

Optimization of Digestive Conditions of *Opuntia ficus-indica* var. Saboten using Food-Grade Enzymes

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Abstract : *Opuntia ficus-indica* is a member of the Cactaceae family that is widely grown in all the semiarid countries throughout the world. *Opuntia ficus-indica* var. Saboten (OFS), commonly known as prickly pear cactus, is commercially cultivated as a dietary foodstuffs and medicinal stuffs in Jeju Island, Korea. Owing to high viscosity of OFS' pad, its application to the commercial field has been limited. When the low viscosity of OFS's pad is obtained, it is useful for the manufacture of healthy food in the related field. This study was performed to obtain the optimal digestion conditions of food-grade enzymes (Pectinex, Viscozyme and Celluclast) with the powder of OFS stem. And also, the contents of water-soluble dietary fiber (WSDF) of the dried powder prepared by the extraction of OFS stem were monitored and optimized using the response surface methodology (RSM), which included 20 experimental points with 3 replicates for two independent variables (fermentation temperature and time). A central composite design was used to monitor the effect of fermentation temperature (30-90 °C, X1) and fermentation time (1-10h, X2) on dependent variables, such as viscosity (Y1), water-soluble dietary fiber (Y2) and dietary fiber yield (Y3). Estimated maximum values at predicted optimum conditions were in agreement with experimental values. Optimum temperature and duration were 50°C and 12 hours, respectively. Viscosity value reached 3.4 poise. Yield of water-soluble dietary fiber is determined in progress.

Keywords : *Opuntia ficus-indica* var. saboten, enzymatic fermentation, response surface methodology, water-soluble dietary fiber, viscosity

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