

Phenolic compounds and biological activities of *Opuntia ficus indica* during ripening

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Cactus (*Opuntia ficus-indica*, *OFI*), commonly known as prickly pear, belongs to the Cactaceae family. Originated in Mexico, it was introduced into the Mediterranean countries at the beginning of the 16th century. These plants grow wild in arid and semi-arid regions, where the production of more succulent food plants is severely limited. Several researchers propose that the principal content of antioxidants of the plants is in the peel of the fruit. Nonetheless, the ripening of the fruit involves a series of complex biochemical reactions, such as hydrolysis of starch, production of carotenoids, anthocyanins and phenolics as well as the formation of volatile compounds. Hence, the antioxidant activities, as well as the physicochemical properties of plants, are often related to the ripening stage of plants. This study was carried out to optimize microwave-assisted extraction (MAE) and study the biological activities during four ripening stage. *Opuntia ficus indica* peels were analyzed for phytochemical contents and antioxidant activities. Moreover, the optimal conditions for microwave-assisted extraction (MAE) of total phenolic content and antioxidant activity radical DPPH from prickly pear peels was investigated using response surface methodology (RSM). The models were verified and validated and the interactions between the factors were studied. High-performance liquid chromatography (HPLC) analysis at MAE conditions was performed to identify and quantify the phenolic compounds. The effect of maturity stage on the antioxidant activities was also studied. The phytochemical contents of *OFI* peel depend on the maturity stage. Unripe (stage 1) exhibited the highest flavonoid, chlorophyll contents, and hydrogen peroxide scavenging activity. (Stage 3) exhibit the highest total phenolic, carotenoid contents, and phosphomolybdenum activity. *OFI* in mature (stage 4) is a source of tannin and betalains. HPLC–ESI-MS-QTOF analysis allowed us to identify nine and five compounds in stages 1 and 2 respectively, and seven phenolic compounds at stage 3 and 4.