USE OF MICROWAVE AND STEAM AS A PRETREATMENT TO OBTAIN FLOUR FROM SWEET POTATO (*Ipomoea batatas* L.): EFFECTS ON FUNCTIONAL PROPERTIES

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Key words: blanching, microwave, sweet potatoes

Introduction

The orange sweet potato (*Ipomoea batatas* L.) is a root belonging to the family of Convolvulaceae, high in starch, β-carotene, iron and zinc. Compared to other staple crops, sweet potato shows positive attributes such as geographic variety production, adaptability to marginal conditions, short production cycle and versatility in terms of sensory flesh color, flavor and texture. Even when it is native from Mexico, there is limited scientific information on the properties of flour and starch and few products in the market. The objective of this study was to analyze the effect of the method of processing on the functional properties and enzymatic activity caused by peroxidase and polyphenol oxidase.

Methods

The flour obtained is based on a factorial design 2^2 x 3, the sweet potato were washed and the shell was removed manually, then it was cut into cubes of 1 cm per side and divided into two batches. In the first one a pretreatment with microwave blanching was applied while the second was treated with steam blanching. In both methods three times of blanching were used, 2, 4 and 6 min. The samples were dehydrated in a convection dryer using 60 and 70°C finally the samples were milled and sieved in 60 mesh. Polyphenol/peroxidase activity were measured (1,2) after applying the pretreatments. In the flour, color was measured with a colorimeter (Mini-Scan, Hunter Lab, Eay Match QC), and the functional properties were determined (3). The gelatinization temperature was determined by differential scanning calorimetry (4).

Results

From the results, higher color variation was observed in the flour when the sweet potato was blanched with steam for 6 min resulting in a loss of flours luminosity up of 12.86%. With regard to the functional properties it was found that water absorption index (WAI) increased as the time of blanching and drying temperature increased, in both, microwave and steam treatments, thereby obtaining the higher WAI of 4.08 ± 0.06 at 70°C in the microwave treatment. Solubility indexes were higher in flours obtained by steam treatments, reaching a value of 20.79 ± 0.45. On the other hand the enzymatic activity of the peroxidase and polyphenol oxidase was inactivated in percentages of 90 and 89% respectively with the treatment of steam for 6 minutes. There was no significant difference ($p<0.05$) in the peroxidase inactivation when treatment with steam for 2 and 4 min, and microwave for 6 min were used. The analysis by differential scanning calorimetry (DSC) indicated that the gelatinization temperature of the orange sweet potato flour, decreased from 64 to 45°C with blanching and drying treatments.

Conclusions

The total color change decreases with microwave blanching. The WAI have higher value when blanched with microwave and ISA with steam. The gelatinization temperature decreases with steam blanching and high drying temperatures. The flour obtained in the pretreatment may be used in the preparation of custard or candies requiring high viscosity at low temperatures.

References

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