ABSTRACT

Title of Abstract : Development of Cempedak Seed and Red Bean Snack Bars as Functional Foods for Diabetes Management
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Background : Non-communicable diseases (NCDs) such as diabetes mellitus (DM), cardiovascular diseases, and obesity continue to increase due to rapid nutrition transition toward diets high in saturated fat, sugar, and processed foods. Type 2 diabetes mellitus (T2DM) represents a significant global burden, affecting more than 537 million adults and projected to reach 780 million by 2045. Dietary modification—particularly adequate intake of high-quality protein, complex carbohydrates, and fiber—is essential for glycemic control. Indonesia has abundant underutilized plant resources with functional potential, including cempedak seeds rich in resistant starch and antioxidants, and red beans containing high protein, fiber, and phenolic compounds. Combining these two local ingredients may support the development of functional snack products beneficial for diabetes management.

Objective : To formulate and evaluate snack bars made from cempedak seed and red bean flours, determine the most acceptable formulation, analyze proximate composition, and assess their nutritional potential for supporting glycemic control.

Research Methods / Implementation Methods : This experimental study used a factorial completely randomized design with four formulations differing in flour composition. Research was conducted in March 2025 at Universitas Mulawarman. Cempedak seeds and red beans were processed into flour, then mixed with brown rice flour and natural binders before being molded and baked. Sensory evaluation was conducted by 42 untrained panelists using a seven-point hedonic scale. Proximate analysis followed AOAC (2019) standards. Data were analyzed using ANOVA and Duncan's test ($p < 0.05$).

Results : Significant differences were found across formulations. Formula F2 (25 g cempedak seed flour, 50 g red bean flour, 25 g brown rice flour) achieved the highest acceptability, with scores of 5.43 for taste and 5.39 for overall liking. The combination improved texture, flavor balance, and color. Nutritionally, F2 contained 321 kcal, 14.52 g protein, 9.28 g fat, 47.82 g carbohydrates, and 6.56 g dietary fiber per 100 g. Its high protein and fiber content supports glycemic regulation and satiety, while resistant starch and phenolic compounds enhance its functional potential. These findings align with previous research recommending moderate-energy, high-fiber, and high-protein foods for diabetes management.

Conclusion / Lesson Learned : Formula F2 provided the best sensory and nutritional profile, indicating strong potential as a functional food for diabetes management. This study demonstrates the feasibility of using local, underutilized ingredients to create health-promoting snack products. Further studies should evaluate glycemic index, antioxidant stability, and physiological effects to optimize product development and support sustainable nutrition strategies.

Keywords : Cempedak seed; Red bean; Snack bar; Functional food; Diabetes mellitus.