ABSTRACT

EKO WAHYU PAMUJI. Decreasing kinetics and shelf life prediction of green tea extract quality using Arrhenius model. Under the direction of DEDDY MUCHTADI and FERI KUSNANDAR.

The main objective of this research is to determine the decreasing kinetics of green tea extract quality and predicting its shelf life using Arrhenius model. The quality of green tea extract was characterized by the total polyphenol, EGCG compound, and sensory test on taste and colour. Critical limit used for quality parameters were 35% for total polyphenol, 5% EGCG, and 5 for sensory taste and color score.

Determination of decreasing kinetics of green tea quality was conducted by storing green tea extract at extreme temperature conditions (35, 45, and 55 ºC), packed in LDPE plastic and cardboard. The humidity during the experiment was kept fixed at 70%. In days of 0, 7, 14, 28, and 35 the sample was carried out and examined for microbiological, chemical and sensory evaluation.

Decreasing kinetics of green tea extract quality was predicted by creating a curve of zero and first order reactions from each temperature. Its correlation could be determined by using regression equation program available on Microsoft Excel. Its slope value showed the reaction constant (K). The reaction constant was then used for creating Arrhenius equation curve of zero and first order reactions by plotting ln K with 1/T (1/°K) value. Kinetics reaction type of each critical quality parameters were determined by correlation level of curve of zero order and first order reaction from each temperature. Arrhenius equation curve was used for determining K value at storage temperature (28 ºC). Shelf life of green tea extract determined by entering K value at storage temperature to its equation of kinetics reaction types.

In this research, reaction kinetics types of all critical quality parameters of green tea extract could not be yet determined except for the total polyphenol parameter which followed first order reaction. Based on its total polyphenol and EGCG content, shelf lifes of green tea extract were 2.8 months and 2.5 months respectively. The shelf life of green tea extract solution was 5.7 months. While based on its sensory parameter of color and taste, the shelf lifes of green tea extract were 8.7 and 8.8 months respectively.

Keywords: Green Tea, Epigalokatechin gallate, Arrhenius, kinetics, shelf life