

KARTUNES BEANS: Innovation to Create Healthy Legumes – Based Snacks from Red Lentils and Red Bean.

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Abstract

Legumes are rich in protein, complex carbohydrates, fiber, and numerous micronutrients. In addition to being an excellent and relatively inexpensive source of dietary proteins, legumes possess several desirable attributes such as low sodium content, high potassium content, ability to lower serum cholesterol in humans, high fiber content, low-fat content, long shelf-life, and diversity of foods that can be made from them. It can be boiled, seasoned, and cooked into savory stews which may be eaten with various dishes. Peanut butter and soymilk are common food products made from legumes. This study was designed to develop healthy snacks using red lentils and red beans. The importance of nuts and seeds consumption are recommended to be included in the weekly diet based on Malaysian Dietary guideline (Ministry of Health Malaysia, 2010). However Malaysian residents are generally not eating properly following the recommendations. (Hui et al., 2016; Kar et al., 2016). The National Health Survey showed that Malays consume more sweet beverages and deep-fried food and tend to include fewer whole grains, fruit, and vegetables in their diets (The Straits Times 2015). Besides, there is strong evidence suggesting a higher risk of developing the chronic disease when fried foods are consumed more frequently (i.e., four or more times per week) (Gadiraju et al., 2015). This study was conducted to determine formulations for healthy legumes-based snacks. Proximate analysis is conducted to determine the nutrient content. Lastly, a sensory test which includes a descriptive test and the hedonic test was also conducted to evaluate the acceptance level of Kartune Beans among the consumer. From the sensory point of view, snacks prepared with 60% legumes were better than 30% legumes contents and also had good taste without adding coloring, and preservatives. Nutritional composition of Kartunes Beans (per 100g) were protein (13.4%), fat (2.7%), carbohydrate (77%), and energy (386 kcal). This result showed a lower level of fat compared with locally available snacks in Malaysia. Therefore, it could be beneficial for human health.

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Keywords: Legumes, Red Lentils, Red Beans, Healthy Snacks.

1. Introduction

Previous research has proven that legumes are rich in protein, complex carbohydrates, fiber, and numerous micronutrients. In addition to being an excellent and relatively inexpensive source of dietary proteins, legumes possess several desirable attributes such as low sodium, high potassium, ability to lower serum cholesterol in humans, high fiber content, low-fat, long shelf-life, and diversity of foods that can be made from them. The focus of this research is to use legumes (red bean and red lentils) to produce healthy snacks. Snacks is chosen because previous studies showed that Malaysian consumed snacks at least once a day. Most were reported taking afternoon snack, which is between lunch and dinner time. In 2019, the sales value of manufactured snack products in Malaysia was approximately 1.68 billion Malaysian ringgits (R. Hirschmann, 2020). From the statistic we know there is a market for healthy snacks. Moreover, the importance of nuts and seeds consumption are recommended to be included in the weekly diet based on Malaysian Dietary guideline (Ministry of Health Malaysia, 2010). Through observation and readings, we found problems in consumption habits and snacking behaviour. The increasing prevalence of unhealthy eating habits and sedentary lifestyles among adolescents, which often continues into adulthood, is a global public health problem. (Smetanina, N et. Al, 2015). Malaysian residents are generally not eating properly following the recommendations. (Hui et al., 2016; Kar et al., 2016). Traditional kuih, crackers, cookies, cakes and banana fritters are the favourite snacking food among Malaysian. This type of food usually is high in calories, salt and sugar. Unhealthy eating habit lead to weight gain and the growth of chronic diseases such as diabetes and cardiovascular disease. The National Health Survey showed that Malays consume more sweet beverages and deep-fried food and tend to include fewer whole grains, fruit, and vegetables in their diets (The Straits Times 2015).

Higher risk of developing the chronic disease when fried foods are consumed more frequently (i.e., four or more times per week) (Gadiraju et al., 2015). By focusing on preventive measure like replace unhealthy foods with healthier ones, might be possible to slow or prevent the development of these diseases. In this research, we produced snacks from Red bean and red lentils using two different formulations with healthier cooking method. Non-stick surface cookware has been used to eliminate oils and butter in the production process. Non-stick cookware is a key tool for healthier meals because it allows us to take fat out of our diet. The aim of the study was to produces legume- based snack inspired by Asian culture that tasty and healthy while cater to the local taste buds. To help achieve these aims, this study was conducted to determine formulations for healthy legumes-based snacks. Second, to determine the nutrient content by conducting proximate analysis. Lastly, a sensory test which includes a descriptive test and the 5-point scale hedonic test was also conducted to evaluate the acceptance level of Kartune Beans among the consumer.

2. Materials and Method

Red bean, red lentils, wheat flour, sugar, eggs and vanilla essences were purchased at convenience store area Pasir Gudang. Legumes were washed and boiled in pot filled with water till soft and then milled into paste using a blender. All the ingredients were mixed into 2 formulas according to the specified ratio and allowed to mix properly. After tempering time batter were spread through a TRIO Egg Roll Maker for 45 seconds. Analyses Proximate composition was done using Association of Official Analytical Chemist (AOAC, 2010) while sensory evaluation was carried out using five-point Hedonic scale. Consumer acceptability scores on a 5-point hedonic scale (Scale: 1-dislike extremely; 2-dislike slightly; 3-neither like nor dislike; 4-like slightly; 5-like extremely). The quality of the finished product was analysed.

