

Minerals and dietary fibre source snack made from Moringa leaves enriched with ginger

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ABSTRACT

The findings from the 2021 Indonesian Nutritional Status Study reveal a substantial 24.4% prevalence of child stunting, emphasizing the need for diverse strategies to achieve the desired target. One such strategy involves ensuring the nutritional well-being of expectant mothers to prevent stunting. Moringa leaves are a rich source of essential nutrients. Incorporating Moringa leaf powder into catfish flour-based snacks can boost their protein and mineral content while overcoming any undesirable odors, though this application is currently limited to crackers. This study aimed to create snack products using Moringa leaves, such as tea, brownies, and pudding, with the addition of ginger to enhance dietary fiber and mineral content for pregnant women. The top formulations identified through sensory assessment are F1 tea, F1 brownies, and F2 pudding. These specific tea, brownies, and pudding variations boast dietary fiber content exceeding 3 grams and meet or exceed 15% of the recommended daily intake levels for iron and zinc for pregnant women, as stipulated by the nutrition label reference. As a result, they can be classified as wholesome snacks rich in dietary fiber, iron, and zinc.

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1. INTRODUCTION

Indonesia has a mission outlined in the National Medium-Term Development plan for 2020-2024, which includes a commitment to enhance the well-being of its population. A pivotal objective within this plan is to reduce the prevalence of child stunting to 14% by 2024. This reduction in stunting is not only a national goal but is also an integral part of achieving the second sustainable development goal (SDG) to eradicate hunger, ensure food security, promote good nutrition, and advance sustainable agriculture. The prevalence of stunting in children under five years old is a key indicator in this pursuit.

Stunting is a pressing global nutritional concern being addressed by various countries and international organizations. Indonesia ranks as the second-highest country in terms of stunting prevalence in the Southeast Asia Region, trailing only Cambodia, and is placed 108th out of 132 countries worldwide. The latest data from the 2021 Indonesia Nutrition Status Study reveals that the prevalence of child stunting remains high at 24.4% [1].

Multiple factors contribute to the occurrence of stunting, including inadequate nutrition during the first 1,000 days of a child's life, beginning with pregnancy [2]. Malnutrition during pregnancy is a significant risk factor for stunting, as is maternal anemia during pregnancy [3]. To address these issues, it is imperative

for pregnant women to consume nutrient-rich foods, encompassing both macro and micronutrients. As directed by the Ministry of Health, focusing on the dietary aspect becomes a top priority.

Efforts to combat and prevent child stunting can take many forms. Prioritizing nutritional intake during pregnancy, starting at an early stage, is a pivotal preventive measure. Indonesia is blessed with abundant natural resources, including the nutrient-rich Moringa plant. Moringa, particularly its leaves, has been extensively explored as a nutritional resource to combat malnutrition [4]. Moringa flour boasts a protein content of 23.62% and is rich in antioxidants, with 29.91 $\mu\text{G/mL}$ [5]. Furthermore, Moringa leaves are abundant in iron and zinc [6] and possess a potent antioxidant capacity, shielding cells from oxidative stress [7]. Their antioxidant properties render Moringa a valuable candidate for stunting prevention [8].

Previous research has focused on creating crackers from a blend of catfish flour and Moringa leaves. However, these products have been limited to crackers and suffered from an undesirable aroma. Therefore, there is a necessity to develop various products using Moringa leaf flour enriched with ginger, which can address the odor issue while offering products high in dietary fiber and essential minerals. Ginger, known for its medicinal and culinary applications [9], contains essential oils that refresh, combat nausea, and stimulate the circulatory and nervous systems [10].

Research findings have shown that ginger products, like red ginger syrup, have positive effects on pregnant women, reducing the severity of hyperemesis gravidarum [11]. The core issue under examination is that while Moringa leaf flour boasts high nutritional value and has been used to create crackers, the lingering odor issue and the precise mineral content have not been addressed. To fulfill this gap, it is essential to explore Moringa leaf flour as a base for snacks enriched with ginger, specifically tailored to prevent stunting from the early stages of pregnancy. This study aims to develop a range of snacks using Moringa leaves, including tea, brownies, and pudding, enhanced with ginger to provide dietary fiber and minerals for pregnant women. The specific goals involve identifying the ideal formulation, conducting sensory evaluations, and assessing the nutritional content of fiber and minerals in the chosen snacks.

