UNIVERSITI TEKNOLOGI MARA

PHYSICOCHEMICAL CHARACTERISTIC, SENSORY ACCEPTABILITY AND STORAGE QUALITY OF PREBIOTIC SNACK BAR ADDED WITH DIFFERENT TYPES AND CONCENTRATION OF GUM ARABIC

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ABSTRACT

A snack bar is one of the ready-to-eat food products which is satiated, convenient, and contains quality sources of nutrients. Due to consumer fast-growing demand for nutritious food, the snack bar would be an ideal food to formulate since most snack bars available in the market contain high levels of sodium, fat, and sugar. Gum Arabic (GA) is an edible dried gum, exudates from the stems and branches of *Acacia senegal* and *Acacia seyal*. GA is categorized as a functional food because it is rich in non-viscous soluble fiber which possesses many beneficial functions for human health. This study aimed to produce the best formulation of a prebiotic snack bar (PSB) containing GA based on the physicochemical properties, sensory acceptability, and storage quality. This study was performed using a complete randomized design. PSB added with different types of GA (*Acacia senegal* or *Acacia seyal*) at different concentration (10%, 20%, and 30%). Results showed that increasing GA concentration increased the texture (i.e. hardness and crispness), total soluble solid (TSS) and water activity (a_w) ($p<0.05$). For chemical or proximate analysis, results showed that increasing GA concentration increased the moisture, ash, fat, fiber, calorie, and carbohydrate ($p<0.05$). Nevertheless, addition more than 20% of GA decrease the protein content in the range of 5.92±0.03 to 4.64±0.03 and 5.60±0.04 to 4.89±0.04. For sensory evaluation, the PSB with *Acacia senegal* revealed that the snack bar hadsimilar acceptance level in all attributes ($p\geq0.05$) except overall acceptability. Meanwhile, the crispness, taste and overall acceptability of PSB were affected by the addition of more than 20% *Acacia seyal*. Based on the findings, PSB with 30% (*Acacia senegal*), 10% (*Acacia seyal*) and 20% (*Acacia seyal*) showed the top three highest degrees of acceptance by the panels. Next, these three formulations were chosen for further storage study for 90 days at ambient temperature. Following that, tests on the physical and microbiological properties of selected PSB were conducted. Increasing GA concentration in PSB resulted in increased the colour (L*, a*, b*), texture (hardness), TSS, and a_w, decreased the crispness, and maintained the pH value. In the first 15 days, total plate count (TPC) results showed there was no bacteria count and the bacteria was expected to start growing at day 15 onwards in the range of 1.83 log CFU/g. During 3 months of storage, the lowest value of TPC recorded was 1.0 log CFU/g meanwhile the highest was 18.5 CFU/g. PSB can be maintained at an acceptable microbial load level for 3 months at ambient temperature (25°C). To conclude, the GA was suitable to be used as a prebiotic ingredient added to the snack bar. The developed PSB formulation was successful based on the physicochemical properties, high sensory acceptability, and storage quality.

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INTRODUCTION

1.1 Preamble

Chapter one starts with the discussion on the background of the study, which emphasizes on physicochemical characteristics, sensory acceptability and storage quality of prebiotic snack bar (PSB) added with different types and concentration of gum Arabic (GA). This chapter also covers the problem statement, research questions, the objectives, and the significance of this study as well as the definition of terms used.

1.2 Background of The Study

Nowadays, interest in healthy foods such as functional food (FF) is increasing among Malaysians, who are exposed to the various health problems (Shandilya & Sharma, 2017). FF are classified as foods that contain and provide essential nutrients that potentially give a positive impact on the human body (Ali & Rahut, 2019). FF are fortified with nutritional ingredients to improve human health and well-being (Noor et al., 2014). In addition, FF encourages optimum health conditions and helps to minimize the risk of non-communicable diseases such as diabetes, atherosclerosis, myocardial infarction, and hypertension (Granato et al., 2017; Aramesh & Ajoudanifar, 2017). Since the demand has increased, the FF industry has been one of the vital parts of the food industry. The future of the FF market depends on the acceptance of the consumers. The emergence of the FF sector in Malaysia provides a great opportunity for the change in lifestyles and food consumption patterns among consumers (Nor et al., 2016; Rezai et al., 2012). According to Lau et al. (2013), the FF can be classified into five prominent types which are fortified, enhanced, altered, non-altered, and enriched products.