2.1 Product Developments

Thoroughly rinse raw ingredients. Bring to a low boil. Cover and reduce the heat just enough to maintain a low boil. Boil until legumes reach desired level of softness. Blend ingredients together until thoroughly smooth. Combine all ingredients with wire whisk. Spread batter in Electric Crispy Egg Roll Maker for 45 second. Use a spatula to remove the cookies from the pan. Fold the cookies in half, then place the flat side on the lip of a cup, folding the edges down into a fortune cookie shape. Repeat with remaining batter.



Figure 1: Best Formulation for Red Bean Snack



Figure 2: Best Formulation for Red Lentils Snack

3. Result and Discussion

3.1 Formulations for healthy legumes-based snacks

Table 1: Best Formulation of Red bean (RB) and Red Lentils (RL) Snack

Ingredients	Formula (RB)	Formula (RL)
Red Bean	65%	60%
Wheat Flour	15%	15%
Sugar	10%	10%
Egg	9.5%	9.5%
Vanilla Essence	0.5%	0.5%
Water	0%	10%
Total	100%	100%

3.2 The chemical composition of Kartunes Beans based on Proximate Analysis

Table 2: The chemical composition of Kartunes Beans based on Proximate Analysis (Nutritional Information)

Parameters	Test Methods / Test Equipment	Results
Protein , % w/w	AOAC 17th Edition Chapter 32.2.03 Official Method 979.09	13.4
Total Fat, % w/w	AOAC 17th Edition Chapter 32.1.13 Official Method 920.85	2.7
Carbohydrate, % w/w (as per calculation)	AOAC, Methods of Analysis for Nutrition Labelling (1993) page 106	77.0
Energy kcal/100g, (as per calculation)	AOAC, Methods of Analysis for Nutrition Labelling (1993) page 106	386

3.3 Sensory Properties of Kartunes Beans

3.3.1 Demographic Analysis

Table 3: Demographics profile of respondent (n=46)

Demographic Variable	Detail	Frequency	Percentage (%)
Gender	Male	16	34.8%
	Female	30	65.2%
Age	20 years old and below	38	82.6%
	21-30 years old	8	17.4%

3.3.2 Data analysis for Sensory Evaluation using 5- point Hedonic Scale

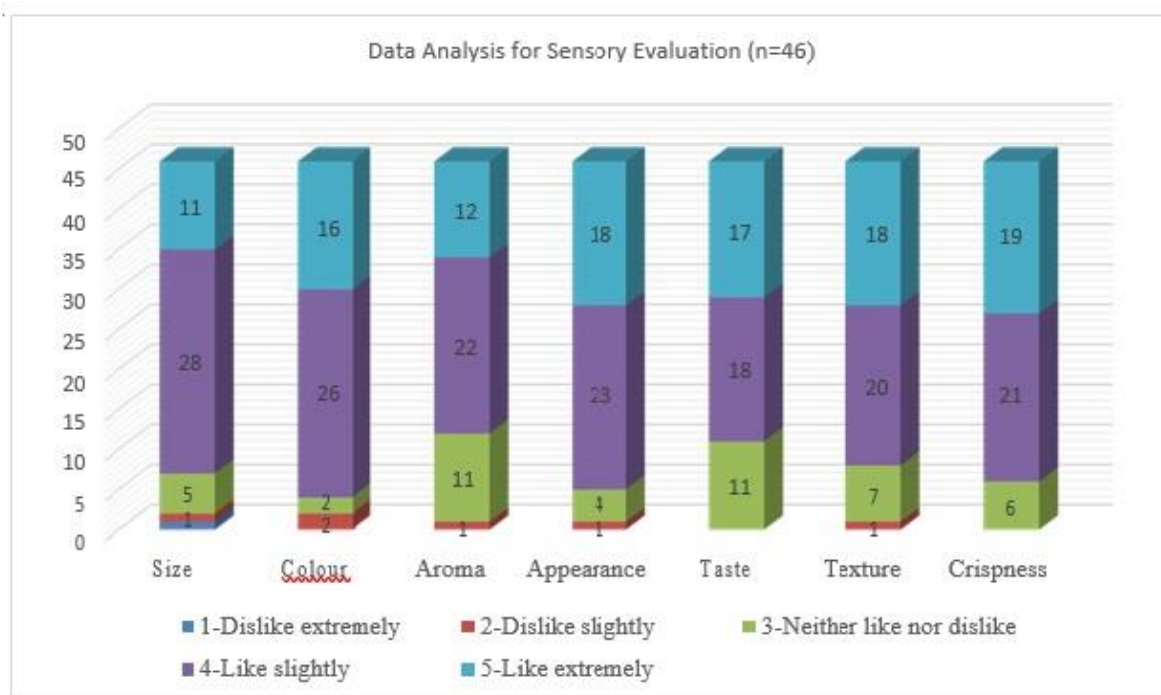


Figure 3: Data analysis for Sensory Evaluation using 5- point Hedonic Scale

4. Conclusion

High nutritional substance in red bean and red lentils suitable to be used as healthy food. Therefore 60% of the main ingredients used to produce Kartunes Beans is based on legumes. From the sensory point of view, snacks prepared with 60% legumes were better than 30% legumes contents and also had good taste without adding coloring, and preservatives. Nutritional composition of Kartunes Beans (per 100g) were protein (13.4%), fat (2.7%), carbohydrate (77%), and energy (386 kcal). This result showed a lower level of fat compared with locally available snacks in Malaysia. Anthocyanin content makes this product having an interesting natural colour. Kartunes Beans Relatively high in fiber, making them smart choice for morning meal and afternoon snack. This Food innovation have good potential in terms of commercial value because the production cost is low. Legumes are non-seasonal crop, which is available throughout the year. Furthermore, Kartunes Beans can be a great replacement for meat as a source of Lacto-ovo vegetarian protein. Therefore, it could be beneficial for human health.

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