2. METHOD

The research took place from May to November 2022 and was conducted in various laboratories, including the Food Laboratory at the University of Mitra Indonesia, the Laboratory at the University of Lampung, and the Laboratory at Lampung State Polytechnic. The study utilized a range of ingredients for tea, brownies, and pudding, including Moringa leaf flour, ginger, wheat flour, eggs, chocolate, water, liquid milk, sugar, and agar agar. Additionally, chemical substances were employed to analyze the nutritional content, such as distillate water, nitric acid, sulfuric acid, boric acid, deionized water, selenium mix, potassium hydroxide, sodium bicarbonate solution, n-hexane, ethanol, hydrochloric acid, and others. A variety of tools and equipment were used in this research, including basins, scales, stoves, knives, measuring flasks, analytical balances, mohr pipettes, bulbs, funnels, spatulas, Whatman filter paper, dialysis bags, ovens, aluminum dishes, porcelain dishes, furnaces, magnetic stirrers, centrifuges, measuring cups, incubators, pH meters, thermometers, and spectrophotometers.

The initial research stage involved formulating tea, brownies, and pudding. The Moringa tea formulation incorporated 2 grams of ginger, with a maximum weight of 12 grams for 10 teabags. Formula F1 included an additional 2 grams of ginger but reduced the Moringa content to 10 grams, while F2 added 4 grams of ginger and reduced the Moringa content to 8 grams. In the case of Moringa brownies, the formulation featured a 12 gram addition of ginger, with a 6 gram increase in each subsequent formula. Thus, there was an F0 without added ginger, F1 with 12 grams of ginger, F2 with 18 grams of ginger, and F3 with 24 grams of ginger. Each formula contained 100 grams of Moringa leaf flour. The formulation of Moringa pudding also included ginger, starting with 12 grams and increasing in 6 gram increments. This resulted in F0 with no added ginger, F1 with 12 grams of ginger, F2 with 18 grams of ginger, and F3 with 24 grams of ginger. Each formula contained 100 grams of Moringa leaf flour.

The second stage of the research comprised organoleptic testing, specifically hedonic tests conducted with 25 panelists and two replications. Organoleptic testing utilized a hedonic acceptance test with a 7-point scale, where higher values indicated greater panelist preference for the product. Panelists were considered to have accepted a product if their scores exceeded 4. Based on the results of the hedonic tests, the most accepted formula was identified for further analysis [12], including nutritional content and the determination of nutritional claims for the three snack products. Ethical clearance for the study was granted by Mitra Indonesia University under No. S.25/248/FKES10/2022.

The third stage focused on the analysis of nutrient content, encompassing the examination of macro-nutrients (carbohydrates, protein, fat, water, dietary fiber, and ash) and micro-nutrients, specifically minerals such as calcium (Ca), iron (Fe), and zinc (Zn). Nutritional content analysis was conducted on selected products in comparison to control samples (products without ginger). Data were tabulated and processed using Microsoft Excel 2010 and SPSS for Windows version 20. Organoleptic test results were subjected to variance analysis

using the ANOVA test, followed by Duncan's multiple range test. Nutrient content data were analyzed with an Independent t-test after undergoing the K-S test (normality test) to determine differences between the selected products and the control. Data were considered significantly different if the p-value was less than 0.05.

3. RESULTS AND DISCUSSION

3.1. Sensory evaluation

The hedonic test, which is an acceptance test employing a 7-point scale. The aspects of hedonic test are color, flavor, taste, texture, and overall impression. The findings from the organoleptic evaluation of Moringa tea are presented in Table 1.

Table 1. Sensory acceptance of Moringa tea

Attribute	Formulation		
	F0	F1	F2
Color	4.52±0.92	4.64±0.86	4.84±1.14
Flavour	3.84±1.18	4.08±0.95	4.24±1.01
Taste	4.20±1.32	4.20±0.96	3.84±0.80
Overall	4.28±1.20	4.20±1.00	4.00±0.91

The mean scores from the organoleptic assessment for the color of Moringa tea, enriched with ginger, ranged from 4.52 to 4.84. This indicates that the color of the tea was generally perceived as being within the range of normal to like. The highest average preference score was observed in the ginger-infused Moringa tea formula, F2. Furthermore, it was noted that as the quantity of Moringa increased, the preference rating also increased.

