




Formulation of Nutritional Content and Acceptability of Hemoglobin Enhancer Menu Substitution for Sea Rabbit and Lentils 2023

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Abstract. Efforts to increase the nutritional content of a food ingredient can be done by conducting research related to menu formulation by substituting various food ingredients to increase the nutritional content. This research is addressed to figure out the nutritional content and acceptability of the Hemoglobin-increasing menu formulation, Substitute for Sea Rabbit and Lentils. Organoleptic testing using the five senses is intended to detect changes or deviations in the product. Observed variables include aroma, color, texture and volume of final product ingredients. Calculate the nutritional value of the ingredients used using Nutrisurvey and the Indonesian Food Composition Table-2017, comparing it with the Nutritional Adequacy Rate (AKG). Using a sample of 33 trained panelists from Nutrition Department students. The results show that P1 contains 420 Kcal of Energy, 15.4 grams of Protein, 22.3 grams of Fat, 60 µg of Folic Acid, 49 µg of Ferum. For P2 men µgm contains Energy 437 Kcal, Protein 18.1gm, Fat 22.8gm, Folic Acid 71.3 µgm, Ferum 54.3 µgm. P3 contains 439 Kcal of Energy, 21.3 grams of Protein, 24.7 grams of Fat, 75.1 µg of Folic Acid and 54.7 µg of Ferum. Organoleptically, Treatment-2 was the most liked by the panelists, and Treatment-3 had the highest nutritional content. The conclusion is 1. The level of treatment most preferred by the Panelists is Treatment-2 or P2. 2. The nutritional content of the most preferred treatment or P2 is that P2 contains 437 Kcal of Energy, 18.1grams of Protein, 22.8 grams of Fat, 71.3 µgr of Folic Acid, 54.3 µgr of Ferum.

Keywords: Blood Booster, Hemoglobin, Ingredients Sea Rabbit-Lentit Nuts, Nutritional Content

1. Introduction

Anemia, characterized by insufficient oxygen delivery to body tissues primarily attributed to inadequate red blood cell (erythrocyte) function, often stems from iron deficiency [1]. Iron deficiency may arise from various factors, including insufficient dietary iron intake, impaired absorption, heightened iron requirements during periods of growth, and excessive iron loss [2]. While iron deficiency anemia may often remain asymptomatic in children and may go unnoticed by both children and parents, its impact on aerobic endurance can lead to diminished physical capacities, thereby potentially impeding the growth and developmental processes in children [3]. Iron deficiency anemia (IDA) is a condition of blood deficiency caused by a lack of iron (Fe) intake

from the food consumed. The number of IDA sufferers in several countries was recorded at 34.2% in Yemen Al- Zabedi, EM et al (2014), 41.6% in Mexico (Ia Cruz-Gongora, D et al (2012), 51.2% in Cambodia Parignon M, et al (2014) and 16.9% in Malaysia [1]. Riskesdas data shows that in (2007) it was 33.1%, in (2013) it rose to 37.1% and rose again to 48.9%, from this amount 70.1% are IDA [4]. In pregnant women the proportion of anemia is 37.1 (2013) increasing to 48.9% (2018), from the same source the prevalence of anemia in adolescent girls is 32.7% [4]. This data is likely to increase because coverage of SMA blood supplement tablets is only 29.2% [5].

The impact of iron deficiency anemia is very diverse, WHO reports that IDA can result in death [6], [7]. Iron deficiency at school age can affect immunity [8], [9], growth speed, effects on intellectual performance, function children's neurological and intelligence [10], [11].

The availability of iron is highly dependent on iron intake, namely low intake, greater intake of non-heme iron, and intake associated with iron absorption barriers [1], [12]. The next impact of anemia is on the growth and development of brain organs in infancy. In particular, iron deficiency anemia (IDA) has been found to damage both normal brain growth and neurobehavioral development [13].

Prevention and control of IDA, now has been carried out, there are four main strategies that are most widely used, according to WHO. These strategies are supplementation with pharmaceutical preparations [14], disease reduction [15], [16], diversification of food consumption [17], [18] and food fortification [19] and [20]. Nonetheless, a number of studies suggest that providing iron-folate supplements along with numerous other micronutrients is a safer and more efficient way to supplement low-iron diets, as well as being more appealing and promoting higher compliance and a decrease in the occurrence of anemia [20], [21].

The provision of alternative food as an effort to overcome the problem of anemia is increasingly common these days. Lentils, papaya and sea hares are little-known food sources of protein and vitamins. A study reported that Lentils showed high oxygen radical absorption capacity (ORAC) values (66.97 $\mu\text{mol TE/g DM}$) due to the significant amount of phenolic compounds (mainly flavonoids) present in the seed coat [22]. Lentil cultivars with high levels of catechin, epicatechin and TFC have high anti-oxidant properties [23].

According to recent research, sea rabbits, or Aplysiidae, are incredibly rich in several amino acids, including glycine, glutamate, and aspartic acid. Of these, arginine is particularly abundant, as it is crucial for the growth of growing infants [24]. Providing food sources of vitamin C and β -Carotene greatly influences the mechanism of action of Fe in forming hemoglobin in BalB/C mice with anemia [25].

