

## **Development of Omega-3 Fish Oil Fortified Functional Stirred Yoghurt by Incorporating *Annona muricata* (Soursop)**

**D.S. Shanuke**<sup>1\*</sup>, R.A.U.J. Marapana<sup>2</sup>, S. Hettiarachchi<sup>3</sup> and E.M.R.K.B. Edirisinghe<sup>1</sup>

<sup>1</sup>*Department of Chemical Sciences, Faculty of Applied Sciences, Rajarata University of Sri Lanka, Mihintale*

<sup>2</sup>*Department of Food Science & Technology, University of Sri Jayewardenepura, Nugegoda, Sri Lanka*

<sup>3</sup>*Department of Biological Sciences, Faculty of Applied Sciences, Rajarata University of Sri Lanka, Mihintale*

\*Corresponding Author E-mail: shamodshanaka@gmail.com, TP: +94774659839

Fish oil is an ideal source of Omega-3 polyunsaturated fatty acids (PUFAs) which lower the risk of numerous non communicable diseases. Consumption of fish oil is not popular in Sri Lankan community. This study aimed to develop a fish oil fortified functional stirred fruit yoghurt to deliver Omega-3 PUFAs and to evaluate the effect of fortifying yoghurt with fish oil on sensory, physicochemical properties and oxidative qualities. Initial sensory analysis for fish oil fortified yoghurt was performed by adding 5% (w/w) three different fruit juices including soursop, mango and pineapple by thirty untrained panelists. Fish oil fortified soursop added stirred yoghurt showed the highest score for overall acceptability as  $7.32 \pm 0.85$  ( $p < 0.05$ ). Results of second sensory analysis have shown that addition of soursop up to 15% (w/w) level was considerably masked the fishy odor and flavor of fish oil (1% w/w) fortified yoghurt. Fish oil emulsion was prepared with guar gum, gelatin and glycerol using Nano emulsion technique. Physicochemical and oxidative qualities were compared among fish oil emulsion added soursop yoghurt (FOESY), fish oil fortified plain yoghurt (FOPY) and bulk fish oil fortified soursop yoghurt (BFOSY) during the storage of 21 days at 4°C. Peroxide values (PV) were analyzed to determine oxidative stability. Syneresis values increased in all yoghurt samples during storage. The highest syneresis value of  $45.18 \pm 1.98$  was recorded by FOPY on day 14. BFOSY and FOESY showed significantly lower syneresis ( $p < 0.05$ ). pH values gradually decreased and titrable acidity values as lactic acid increased in all treatments during storage. The pH values of both FOESY and BFOSY was  $4.5 \pm 0.01$  at day 14. FOESY recorded the lowest ( $p < 0.05$ ) PV ( $4.64 \pm 0.12$  mEq O<sub>2</sub> kg<sup>-1</sup>) at day 21 compared to BFOSY and FOPY. The *Escherichia coli* and coliform counts were complied with the requirements of SLS but yeast and molds counts had exceeded SLS limits after 14 days. This study demonstrated the potential of producing fish oil emulsion fortified functional yoghurt with acceptable level of sensory characteristics, physicochemical properties and oxidative stability by incorporating soursop juice.

**Keywords:** Omega-3; Fortification; Fish oil; Yoghurt; Soursop

**Acknowledgement:** Financial Assistance of AHEAD RIC Project “Encapsulation of Omega -3 fish oil from Sri Lankan Fishes and Development of Omega -3 Fortified Foods” of Faculty of Applied Sciences, Rajarata University of Sri Lanka, Mihintale is acknowledged.