



Influence of osmotic dehydration pre-treatment and combined drying method on physico-chemical and sensory properties of pomegranate arils, cultivar *Mollar de Elche*



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ABSTRACT

“*Mollar de Elche*” is the most popular Spanish pomegranate cultivar (intense sweetness and easy-to-chew arils); however, arils have pale pink colour and flat sensory profile. “*Mollar the Elche*” arils first underwent an osmotic dehydration pre-treatment (OD) with concentrated juices: (i) chokeberry, (ii) apple, and/or (iii) pomegranate cultivar “*Wonderful*”, to improve their antioxidant capacity, colour, and sensory profile complexity, and later the arils were dried by a combined method (convective pre-drying + vacuum microwave finish drying). The use of OD provided dried arils with characteristic sweetness, and improved colour and aromatic complexity. The recommended OD methods were those using (i) pomegranate, and (ii) pomegranate with chokeberry juices; they improved the total anthocyanin content (mean of 368 mg kg⁻¹), red colour (*a** coordinate 15.6), and antioxidant capacity (e.g. ABTS mean of 5.7 mmol Trolox 100 g⁻¹). However, further research is still needed because freeze-dried arils had the highest anthocyanin content.

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1. Introduction

Epidemiological studies concluded that high consumption of fruits and vegetables reduces the risk of chronic diseases (EUFIC, 2012). Among fruits, pomegranate (*Punica granatum* L.) and pomegranate-based products have been specifically associated with inhibition of prostate, breast, and lung cancer (Orgil, Spector, Holland, Mahajna, & Amir, 2016), reduction of dyslipidaemia, and cardiovascular issues (Haghighian et al., 2016), antioxidant stress effect (Orgil et al., 2016), and anti-diabetic properties. Pomegranate owns its health-related properties to the unique composition of biologically active components, mainly polyphenols from the fruit peel (exterior rind) (Calín-Sánchez et al., 2015).

Pomegranates are usually available on the market as fresh fruits or as beverages, basically juices, concentrates or wine (Jaiswal, DerMarderosian, & Porter, 2010). In smaller amounts, they are available as an additive to jams, jellies, and are used for candy production (Tezcan, Gültekin-Özgülven, Diken, Özçelik, & Erim, 2009).

To prolong the arils shelf-life, different drying processes have been applied; however, they had a significant impact on the final products quality (Kingsly & Singh, 2007). Dried pomegranate arils are a great source of vitamins and minerals and are rich in biologically active components (Alaei & Amiri Chayjan, 2015). The main purpose for production of dried pomegranate arils is consumption of the arils as a nibbling snack.

Among Spanish pomegranates, the most popular cultivar is “*Mollar de Elche*”, which production is safeguarded by a Protected Designation of Origin (DOP) since 2016 [R (UE) 2016/83]. This cultivar is recognized worldwide, due to its high sweetness intensity and arils with soft woody portion. It has also disadvantages, such as pale pink colour that significantly decreases the quality of pomegranate-based products, especially the juice after the heat treatment. Besides, its sensory profile is too flat with a predominating sweetness and with very weak fruity notes (Vázquez-Araújo et al., 2014).

There are agronomic practices that can be used to improve the flavour of some fruits. Regulated deficit irrigation led to pomegranate fruits, cv. “*Mollar de Elche*” with a more complex sensory profile and enriched chemical composition (high punicalagin content); these fruits are called “*hydroSOStainable*” (Galindo et al., 2014).

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