UNIVERSITI TEKNOLOGI MARA

PHYSICO-CHEMICAL PROPERTIES, SENSORY EVALUATION AND STORAGE STABILITY OF VITAMIN E FORTIFIED PINK GUAVA JUICE

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of the requirements for the degree of
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AUTHORS'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the result of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic instituition or non-academic instituition for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

The experimental work of this research was divided into three phases. In the first phase, proximate analysis (i.e. protein, carbohydrate, fat, fibre, ash and moisture content) was determined followed by physico-chemical properties analysis (i.e titratable acidity, pH, total soluble solid (TSS), water activity (a_w), viscosity determination and colour analysis (i.e. lightness (L*), chroma (C*) and hue angle (H^o)). In order to stabilise pink guava juice (PGJ), fifteen combinations of stabilisers which consist of six stabilisers namely guar gum (GG), carboxylmethylcellulose (CMC), arabic gum (AG), xanthan gum (XG), propylene glycol alginate (PGA) and pectin were applied into PGJ in different ratios. Three emulsifiers namely arabic gum (AG), polysorbate 80 (P80) and propylene glycol alginate (PGA) were used to emulsify vitamin E in PGJ. Selection of the most suitable combination of stabilisers and emulsifiers added in PGJ was conducted followed by ultrasonic homogenisation process. In the phase 2, the sensory evaluation of PGJ that contained suitable amount of stabiliser, emulsifier and vitamin E was evaluated and continued by phase 3 where the determination of some physco-chemical properties changes during 180 days of storage at 5°C, 15°C and 25°C (i.e viscosity, emulsion stability, colour stability and loss of vitamin E). Results in phase 1 showed that PGJ contained protein (0.67 ± 0.15%), carbohydrate (4.96 ± 0.59%), fat (0.27 ± 0.05%), total fiber (0.74 ± 0.10%), ash (0.64 ± 0.10%), moisture (92.72 ± 0.91%), acidity (0.41 ± 0.10%), pH (3.65 ± 0.12), TSS (10.56 ± 0.43), a_w (0.99 ± 0.02), viscosity (15.33 ± 1.15 mPa.s), L* (31.95 ± 0.02), C* (34.65 ± 0.01) and H^o (25.42 ± 0.02). Results showed that the amount of stabilisers used was 0.2% (w/v) and the most suitable combination of stabilisers added in PGJ were XG and CMC at the 70:30 mixture proportion. It was also revealed that P80 was found to be the best emulsifier at the concentration of 0.8% (w/v). Meanwhile, the continuous application of 24 kHz ultrasonic frequency was effective to reduce the particle size distribution of PGJ fortified with vitamin E down to 3.87±1.11 μm. The result obtained in phase 2 showed that PGJ fortified with 225 mg vitamin E was chosen as the most acceptable PGJ among panellists. Based on the emulsion stability, colour stability and vitamin E content results obtained in phase 3 indicates that the vitamin E fortified PGJ was most stable at 5°C for 6 months compared to at 15°C and 25°C storage temperature.

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