

Rice Bran Based Vitabran Sports Vitality Booster

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Abstract. The local food ingredients also function as a functional food. They are rich in nutrients and have a low GI, such as rice bran and sweet potato flour. The research objective was to analyze the benefits of Vitabran, a mixture of rice bran and sweet potato, for health. The process begins with rice bran flour manufacture, followed by making Vitabran selected from 3 formulas, organoleptic test, hedonic test, and proximate test. The selected formula was then tested for GI, with a bran composition of 20%, 40% yellow sweet potato, 14% cornstarch, 10% soy milk, 10% margarine, 5% honey, one egg, 1% baking powder, oats to taste. The selected Vitabran formula contains 63.214% carbohydrates, 10.756% protein, 6.26% fat, 0.09% water, 17.44% ash, and 2.232% crude fiber. One piece of Vitabran measuring 12x3x2 cm, weighing 75 grams contains 264 calories, a moderate GI category (65), and usable as a Sports Vitality Booster.

Keywords: Glycemic Index, Local Food Ingredients, Functional Food, Sports Vitality Booster.

1 Introduction

Nutritional needs that come from food consumption to generate energy in sports activities are urgent and need attention. The primary energy source obtained from carbohydrates will harm health if fulfilled from the wrong food selection. It will have an impact on exacerbating the increase in cases of degenerative diseases, including diabetes mellitus. According to WHO, DM cases have experienced an alarming increase as WHO predicted that by 2040 the number of DM sufferers would reach 642 million. Around 366 million adults will be diabetes in 2030, where 75% of sufferers locate or live in developing countries. Some research show food sources existing in one area (local) can be used as a functional food. They have a low GI value. So they can reduce or suppress the excessive consumption of wrong foods and their long-term effects.

These foods include bran flour, yellow sweet potato (*Ipomoea batatas*): [1,2,3,4,5]. Bran flour is a byproduct of rice processing that contains many nutrients such as fiber, minerals, vitamin B complex, vitamin E, essential fatty acids, and amino acids, as well as antioxidants: [6,7,8]. The composition of the bran flour contains 34% -62% carbohydrates, 15% -20% lipids, 11% -15% protein, 7% -11% fiber, and minerals, such as phosphorus 1.5% -1.7%, potassium 1.4% -1.5%, Magnesium 0.78%, Calcium 0.02%, and contains strong antioxidants. The magnesium content in bran flour can improve glycemic control, prevent insulin resistance, and strong antioxidant content. They can help manage diseases associated with oxidative stress, such as diabetes mellitus: [4,5].

The nutritional content of yellow sweet potato (*Ipomoea batatas*) per 100 grams is: 20.12 grams of carbohydrates, 1.57 grams of protein, 3 grams of fiber, 0.05 grams of lipids,

vitamins such as Thiamin, Riboflavin, Niacin, B6, B9, vitamin C, vitamin K and most is vitamin A 14187 IU, mineral content such as Calcium 30.78 mg, Iron 0.61 mg, Magnesium 25.70 mg, Phosphor 47.81 mg, Potassium 337 mg, Sodium 55 mg. The effect of lowering blood glucose in sweet potatoes is associated with increased adiponectin levels. It is an adiposity hormone that functions as a process of insulin metabolism: [2].

The research problems are: 1) How is the acceptance of target consumers for products related to the organoleptic test and hedonic test at bran levels of 20% and 30% with yellow sweet potato substitution. 2) What are the proximate product test results at bran content of 20% and 30% with yellow sweet potato substitution. 3) Which product formula to recommend as Vitabran. 4) What is the value of IG Vitabran.

2 Methods

The staple ingredients are rice bran with a mixture of yellow sweet potatoes, cornstarch, soy milk and wheat flour, eggs, honey, baking powder, margarine, and oats. The equipment used consists of a microwave oven, Otoclaf, sieve, oven, gas stove, cake toaster. We test the VITABRAN formula with two kinds of bran content, namely 20% and 30%.

The making bran flour process by 1) selected fresh and clean bran, sieved with a diameter of 80 Mesh 2) sterilized by autoclave at 121 C for 3 minutes, dried in 105 C oven, for 1 hour. VITABRAN production process by mixing the formula into a formable dough. Then formed a bar with a 12x3x2 cm size and sprinkled with oats, then baked in the oven.

Table 1. VITABRAN Formula

No	Ingredients	Formula 1	Formula 2
1.	Rice bran	20 %	30%
2.	Yellow potatoes mix	40 %	30 %
3.	Cornstarch	14 %	14 %
4.	Soy milk	10 %	10 %
5.	Baking powder	1 %	1 %
6.	Margarine	10 %	10 %
7.	Honey	5 %	5 %
8.	Oats	Sown to taste	Sown to taste

The researcher carried out the bran flour processing, VITABRAN products, and GI measurements at the UNNES Nutrition Laboratory. For proximate analysis at the UNNES Biology Laboratory. It consists of checking moisture and ash content (oven method): [9], protein content (Kjeldahl Micro method): [9], fat content (Soxhlet method): [9], carbohydrate by difference: [9], Analysis of dietary fiber content: [10]. Sensory analysis with trained panelists aged 25-40 years, a total of 10 panelists (5 males and females), the quality scales consisting of 9 points (very low to very very good), and following standard procedures: [11]. The aspects assessed were color, texture, sweetness, aroma, and overall quality. Sensory

analysis was assessed for three repetitions, with a time lag of 30 minutes. The product preference rating was determined by 80 panelists, with the acceptability test (preference scale 1 - 9): [11,12].

