

Effect of high-power ultrasound as an emerging technology for vegetable oil bleaching

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In Mexico, canola (*Brassica napus* L.) is positioned as the most used oilseed for vegetable oil extraction, because it is rich in poly and monounsaturated fatty acids such as linoleic acid (21%) and oleic acid (61%). However, for these to be preserved intact in it, it is necessary that the bleaching method does not modify their *cis* configurations. Since the method currently used for its realization has the disadvantages of using high temperatures (100 °C), a long processing time (180 min) and a high percentage of bleaching clay (3%), which may favor the appearance of *trans* configurations, the aim of this research was to develop a bleaching methodology for canola oil, using high-power ultrasound (40 kHz-600 W) applied in 9 treatments in which the processing time was varied (60, 75 and 90 min), the percentage of clay (1, 2 and 3%) and its temperature (60 and 80 °C). Evaluating the content of chlorophyll *a* and *b* (µg/100 g), carotenoids (µg B-carotene/100 g), color (L^* , a^* and b^*) and, finally, performing a spectroscopic analysis. These samples were evaluated with a control treatment (conventional bleaching treatment). The results showed that the ultrasonic treatments that used 60 and 90 min with 2% clay at 60 °C, reduced the highest amount of chlorophyll compounds (98% approximate). On the other hand, regarding the reduction of carotenoids, these same treatments showed a similar trend to the conventional method (30% reduction). These results were reflected in the color of the samples, where the ultrasonic samples presented the lowest values in a^* and b^* , as well as being more luminous (high L^*). Finally, the spectroscopic analysis did not show the appearance of *trans* configurations. In this sense, high-power ultrasound can be widely considered as an effective tool for bleaching vegetable oils, which helps to optimize the resources used in the process.