2564 - Effects of Pretreatments and Drying Techniques on the Quality of Dehydrated Tomato

P. Jemika[1] and S. Sivakanthan[1]

Tomatoes (*Lycopersicon esculentum*), a staple in diets worldwide, are highly perishable, leading to significant postharvest losses. Drying offers an effective solution to extend shelf life and preserve surplus tomatoes. This study aimed to investigate the effects of different pretreatments and drying methods on the quality of dehydrated tomatoes. Uniformly sized tomato (Padma F1 variety) slices were subjected to various pretreatments: distilled water, calcium chloride ($CaCl_2$, 1% (w/v)), sodium metabisulphite (SMS, 0.25% (w/v)), ascorbic acid (AA, 0.25% (w/v)), and a combination ($CaCl_2$, 1% (w/v) + SMS, 0.25% (w/v) + AA, 0.25% (w/v)) with untreated slices as controls. Dehydration methods included cabinet drying (CD) at 60 °C and 70 °C, microwave drying (MD) at 300W and 500W, and freeze drying (FD). The dehydrated tomato slices were ground into powder and analyzed for moisture content, protein content, ash content, crude fat content, total phenolic content (TPC), total flavonoid content (TFC), antioxidant capacity, lycopene content, and water activity. Statistical analysis, conducted with MINITAB (17), revealed that both pretreatments and drying methods significantly influenced ($p<0.05$) the quality of the dehydrated tomatoes. MD at 500W was most effective for retaining protein, ash, and flavonoid content, while FD best preserved fat with minimal variation between pretreatments. The highest lycopene retention (9.29±0.13 mg/100g) was reported in the sample subjected to CD at 60 °C with the pretreatment ($CaCl_2$ + SMS + AA). Pretreatments such as $CaCl_2$, SMS, and AA improved nutrient retention in all drying methods. MD at 500W and CD at 60 °C were found to be superior for preserving antioxidants (15.05±0.63 mg ascorbic acid equivalent/g) and TPC (49.34±1.3 mg gallic acid equivalent/g), followed by FD. Pretreatments with AA and $CaCl_2$ aided in the retention of flavonoids especially when paired with drying techniques such as CD at 60 °C (97.09±0.41 mg CE/g) and MD at 500W (89.04±0.72 mg CE/g). FD was reported to be the most efficient method to reduce the water activity, followed by MD at 300W and CD at 70 °C. In conclusion, MD at 500W and CD at 60 °C were identified as the most effective methods for retaining nutrients. Therefore, tailoring the choice of pretreatment and drying technique based on target nutrients can greatly enhance the quality of dehydrated tomato products.

Keywords: Dehydrated tomatoes, Drying methods, Lycopene, Nutrient retention, Pretreatments

[1]Department of Agricultural Chemistry, Faculty of Agriculture, University of Jaffna, Sri Lanka.