A panel of 10 adult volunteers (5 men and women) performed the GI analysis. The analysis by t-test using SPSS 16.0. to compare the GI of the reference food with the GI of the treated food

3 Result and Discussion

Based on the data obtained, the results of the sensory quality assessment, overall formula two biscuits with a higher value (53), as well as the total (309), while the highest value was in the aroma aspect (55) according to Table 2.

Table 2. Result of Sensory Quality Assessment (Organoleptic Test)

Product Assesment	Overall	Color	Aroma	Texture/ crispness	Sweetness	Yellow Potatoe Taste	Total
	1	2	3	4	5	6	7
Biscuit bar 1	49	46	48	44	45	45	277
Biscuit bar 2	53	49	55	52	47	53	309

The favor value or the hedonic test results as a whole were the highest in the biscuit formula 2 (503). The overall aspect value was found in the biscuit formula 2 (2962), while the highest value was in the aroma aspect (515), according to Table 3.

Table 3. Result of Hedonic Test Assesment

Product Assesment	Overall	Color	Aroma	Texture/ crispness	Sweetness	Yellow Potatoe Taste	Total
	1	2	3	4	5	6	7
Biscuit bar 1	488	484	438	429	447	475	2761
Biscuit bar 2	503	495	515	509	458	482	2962

In the proximate test results, the carbohydrate, protein, and fat content was higher in formula 2 biscuits while the water, ash and crude fiber content was higher in formula 1 biscuits (Table 4).

Table 4. Proximate Test Results

No	Sample Code (%)	Carbohydrate (%)	Protein (%)	Fat (%)	Water (%)	Ash (%)	Crude Fiber (%)
1	1	63.214	10.756	6.26	0.09	17.44	2.232
2	2	68.569	11.273	6.62	0.08	13.02	0.446

The Vitabran biscuit selected for the IG test is the formula two biscuits, considering that they are acceptable to target consumers. The resulting Vitabran contains 63.214%

carbohydrates, 10.756% protein, 6.26% fat, 0.09% water, 17.44% ash and 2,232% crude fiber. One slice of Vitabran produced (bar-shaped with a 12x3x2 cm size) weighing 75 grams contains 264 calories. The Glycemic Index obtained is in the medium category or 65.

The biscuit formula chosen for the GI test on panelists is the most acceptable formula for consumers, namely biscuit formula 2. The glycemic index is the speed at which blood sugar levels rise after consuming food. It is equivalent to 50 g of carbohydrates: [13,14]. The increase in blood sugar rate is different for each food-stuff. It is classified into low GI <55, medium GI 55-70, and high GI > 70. Fast-processed carbohydrates during digestion have a high GI, whereas slow-processed carbohydrates release glucose into the bloodstream slowly so that a low GI: [15].

The results of GI examination in volunteers were obtained in the moderate category or as large as 65. It is possible because of the synergistic effect of the overall composition of Vitabran: [16], such as the results of a study which stated that rice bran contains 34% -62% carbohydrates, 15% -20% fat. , protein 11% -15%, fiber 7% -11%, minerals, such as Phosphorus, Potassium, Magnesium, Calcium, and strong anti-oxidants: [3, 4]. The results of other studies suggest that bran prolongs the period of glucose release and shows the potential to increase satiety: [17,18]. Meanwhile, the addition of the yellow potatoes mixture is referred to the results of similar research. It states that the nutritional content of sweet potatoes per 100 grams includes calories (86kcal), carbohydrates (20.1g), fat (0.1 g), protein (1.6g), fiber (1.7g), high in vitamin A (709µg), high in the mineral potassium (337mg). Or other proximate analysis results of yellow sweet potato per 100 grams are: 20.12 g carbohydrates, 1.57 g protein, 3 g fiber, 0.05 g lipids, various kinds of vitamins such as Thiamin, Riboflavin, Niacin, B6, B9, vitamin C, vitamin K and most is vitamin A 14187 IU, various minerals such as Calcium 30.78 mg, Iron 0.61 mg, Magnesium 25.70 mg, Phosphor 47.81 mg, Potassium 337 mg, Sodium 55 mg. Vitabran has the main ingredients of rice bran, and yellow sweet potato contains strong natural anti-oxidants. It helps treat and manage diseases associated with oxidative stress such as hypertension, atherosclerosis, diabetes, heart failure, and stroke: [3].

The content of the product from this research is called Vitabran. It contains high carbohydrates but with a Low Glycemic Index (LGI 51) value. It is a type of carbohydrate which, if consumed, will not increase blood sugar levels drastically. Based on the content obtained, Vitabran can be used as a Vitality Booster. Vitabran can be consumed as a snack or as a complementary food that can meet energy and protein needs, with the effect of preventing diabetes and other degenerative diseases in athletes in the future.

Vitabran is suitable for athletes, especially for physical fitness/physical fitness and health improvement. The usage of Vitabran can be a complementary food for athletes to build muscle mass and in sports achievements. The use of Vitabran is like eating regular snacks when needed or when feeling hungry before exercising or after exercising. As a snack, it is eaten several times a day and is taken along with activities (anytime) or an efficient substitute for large meals currently trending by the community. The requirement depends on the calorie needs of each individual. Based on age, gender, physical activity is undertaken and considering the diet that is carried out.

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