Designing a good menu according to the patient's tastes and body condition can increase the level of nutritional intake to meet a person's needs.

1.1 Goals to assess the differences:

- a. Knowing which level of treatment the test panelists receive
- b. Knowing the level of use of Sea Rabbit and Lentite ingredients
- c. Knowing the nutritional content at each level of treatment.

2. Methods

2.1 Organoleptic Research Methods

The organoleptic method in this study assessed the Hemoglobin Addition Enhancing Formula, using the five senses, as follows.

- Color : The yellow color appears on the cake
- Texture : Typical external appearance
- Aroma : Something that is smelled
- Taste : Sensory taste
- Taste : Sensory combination of aroma and taste

This research provides a combination of animal protein with vegetable protein, namely sea rabbit and lentils with different concentrations. Treatment P1 (120 and 120), P2 (160 and 90), P3 (180 and 60), with the following table.

Table 1. Composition of Material Use from the Three Treatments

Materials	Treatments		
	P1	P2	P3
Wheat Flour	125 grm	125 grm	125 grm
Sea Rabbit	120 grm	160 grm	180 grm
Large Duck egg	65 grm	65 grm	65 grm
Lentit Nuts	120 grm	90 grm	60 grm

2.2 Panelist Sample

1. Sample, the sample of panelists in this research were students majoring in nutrition at the Kendari Ministry of Health Polytechnic, totaling 33 people.
2. Panelists and Criteria Panelist screening is carried out using the panelist screening form. Researchers provided a screening form to panelists using a Google form sent via WhatsApp. The panelists selected were panelists who liked the Hemoglobin (Hb) Increasing Menu Formulation cake as well as those who didn't like it or really liked it. Determination of Panelists The panelists used in this research are the trained panelists were students at level II and level III of the Diploma IV Nutrition Study Program, Nutrition Department, Health Polytechnic, Ministry of Health, Kendari, totaling 33 panelists.
 - a. Inclusion Criteria
 - 1) Willing to become a research panelist
 - 2) Like the Hb Enhancer Menu Formulation cake and those who don't like it or really like it.
 - 3) Do not have allergies to seafood and nuts
 - 4) In good health when the organoleptic test takes place
 - b. Exclusion Criteria
 - 1) Being sick when the organoleptic test takes place

2) Not present when the organoleptic test takes place

Things that must be considered when selecting panelists are as follows:

- 1) Panelists are determined by simple random sampling, after meeting the requirements inclusion-exclusion criteria.
- 2) The panelists selected were 33 trained panelists.
- 3) Researchers provide a panelist reserve of 10%

Research Time

The research was conducted from May 2023 to September 2023, in 4 months consisting of: 1 month for preparation, 2 months for intervention, 1 month for data management.

Research Instruments

The instruments used in this research include:

1. Identity data form for screening and selecting writer samples.
2. Form of willingness to become a panelist (informed consent)
3. Data management tools, programs and documents.

Research Procedures

1. Field preparation:
 - Permit from the Research Agency and local government
2. Preparation of materials:
 - Raw materials: Rice flour, diced sea rabbits, lentils, papaya fruit
3. Additional ingredients: Duck eggs, margarine, granulated sugar, brown sugar, coconut.
4. Implementation of Data Collection:
 - Research Team Training, Panelists (training/discussion)
 - Approach the panelists by explaining the aims and objectives of the research.
 - Prepare the tools and materials needed for research. The intervention materials used were Baruasa Cake, Hb Lowering Menu Formulation, Sea Rabbit, Lentils and Papaya Fruit.
 - Creating a menu design: (by members of the research team).
 - Baruasa Cake Formulation of Hb Lowering Menu, the contents of this cake are a collaboration Rice flour, granulated sugar, chicken eggs, coconut milk and (a combination of nuts lentils, sea hare, with papaya juice).

Data Processing

1. Data from research interviews, given an average score and then classified at the level of consumption assessment, using the Organoleptic Test method.
2. Data on the nutritional content of the materials used are analyzed using:
 - a. Indonesian version of the Nutrisurvey Program, TKPI (Indonesian Food Composition Table - 2017) and AKG (Nutritional Adequacy Rate) 2019.

Data Analysis

Organoleptic testing is a method of assessment that uses the five senses, this is intended to detect changes or deviations in the product being assessed. The capacity of the senses to produce impressions or reactions that, depending on the kind of impression received, can be examined or distinguished. These skills include the capacity to discern, identify, contrast, and communicate preferences (hedonics) [26]. The variables observed in this research include aroma, color and volume of the final product.

3. Results

3.1 Product Results and Nutritional Composition

- a. Menu Design Material Procurement Process. This process consists of: Purchasing, Manufacturing and Procurement of materials. This menu design material consists of:

Table 2. Distribution of Ingredients and Nutrient Composition per 100 Grams from Treatment 1, 2 and 3.

