UTILIZATION OF LYCOPENE FROM TOMATO (*LYCOPERSICON ESCULENTUM L.*) PEEL AS A NATURAL ANTIOXIDANT AND A COLORANT IN STIRRED YOGHURT

A dissertation submitted to the
Faculty of Animal Science and Export Agriculture
Uva Wellassa University
in partial fulfillment of the requirement of
the degree of
Bachelor of Animal Science

by

WASANTHA KUMARI MEEGAHAWATHTHA

Animal Science Degree Programme

Department of Animal Science

Faculty of Animal Science and Export Agriculture

Uva Wellassa University of Sri Lanka

2017

ABSTRACT

Tomato peel is a good source of lycopene which can be used as a natural antioxidant agent and colorant in foods. This study investigated use of Tomato Peel Powder (TPP) as an antioxidant agent and a colorant in stirred yoghurt. Tomatoes, purchased from the market were washed, immersed in boiling water (1-2 min), cooled under tap water and hand peeled. Tomato peels were lyophilized, pulverized and analyzed for Radical Scavenging Activity (RSA) and Total Phenolic Content (TPC) using DPPH (2, 2-diphenyl-1-picylhydrazyl) and Folin-ciocalteu's methods respectively. Total Carotenoid Yield (TCY), expressed as lycopene in TPP was measured. FTIR (Fourier Transform Infra-Red) and UV-Vis spectrum analysis were done for TPP comparing with extracted lycopene and commercial lycopene (HerbaDiet®, 10% lycopene). Two batches of stirred yoghurts were prepared by adding lyophilized TPP at percentage levels of 0%, 2%, 4%, 6% and 8% (w/w), before incubation and after incubation. The physiochemical, microbial and sensory properties were analyzed to determine the quality of stirred yoghurts. Radical Scavenging Activity and color of all ten stirred yoghurt samples were investigated at 7 days interval at refrigerated storage for 21 days using DPPH method and colorimeter, respectively. Radical Scavenging Activity and TPC of TPP were 50.05±0.66% and 0.38±0.01 mg GAE g^{-1} extract, respectively. Total Carotenoid Yield of the TPP was 71.42±0.10 mg kg^{-1}. FTIR and UV-Vis spectrum data confirmed the presence of lycopene in TPP. Significantly higher ($P < 0.05$) overall acceptability was perceived by the panelists in the stirred yoghurt contained (2% w/w) TPP. The chemical (pH and titratable acidity) and microbiological (*E. coli*/Coliform and yeast and mold count) properties of 2% TPP incorporated stirred yoghurts were not deviated from Sri Lanka Standards specification for yoghurts. The highest RSA was showed by the sample contained 8% (w/w) TPP, after incubation (23.07±0.45% at day 1, 15.30±0.17% at day 21) while, the lowest RSA was shown by the control group (0% w/w) before incubation (1.58±0.10% at day 1, 1.21±0.19% at day 21). Tomato peel powder (8% w/w) added sample showed the highest color value for redness (18.70±0.34 at day 1 in before incubation, 18.83±0.37 at day 1 in after incubation). Results of the study revealed that TPP can be successfully incorporated into stirred yoghurt as a natural antioxidant agent and a colorant.