

UNIVERSITI TEKNOLOGI MARA

**DEVELOPMENT, SENSORY, AND
NUTRITIONAL EVALUATION OF
FLAVONOID-RICH GRANOLA BAR**

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ABSTRACT

This study focused on the development, sensory, and nutritional evaluation of flavonoid-rich granola bar that is aimed to support cognitive health especially for working adults that are exposed to stress and other work-related factors. Four granola bar formulations are made with different percentage of dried mixed berries (dried blueberries and dried cranberries): 0%, 15%, 25%, and 35% while other ingredients, peanut butter, honey, almonds and dark chocolate remained constant. The proportion of rolled oats and rice puffs decrease when the percentage of dried berries increased. The objectives of this study are to develop a granola bar enriched with flavonoids that is suitable for a fast-paced life and to evaluate and assess the nutritional composition and sensory acceptance of the granola bar. Proximate analysis included moisture, ash, fat, fiber, protein, carbohydrate, and flavonoid content. Sensory evaluation conducted with 30 mildly trained panelists using a 9-point hedonic scale. Proximate analysis showed that increased in dried berries percentage led to higher moisture, carbohydrate, and flavonoid content and decrease in ash, fiber, protein, and fat due to decrease in rolled oats proportion. Sensory evaluation showed that formulation B with 15% dried berries achieved the highest overall acceptability score, showing a balance in taste, texture, and nutritional enhancement while both formulation A and D received lower ratings.

Keywords: flavonoid, granola bar, cranberries, blueberries

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CHAPTER 1

INTRODUCTION

1.1 Research Background

According to the World Health Organization (WHO), brain health refers to the brain's ability to function related to cognition, perception, social emotion, behavior, and motor skills. In recent years, brain health has emerged as an important focus, attracting interest from both the medical community and the public. Based on a WHO report, neurological disorders are the major cause of disability and the second largest cause of mortality, with an estimated 1 in 3 persons experiencing one at some point in their lives. On August 9, 2022, the WHO released a new position document highlighting that brain health can be affected by several factors such as physical health, safety and security, learning and social connection, and access to quality services. Age is one of the common factors for a decline in brain function (Hernandez et al., 2024). In 2022, WHO recorded an estimated 260,000 persons, or 8.5% of Malaysia's senior population, suffering from dementia.

Cognitive decline and disorders such as dementia and Alzheimer's Disease (AD) are frequently associated with adults aged 60 and above (K et al., 2016). In Malaysia, the prevalence of cognitive impairment is estimated at 11-22.4% (Lim et al., 2020). Although cognitive health is often associated with older adults, it is equally important for working-age individuals, as it directly impacts job performance. Cognitive ability affects workers' ability to acquire the knowledge and skills required to complete work-related tasks (Fisher et al., 2019). Cognitive decline negatively affects quality of life, and for working individuals, having a decline in cognitive function can reduce their workplace performance. Healthy cognitive function is necessary to ensure optimal workplace performance (Bufano et al., 2024). As employees with cognitive decline may find it difficult to stay focused, analyze information, and make judgments quickly, their productivity can drop. Cognitive decline not only affects cognitive performance, but physical abilities can also be negatively impacted. Gray et al. (2020) stated in their study that individuals with cognitive decline are more likely to walk more slowly and have greater mobility