

P-41: Process Intensification in Plant Extraction under high-Intensity Ultrasound

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A process intensification in plant extraction can be achieved with flow-processes under ultrasound in suitable reactors at very high power density. Under these harsh conditions a rapid cell wall disruption is observed, avoiding a bulk heating and any thermal degradation. In fact the permanence time of the plant material in the flow multi-probe reactor is comprised from 20 to 40 sec. When longer times are required, temperatures can be kept constant by circulating a cooling fluid through the double-walled reactor. With this technique the extraction can be performed in water which conveys the ultrasonic waves and disperses the phytochemicals by cell wall disruption (figures). The solvent can be therefore somehow be replaced by a simple green liquid medium. After quick acoustically aided filtration of the suspended cytoplasmatic material, the mixture is concentrated to a reduced volume under vacuum and subjected to spray drying or freeze drying. Different plant materials have been subjected to this innovative extraction affording flavours and phytocomplexes that fully preserves the organoleptic, chemical, biological and functional properties of the original plant. Extract yields and analytical profiles will be presented and compared to those obtained with classic maceration and batch US-assisted extraction.

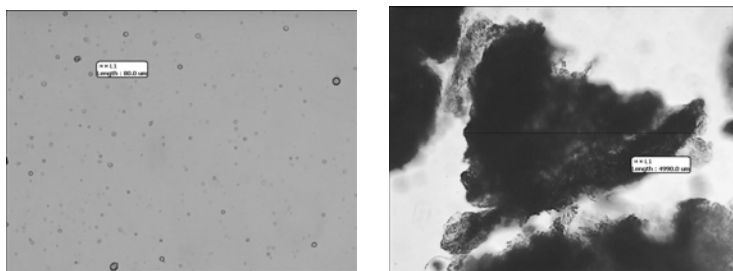


Figure 1: Plant particles size before and post US-treatment

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