Regarding the taste of Moringa tea with added ginger, the average preference scores ranged from 3.84 to 4.2, suggesting that the taste was rated from not liked to normal. Interestingly, the inclusion of the same amount of ginger and an increase in the quantity of Moringa led to a decrease in the panelists' preference for taste. This drop in preference can be attributed to the greater presence of Moringa leaves, which intensifies the astringent taste due to the tannin content in Moringa.

When evaluating the flavor of ginger-infused Moringa tea, the average preference scores spanned from 3.84 to 4.24, indicating that the tea's flavor ranged from disliked to normal. Notably, a higher percentage of Moringa leaf powder corresponded to an upward trend in panelists' preference for the tea's flavor. This was due to the presence of an unpleasant aroma attributed to the catechins content. Moringa tea with ginger had an overall average score ranging from 4 to 4.28, classifying it as normal.

As for Moringa brownies, the results of the organoleptic assessment are presented in Table 2. The average preference scores for the color of Moringa brownies with ginger additions ranged from 4 to 4.72, indicating that these brownies were generally considered normal to liked. Notably, panelists favored the brownies prepared with the F1 formula, as it received the highest score in terms of color preference. The color of these brownies is influenced by factors such as raw materials, processing methods, and chemical constituents.

Table 2. Sensory acceptance of Moringa brownies

Attribute	Formulation			
	F0	F1	F2	F3
Color	4.60±1.12	4.72±1.02	4.12±1.13	4.00±1.12
Taste	4.72±1.10	4.12±1.13	4.24±1.09	3.48±1.45
Flavour	4.56±1.12	4.20±1.19	4.32±0.99	3.84±0.99
Texture	4.60±1.12	4.24±0.88	4.04±1.02	3.92±1.35
Overall	4.04±2.13	4.00±2.10	3.64±1.73	3.40±1.89

The average panelist preferences for the taste aspect of Moringa brownies with added ginger ranged from 3.48 to 4.72, signifying that these brownies fell within the range of not being particularly liked to being considered normal. It's noteworthy that the formulation of Moringa brownies had a noticeable impact on the taste aspect. The introduction of ginger had a slight diminishing effect on panelists' preferences for the taste, but it still remained at score of 4, indicating that both variations, with or without ginger, were perceived as normal in terms of taste.

Moving on to the flavor of Moringa brownies with ginger additions, the average panelist preferences ranged from 3.84 to 4.56. This suggests that the flavor of the brownies fell within the range of not particularly liked to being considered normal. The addition of ginger had a minor influence on the flavor of the brownies, and this change was not statistically significant. Both variations, with and without ginger, were still classified as having a normal flavor. The flavor of the brownies is influenced by a combination of ingredients, particularly Moringa and ginger. Moringa leaves have an unfavorable aroma attributed to the presence of lipoxidase enzymes, which are commonly found in green vegetables like Moringa leaves. These enzymes are responsible for breaking down fat into odor-producing compounds belonging to the hexanal and heksanol groups.

In terms of Moringa pudding, the organoleptic results are presented in Table 3. Panelists indicated that they found the color of Moringa pudding with ginger additions to be within the range of normal to liked, with scores ranging from 4.72 to 5.76. The inclusion of ginger led to an increase in panelist preference for the color, as observed in the higher scores for F3 compared to F1 and F2. Panelists evaluated the taste of Moringa pudding with ginger additions, and the results fell within the range of normal to liked, with scores ranging from 4.16 to 5.12. The decrease in taste associated with the addition of ginger could be attributed to the fact that a higher quantity of ginger introduced spiciness into the pudding, thus affecting the overall taste.

Table 3. Sensory acceptance of Moringa pudding

Attribute	Formulation			
	F0	F1	F2	F3
Colour	5.76±0.93	4.72±0.84	4.72±1.02	5.04±0.79
Taste	5.12±1.05	4.40±0.97	4.60±1.08	4.16±1.11
Flavour	4.50±0.86	4.36±1.32	4.12±1.23	4.28±0.84
Texture	5.24±0.97	4.84±0.90	4.88±1.05	4.80±1.00
Overall	4.64±1.60	4.28±1.60	4.24±1.62	4.44±1.34

Panelists evaluated the flavor of Moringa pudding with added ginger, providing ratings in the range of 4.12 to 4.76, indicating that the flavor was perceived as normal. It's worth noting that ginger, known for its essential oils, contributes to the flavor of the pudding. However, when ginger was added in an amount corresponding to 0.9% of the total material weight, panelists considered it to be rather ordinary.

