EFFECT OF DIFFERENT DRYING METHODS ON THE PHYSICO-CHEMICAL CHARACTERISTICS OF TOMATO POWDER

T. Mahendran

Department of Agricultural Chemistry, Faculty of Agriculture, Eastern University of Sri Lanaka, Sri Lanka

Corresponding author: thevamahen@yahoo.com

Dehydration is one of the techniques mostly utilized in the food industry and under optimal processing conditions. It has proved to be an effective method to extend the shelf life of the food. Dehydration of tomatoes into powdered particles gives a considerable reduction in volume and is an effective method of prolonging the storage life. Therefore, a research was carried out to assess the effects of various dehydration techniques on the physico-chemical properties of tomato powder. The tomato fruits were used to prepare powder by different dehydration techniques like solar drying, tunnel drying and vacuum drying. The obtained powders were analyzed for moisture, water activity, ash, pH, colour, bulk density and solubility. Lightness, redness and yellowness of tomato powder in terms of L^*, a^*, b^* values were also measured. Significant differences ($p<0.05$) in chemical composition of tomato powder were observed when prepared by different drying techniques. The solar dried tomato powder had the minimum bulk density of 0.54 g/cm^3 followed by tunnel dried powder of 0.61 g/cm^3 and the vacuum dried powder had the maximum value of 0.67g/cm^3. Acids are present in tomato juice and the titratable acidity of the fresh tomato pulp was 0.47 % as citric acid. During tunnel drying, a significant reduction ($p<0.05$) in titratable acidity to 0.36 % with an increase in pH of 0.47 units after drying of tomato juice indicated that some acids were lost due to evaporation. The solar dried powder had the highest ascorbic acid content followed by vacuum dried powder. The oxidative loss of ascorbic acid was considerably lower in solar drying (12.8%) compared to tunnel drying (32.2%). The various drying methods used in this study were found to have a significant effect on the colour parameters of the tomato powder. An increase in Hunter L* (lightness) values and b* (yellowness) values following the production of tomato powder was probably as the result of non-enzymatic reactions during solar drying which produced a light colour product. Solar dried samples showed maximum mineral contents in terms of potassium (12.2 mg/g), calcium (1.44 mg/g), phosphorus (16.6 mg/g) and iron (0.114 mg/g). Organoleptically, the solar dried tomato powders were liked very much in terms of its appearance, color, taste and flavor. Hence the tomatoes could be dried effectively using solar dryer to preserve as dried powder and value added for its industrial exploitation.

Keywords: Dehydration, Physico-chemical properties, Sensory quality, Tomato powder