Application of Rheological Properties on Quality Control of Liquid Food Products

Wanasinghe CNP[1], Rupasinghe CP[1], Navaratne SB[2] and Ariyawansha KT[1]
[1]*Department of Agricultural Engineering, Faculty of Agriculture, University of Ruhuna, Mapalana, Kamburupitiya*
[2]*Harischandra Mills Pvt. Ltd, Matara*

Abstract

Foods are diverse and complex materials, which exhibit a wide range of different rheological properties. Viscosity is the one of main rheological property of liquid food. Resorting of this property in the sphere of quality control in detecting of magnitude of suspended solid factory flow level as well as at different field level in different type of liquid food products is important aspect. Because existing methods are time consuming, high service charge with expensive equipments and fatigue to the examiner.

In this study viscosity was measured using lab scale apparatus (using Poiseuille principal) under different temperatures at 15°C, 25°C, 30°C, and 35°C and different concentrations, for milk and fruit juices diluted with water and Treacle diluted with sugar syrup by 20%, 40%, 60%, 80%, and 100% as Newtonian and Non-Newtonian foods. An Electro Resistance Type (ERT) viscometer was designed and fabricated to measure viscosity of these liquid foods at above concentrations and temperatures. The principal of fabrication is more electric amperage is required to rotate the device at constant speed with the increment of viscosity.

The data obtained from the ERT viscometer reading (amperage) was compared with the viscosity value of lab scale apparatus and solid content of each food by resorting Regression and correlation statistical test method, in order to determine correlation between these two variables.

The Regression and correlation analysis revealed that there is positive correlation between Electro Resistance Type Viscometer readings (amperage) and viscosity values of Poiseuille principle as well as solid content. The linear relationship of viscosity and ERT Viscometer reading is always more than 90% for all tested liquids in different temperatures and concentrations. ERT viscometer is a low cost apparatus.

Keywords: Electro resistance type viscometer, Food quality, Newtonian food, Rheology, Viscosity