The preference level of panelists for various Moringa snack products ranged from normal to liking. The results of the comprehensive hedonic test for Moringa tea, brownies, and pudding yielded scores ranging from 3.40 to 4.66, classifying them as ranging from dislike to like. Notably, the top ratings for the overall aspects were achieved by F1 for Moringa tea, F1 for Moringa brownies, and F2 for Moringa pudding. As a result, these specific formulas, F1 for Moringa tea, F1 for Moringa brownies, and F2 for Moringa pudding, were selected for further analysis of their nutritional content, to be compared with the control, F0.

Regarding the proportion of ginger used in Moringa tea, Moringa brownies, and Moringa pudding, our findings indicated that a greater quantity of ginger led to a more preferable flavor in Moringa tea, a preferred taste in Moringa brownies, and enhanced color and taste attributes in Moringa pudding. Previous research supports these observations, where the use of ginger extract had a significant impact on the color, aroma, and taste of syrup coconut sap [13]. A 4% concentration of red ginger extract had the most favorable effect on color and texture, 3% on aroma and taste, and 2% on liking in the yogurt. It's well-established that ginger, with its essential oils, imparts a distinctive ginger taste [14], thanks to constituents like zingiberone, oleoresin, and zingiberol, which play a pivotal role in delivering that characteristic ginger flavor [15]. Essential oils are of utmost importance in defining taste and medicinal qualities.

3.2. Nutrition content of Moringa snacks

Table 4 displays the findings related to the macro-nutrients, dietary fiber, and mineral content of the chosen Moringa tea, brownies, and pudding, as well as the control samples. Notably, all the selected snacks exhibited lower moisture content in comparison to the control samples. It's worth highlighting that there was a significant difference observed when comparing the moisture content of F0T and F1T in Moringa tea, F0B and F1B in Moringa brownies, and F0P and F2P in Moringa pudding.

The ash content in all of the chosen snacks exceeded that of the control samples. This elevation in ash content can be attributed to the high mineral content present in ginger. A related study [16] demonstrated that an equal mixture of ginger flour and tempeh led to an increase in mineral levels. Notably, the content of Ca, Zn, and Fe in F1T, F1B, and F2P was higher than in F0 and exhibited a significant difference. The introduction of ginger had a notable impact on augmenting the mineral content in the pudding. Furthermore, the inclusion of ginger powder contributed to the increase in ash content, as supported by previous research [17]. Ginger comprises various components, including water, starch, essential oil, oleorcin, crude fiber, and ash, all of

which collectively elevate the ash content [18]. It's important to note that ash content is closely related to the mineral composition of a substance, which can include both organic and inorganic salts [19]. Organic salts include compounds like malic acid, oxalic acid, acetate, and pectate, while inorganic salts take the form of phosphate salts, carbonates, chloride, sulfate, and nitrate. In addition to these salt forms, minerals can sometimes exist as complex organic compounds.

Table 4. The content of macro-nutrients, dietary fibre and minerals in selected Moringa snacks and control

Nutrient parameters	Unit	F0T	F1T	F0B	F1B	F0P	F2P
Moisture	(%)	12.0±0.00 ^a	10.2±0.00 ^b	9.28±0.00 ^a	8.19±0.07 ^b	83.1±0.13 ^a	77.4±0.09 ^b
Ash	(%db)	9.18±0.00 ^a	9.58±0.00 ^b	0.81±0.00 ^a	0.95±0.07 ^a	0.33±0.06 ^a	0.43±0.08 ^a
Fat	(%db)	7.52±0.06 ^a	7.72±0.01 ^b	23.6±0.06 ^a	23.4±0.01 ^a	2.19±0.01 ^a	1.74±0.01 ^b
Protein	(%db)	23.5±0.00 ^a	14.5±0.00 ^b	5.78±0.01 ^a	7.32±0.00 ^b	1.64±0.08 ^a	1.42±0.04 ^a
Carbohydrate	(%db)	47.4±0.00 ^a	58.4±0.01 ^b	60.5±0.01 ^a	60.2±0.08 ^a	12.9±0.08 ^a	19.1±0.12 ^b
Dietary fibre	(%db)	13.3±0.00 ^a	13.4±0.00 ^b	4.74±0.01 ^a	12.5±0.00 ^b	4.29±0.04 ^a	4.42±0.05 ^a
Zn	(mg)	2.05±0.06 ^a	2.42±0.16 ^b	1.93±0.14 ^a	2.09±0.08 ^b	6.35±0.01 ^a	6.93±0.01 ^b
Fe	(mg)	19.57±0.15 ^a	47.17±0.20 ^b	8.88±0.13 ^a	9.68±0.05 ^b	27.53±0.01 ^a	44.42±0.01 ^b
Ca	(mg)	3.38±0.13 ^a	8.72±0.13 ^b	1.36±0.00 ^a	1.95±0.00 ^b	1.53±0.00 ^a	5.43±0.00 ^b