Materials	Threatments								
	P1			P2			P3		
	Gram	Nutrit Value		Gram	Nutrit Value		Gram	Nutrit Value	
Wheat Flower	125			125			125		
Dice Sea Hare	120	Energi Protein	420	160	Energi Protein	437	180	Energi Protein	439
Large Duck Egg	65		15,4	65		18,1	65		21,3
Lentit Nuts	100	Fat As.	22,3	90	Fat As.	22,8	60	Fat As.	24,7
Ripe papay Fruit	30	Folat		20	Folat		20	Folat	75,1
Grated Coconut	50		60	50		71,3	50		
Margarine	50	Ferum		50	Ferum		50	Ferum	
Granulated sugar	50		49	50		54,3	50		54,3
Brown Sugar	50			50			50		
Baking Powder	½ sdt			½ sdt			½ sdt		
Baking Soda	¼ sdt			¼ sdt			¼ sdt		

Description: The above ingredients produce 40 Baruasa Cakes (Menu Enhancer Formula Hb) 600Grams or 1 Jar for each treatment 1 2 and 3.

Table 2 shows that for 25% RDA, for every 100 grams of Hb increasing Menu Formulation ingredients, for P1 it contains 420 Kkl of Energy, 15.4 grams of Protein, 22.3 grams of Fat, 60 µg of Folic Acid, 49 µg of Ferum. For P2 contains Energy 437 Kcal, Protein 18.1 gm, Fat 22.8 gm, Folic Acid 71.3 µgm, Ferum 54.3 µgm. P3 contains 439 Kkl of Energy, 21.3 grams of Protein, 24.7 grams of Fat, 75.1 µg of Folic Acid and 54.7 µg of Ferum. If you look further at the results of this analysis, it shows that treatment-3 or P3 has a higher nutrient content than P1 and P2. Following next is Treatment-2 or P2, while Treatment-1 has less nutritional content because it also uses less nutritious food ingredients than the other treatments.

3.2 Organoleptic Test Results

After carrying out organoleptic tests on the panelists, scoring is then carried out as follows:

Table 3. Organoleptic Test Results from the Three Forms of Treatment

Organoleptic Assessment	Treatments			Mean	Information
	P1	P2	P3		
Color	85	85	83	84,3	Dark Yellow
Aroma	80	82	80	80,6	Strong Scent
Texture	78	82	80	79,3	Fragile
Flavor	78	80	80	80,0	Sweet

Note: Results of diversity analysis of treatments P1 P2 and P3, ANOVA test results are not has a significant effect on color, aroma, texture and taste, at $\alpha > 0.05$. The three treatments P1 P2 and P3 were not significantly different.

Table 3 shows that for P1 Color 85, Aroma 80, Texture 78 and Taste 78. For P2 Color 85, Aroma 82, Texture 82 and Taste 80. For P3 Color 83, Aroma 80, Texture 80 and Taste 80. For panelists' level of preference prefer P2. Further analysis from Table 3, organoleptic analysis of the three forms of treatment, shows that if you look at the score values, treatment 2 or P2 is more popular with panelists, compared to other treatments. However, organoleptic Rasa has a high score. In general, the three types of treatment have a dark yellow color, a strong or distinctive aroma, a crumbly texture and a sweet taste.

4. Discussion

The results of studies on the nutritional content of formula menus are widely discussed nowadays. Like other organoleptic results, in this study the organoleptic Rasa also had the highest score. This is in line with the results of the latest study reported that the formula selected based on the best level of treatment was F2 with the first ranking result on the organoleptic test variable being taste [27].

Based on the nutritional content of the three menu formulations, treatment-3 or P3 has a higher nutritional content than the other two treatments. This is because treatment-3 also has slightly more ingredients than the other treatments. Related to this, Fitriyah said that omelette formulations with the addition of red snapper and carrots can be used as an alternative snack to prevent malnutrition in babies 6-11 months [28].

The results of the study found that the higher the amount of Hb-forming haem protein (sea rabbit), the higher the rate of increase in Hemoglobin levels. This is due to the presence of a number of main raw materials for food formation which play a role in the formation of hemoglobin. This statement is supported by the statement that giving MMN for 12 weeks can significantly increase the assessed micronutrient status, but

cannot be proven by iron and folic acid supplementation alone in increasing hemoglobin levels from anemiain adolescent girls [29].

In almost all studies regarding menu variations to increase the nutritional content and taste of food, the panelists will choose and determine a particular formula that they like. As stated by the following research results from the overall analysis results, F1 is the most preferred formula and F3 is the selected formula for analyzing serving size [30].

5. Conclusion

Based on the explanation above, it can be concluded: (1) the level of treatment most preferred by the Panelists is Treatment-2 or P2, (2) level of use of Sea Rabbit and Lentite ingredients: - Sea rabbit: P1 120 grams, P2 160 grams, P3 180 grams, - Lents: P1 120 grams, P2 90 grams, P3 60 grams, (3) the nutritional content of the most preferred treatment or P2 is P2 men μgm contains Energy 437 Kcal, Protein 18.1 gm, Fat 22.8 gm, Folic Acid 71.3 μgrm , Ferum 54.3 μgrm .

Suggestions

In the future, the type of food formulation preferred by the panelists should also be onethat has better nutritional content.

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