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ESTRATÉGIAS PARA A EXCELÊNCIA,

AUTENTICIDADE, SEGURANÇA

E SUSTENTABILIDADE ALIMENTAR

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PC-D01: Comparative study of the influence of microwave and hot air drying on mass transfer and qualitative aspects of pomegranate (*Punica granatum* L.) arils

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Despite being an ancient method for food preservation, drying is still nowadays one of the most widely used techniques to extend shelf life of food products. There are numerous methods for drying, either isolated or in combination.[1] In the case of microwave drying, the microwave energy penetrates the food and has the capacity to generate heat inside the sample. This quick energy can easily penetrate the inside layers, causing water elimination through an exterior flux of rapidly escaping vapour. Hence, microwave drying method can be faster and produce a higher quality final product, as compared, for example, with conventional hot air drying. [2]
In this study, the drying time, effective moisture diffusivity, specific energy consumption, shrinkage, and colour properties of the pomegranate arils were compared when dried by convective drying (CVD) and microwave drying (MW). The experiments were conducted at air temperatures of 50, 60 and 70°C and air velocities of 1 m/s for the convective dryer and at power levels of 270, 450 and 630 W for the microwave dryer. The results showed that increasing air temperature and microwave power increased the effective moisture diffusivity. The calculations demonstrate that the maximum effective moisture diffusivity value for pomegranate arils was achieved under microwave drying (630 W). Additionally, the analysis specifies that maximum specific energy consumption for pomegranate arils in the convective dryer was 145.12 kWh/kg whereas it was found to be 35.42 (kWh/kg) when using the microwave dryer. The lowest values for total colour change and shrinkage observed were 14.77 and 66.5%, respectively, and they occurred for microwave drying. Comprehensive comparison of the various dryers (microwave and convective) revealed that microwave drying performed best for the drying of pomegranate arils, taking into consideration the drying time, effective moisture diffusion, specific energy consumption, colour and shrinkage.

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