Note: Different superscript in one line indicates significantly different at $p < 0.05$, was evaluated using independent t-test.

In this investigation, the dietary fiber content in all selected snacks surpassed that of the control samples. These results align with a previous study [20], which indicated an increase in dietary fiber content in snacks incorporating ginger. The study noted that all herbal extruded corn snacks had relatively higher ash and fiber content, along with lower carbohydrate content compared to the control. These findings are in line with research conducted by others [21] who observed similar outcomes when incorporating herbs such as mint and basil.

3.3. Contribution of Moringa snacks to recommended dietary allowance (RDA) for pregnant women

The primary objective of this research was to create a wholesome snack option tailored for expectant mothers. The study assessed the nutritional content of the Moringa snacks per serving in relation to the recommended dietary allowance (RDA) for pregnant women in Indonesia. The nutritional assertions, as determined by the comparison to the RDA, are outlined in Table 5.

Table 5. Contribution of nutrient content of Moringa snacks to RDA and nutrition claims

Nutrient	Nutrition content per 100 g			Contribution of macro nutrients (%) and minerals (mg) to pregnant women			Nutritional claims		
	Moringa tea	Moringa brownies	Moringa pudding	Moringa tea	Moringa brownies	Moringa pudding	Moringa tea	Moringa brownies	Moringa pudding
Protein (g)	14.5	7.32	1.42	17.90	9.04	1.75	-	-	-
Dietary fibre (%)	13.4	12.5	4.42	53.60	50.00	17.68	high	high	source
Ca (mg)	8.72	1.95	5.43	0.92	0.10	0.57	-	-	-
Fe (mg)	47.17	9.68	44.42	142.94	20.24	134.61	high	source	high
Zn (mg)	2.42	2.09	6.93	16.46	14.22	47.14	source	-	high

When considering the macronutrient contribution according to the RDA for Indonesian pregnant women, it was found that Moringa tea, brownies, and pudding provided 17.9%, 9.04%, and 1.75% of the daily protein requirements, respectively. Notably, the claims of high dietary fiber in Moringa tea and Moringa brownies are in line with government regulations, as per the 2016 nutritional label reference (ALG) for dietary fiber content, which should not be less than 6 gram per 100 gram in solid form. Moringa pudding, with its dietary fiber content of not less than 3 gram in 100 gram, also serves as a source of dietary fiber.

In terms of mineral content, the serving size of 100 g of Moringa tea and Moringa pudding contained 47.17 mg and 44.42 mg of Fe, respectively. Based on Fe analysis, Moringa tea and Moringa pudding were able to meet approximately 142.94% and 134.61% of the RDA for Fe, thus qualifying as high-Fe foods. A similar trend was observed for Zn, where Moringa pudding met about 47.14% of the RDA for Zn, thus also being classified as a high-Zn food.

The Moringa tea, Moringa brownies and Moringa pudding can be consumed along with each meal time or in between meals. Pregnant women are one of the phases of life that need to be considered for their nutritional intake [22]. Pregnancy is a critical period where good maternal nutrition is an important factor affect

the health of mothers and children. Pregnant women not only have to be able to fulfill nutritional needs for himself, but also for the fetus in the womb. Risk complications during pregnancy or birth are lowest when gaining weight before delivery is sufficient [23]. Pregnant women often experience symptoms of nausea and vomiting. Nausea, vomiting, which mainly occurs at 8-12 weeks of gestation and that is normal for pregnant women. Along with age pregnancy, nausea and vomiting will decrease and stop at around 16 weeks of gestation. However, there are also those who continue into the third trimester with complaints of nausea and vomiting categorized as severe, where every time you drink or eat the mother will vomit. As a result, the body becomes weak, the face is pale, and the frequency of urination decreases dramatically. Here it is called hyperemesis gravidarum [24]. If a pregnant woman has hyperemesis gravidarum with intake small amounts of food and drink can harm the mother (eg, dehydration) and the fetus.

