units and managed the olive paste flow passing through the machine and, also, a pneumatic valve installed at the output section of the machine in order to assure a costant pressure inside the treatment cells. Experimental tests were set up to evaluate the HUM, in comparison with the conventional arrangement. The machine was tested to work at high flow mass rate of olive paste and permitted to condition the olive paste in addition to a short malaxation phase. The extractability values registered higher values than those obtained by the conventional arrangement of the plant. The hi-power ultrasound treatment permitted to obtain a better quality of final oil. In conclusion, the HUS shown good capability to condition the olive paste improving the separation phase. This technology could be a promising tool to improve the olive oil extraction process performance in terms of extraction yield and quality of oil obtained, and by simplifying the layout of plant.

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