

Dry ginger extracts obtained by coupled emergent technology

ALCILENE M. (1), DALSSASSO R. (1), VALENCIA G. (1)

1 UFSC, Florianópolis, Brazil

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Raul Remor Dalsasso, Germán Ayala Valencia, Alcilene Rodrigues Monteiro * (presenting author)

Ginger extract has high phenolic compounds such as sesquiterpenes, gingerols, and shogaols. The bioactivity of ginger extracts is correlated to total phenolics concentration and conversion of gingerols to shogaols, which generally occurs at high temperatures. Thus, when an extract rich in phenolics is requested, the process conditions of the drying and/or extraction can be adjusted, promoting the formation of shogaols from gingerols. In this study, two unconventional techniques were applied to obtain extracts with antioxidant activity: vacuum-microwave drying (VMD) (840 W and 100 mbar) associated with ethanolic ultrasound-assisted extraction (UAE) at 20 °C. Drying kinetics were studied. The extracts were characterized by total phenolic concentration and antioxidant activity. VMD had a processing time 36-fold lower than conventional oven drying (60 °C), which was resultant of its higher maximum drying rate (4.95 h⁻¹) than oven drying (0.176 h⁻¹). Between the drying models adjusted, Page and Midilli had a better fit, with R² values ranging from 0.99439- 0.99689 and 0.99454-0.99961, respectively. Despite the reduction of global extraction yield by 60.9% compared to Soxhlet extraction, UAE was more selective, producing extracts richer in antioxidant activity (2100.7 mmol.Trolox/mL) and total phenolic compounds (387.6 mg.GAE/mL) than Soxhlet extraction (1055.6 and 295.9, respectively). Thus, the association of VMD with UAE was able to reduce the production time of ginger extracts while promoting more bioactive extracts than those obtained by conventional processes.