Hyperemesis can be overcome by managing a good diet. Pay attention to portions eat and the type of food that provokes nausea and vomiting, then avoid it the food, so it is recommended to eat small and frequent meals [25]. Therefore, pregnant women need nutritious snacks and do not cause nausea. This snacks can be used as an alternative nutritious snack for pregnant women. The adding ginger to pudding can prevent nausea in pregnant women. The study show that ginger and mint leaves may be a safe treatment of nausea and vomiting. Addressing important benefits of using ginger and mint leaves for the management of nausea and vomiting during the 1st trimester of pregnancy and reducing duration of the nausea and vomiting is important [26]. The other study show the same result that ginger can reduce nausea and vomiting in pregnant women in the 1st trimester [27]. Women who are experiencing nausea and vomiting during pregnancy can utilize ginger to alleviate their symptoms to the same amount as vitamin B6 [28].

The high fiber content in pudding can also help the digestive process in pregnant women who often have difficulty defecating. Pregnant women often experience constipation [29]. This is due to a decrease in motion peristalsis in the digestive tract that is slower than usual [30]. This slowed bowel movement caused by increased levels of the hormone progesterone in pregnant women. Besides that, constipation can occur due to poor diet, such as low intake fibrous foods, increasing foods that contain lots of fat, and less drink. Constipation can be overcome and prevented by adopting a balanced nutritional diet and consuming more high-fiber foods, such as the pudding in this research that contain high fiber. Higher dietary fiber intakes in pregnant women can have health benefits including lowering the risk of constipation, pre-eclampsia and diabetes [31]. The fiber is a nutrient that could not get digested but important to absorb water and helps bowel movement. Fiber is effective to prevention of many gastrointestinal disease. The fiber rich diet gives optimal calorie control and important of pregnancy diet both for mother and fetus health.

Using Moringa leaves flour for tea, brownies and pudding can be a nutritious snack. However, it's essential to be aware of potential side effects. Moringa leaf flour may cause gastrointestinal discomfort, such as stomach cramps or diarrhea, in some individuals. The ways to address them is start with a small amount of snack from Moringa leaf flour and gradually increase as the digestive system adapts [32]. The Moringa leaf flour is rich in nutrients, and adding it to snack may increase the intake of certain vitamins and minerals, potentially leading to nutrient imbalances. The consume of snack from Moringa leaf flour in moderation, considering the overall nutrient intake. It's important to note that the potential side effects of Moringa leaf flour when used in cookies are similar to those when consuming Moringa leaf flour in other forms. Always follow recommended serving sizes, monitor the body's response, and consult with a healthcare provider if have any specific health concerns or conditions. The limitation of this research is that it did not analyze the bioavailability of minerals and fiber so it cannot explain the amount of minerals and fiber that can be absorbed by the body from the products produced.

4. CONCLUSION

This paper presents a study that introduces a product derived from Moringa leaves and ginger, offering improved acceptance and nutritional value for pregnant women. The optimal formulations for development were identified as F1 for Moringa tea, F1 for Moringa brownies, and F2 for Moringa pudding. Moringa tea and Moringa brownies both contain more than 6 g/100 g of dietary fiber, meeting the dietary fiber requirements for pregnant women according to the nutrition label reference (ALG, for Indonesian), thus qualifying as high dietary fiber snacks. Moringa pudding contains more than 3 gram/100 gram of dietary fiber, making it a valuable source of dietary fiber for pregnant women.

Furthermore, selected Moringa tea and Moringa pudding provide over 30% of the recommended daily intake for Fe, while Moringa pudding contains over 30% of the recommended daily intake for Zn for pregnant women. Consequently, they can be recognized as high-iron and high-zinc snacks. Altogether, Moringa tea, Moringa brownies, and Moringa pudding offer a suitable and nutritious snacking option for pregnant women.

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