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ORIGINAL ARTICLE

Sari Mie Ispi as Healthy Packed Meal: Acceptability and Potential for Improving the Nutritional Status of School-Aged Children in Gisik Cemandi Sidoarjo

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ABSTRACT

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Processed noodle products are widely consumed, particularly among children, due to their practicality, ease of preparation, affordability, and long shelf life. In addition, they have the potential to be developed as a healthy lunch alternative. This study aimed to determine the acceptability of Sari–Mie Ispi as a healthy lunch option and its potential contribution to improving the nutritional status of school-age children in Gisik Cemandi Sidoarjo. A quasi-experimental design was employed, with the sample consisting of a processed noodle product known as Sari–Mie Ispi. The panelists were 23 parents (fathers or mothers) who have school-age children. The main variable was product acceptability, which was assessed using an organoleptic test. The evaluation applied a three-point hedonic scale (1 = lowest, 3 = highest), covering taste, aroma, colour, and texture. The results showed that the highest level of acceptability was achieved by formula P-2, with a mean total score of 2.25, indicating that the product was generally well accepted. In conclusion, Sari–Mie Ispi demonstrates good acceptability and has potential as a healthy lunch alternative to support the improvement of nutritional status among school-age children.

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Introduction

The nutritional status of a population serves as an indicator for assessing the well-being of people in a country (1). In the context of developing the quality of human resources, ensuring adequate nutrient intake is a crucial factor to consider. Human productivity is significantly influenced by the adequacy of one's nutrition (2). Children represent the future generation and a valuable human resource whose well-being particularly nutritional intake requires careful attention. School-aged children are especially vulnerable to nutritional and health-related issues; during this stage of development, their bones, teeth, muscles, and blood are growing rapidly, necessitating a higher nutritional intake than that required by adults. Bringing a packed meal from home allows for better monitoring of a child's nutritional intake, as well as the hygiene and cleanliness of their food, while also helping to avoid the habit of purchasing unhealthy snacks at school. Noodle-based products are highly popular among consumers of all backgrounds because they are convenient, easy to prepare, affordable, and have a long shelf life (3).

Instant noodles are a favorite food among Indonesians(4). Acording to data from the Word Instant Noodles Association (WINA), Indonesia ranked second globally in instant noodle consumption after China in 2020, with a total of 12,640 million serving (5). Despite their

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convenience, instant noodles are not considered a nutritionally complete food, as they fail to provide a balanced nutrient profile(6). Globally, the World Health Organization (WHO) reports that approximately 13.0% of children—totaling around 88.2 million—suffer from underweight. In Indonesia, the 2017 Nutritional Status Monitoring (PSG) survey indicated that among children aged 5–12 years, 3.4% were classified as severely thin and 7.5% as thin based on Body Mass Index-for-age (BMI-for-age). Furthermore, data from the 2018 Basic Health Research (Riskesdas) revealed significant nutritional challenges in this age group, including a 25.7% prevalence of stunting, 8.0% overweight/obesity, and a 26.0% prevalence of anemia

Instant noodles are rich in carbohydrates(7) but lack sufficient protein, vitamins, minerals, and dietary fiber(8). Although carbohydrates serve as a primary energy source(9) xcessive intake can displace essential nutrients required for optimal growth and development, while also promoting unhealthy dietary habits(10). dequate intake of proteins, vitamins, and minerals is crucial for maintaining cellular and tissue function(9). Consequently, high consumption of instant noodles poses significant health risks, including obesity, metabolic disorders, and digestive issues(11).

The government has implemented various strategies to address nutritional issues, including the dissemination of national balanced nutrition guidelines. These guidelines advocate for healthy dietary patterns, regular physical activity, proper hygiene practices, and the maintenance of a healthy body weight. A practical application of these principles is the "Isi Piringku" model, which recommends that half of a meal portion consist of vegetables and fruits, while the remaining half be composed of staple foods and protein sources. Given the widespread popularity of noodles across all age groups—particularly school-aged children—there is a critical need to develop healthy, noodle-based meal options that comply with the "Isi Piringku" guidelines.

Methods

This study employed a descriptive quantitative design to evaluate the sensory acceptability of a processed noodle product, branded as "Sari–Mie Ispi". The study involved of panelists a consumer panel of 23 parents (fathers or mothers) of school-aged children residing in Gisik Cemandi Village, Sidoarjo Regency, for acceptability testing. The primary variable measured was product acceptability, assessed using an organoleptic hedonic test. This sensory evaluation evaluated the panelists' degree of preference regarding the product's attributes. To facilitate scoring, a 3-point hedonic scale was applied (1 = Dislike, 2 = Like, 3 = Strongly Like). The overall acceptability level was determined based on the scoring classification presented in Table 1.

Table 1. Hedonic Test Table

Organoleptic	Hedonic Scale	Numerical Scale
Taste	Like	3
	Moderately Like	2
	Dislike	1
Aroma	Like	3
	Moderately Like	2
	Dislike	1
Color	Like	3
	Moderately Like	2
	Dislike	1
Texture	Like	3
	Moderately Like	2
	Dislike	1

Primary data for this study were collected directly from acceptability assessments completed by parents of school-aged children in Gisik Cemandi Sidoarjo Regency. The collected sensory evaluation scores were analyzed using descriptive percentage analysis to evaluate the panelists' preference levels toward "Sari–Mie Ispi". The ordinal sensory responses were

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converted into quantitative scores to determine the overall level of acceptability. The formula used to calculate the percentage score for each attribute is as follows

$$\% = \frac{n}{N} x100\%$$

Keterangan:
P = Percentage score (%)
S = Total score obtained
Smax = Maximum possible score (maximum scale score x number of panelists)
To interpret the resulting percentage scores, the acceptability levels were categorized based on a 3-point hedonic scale criteria: 3 (Like), 2 (Moderately Like), and 1 (Dislike).

The evaluated formulations of "Sari–Mie Ispi" were as follows:

1. Formulation K (Control): Standard noodle formulation without intervention.
2. Formulation P1 (Treatment 1): 40% vegetables + 40% fish + 20% base ingredients.
3. Formulation P2 (Treatment 2): 50% vegetables + 30% fish + 20% base ingredients.
4. Formulation P3 (Treatment 3): 30% vegetables + 50% fish + 20% base ingredients.

Results

The sensory evaluation of "Sari–Mie Ispi" was conducted in July 2025 in Gisik Cemandi, a coastal area in Sidoarjo known for its abundant milkfish (Chanos chanos) production. The milkfish enrichment in "Sari–Mie Ispi" was designed to utilize this local commodity to enhance the nutritional value of school lunch options. The panel comprised parents (fathers or mothers) of school-aged children residing in the village. The demographic characteristics and frequency distribution of the panelists are presented in Table 2.

Table 2. Demographic Characteristics of Panelists in the Sensory Evaluation of "Sari–Mie Ispi" in Gisik Cemandi Village, Sidoarjo, July 2025 (n = 23)

Panelis Characteristic	Category	Frequency (f)	Procentage (%)
Gender	Male	3	11.55
	Female	23	88.46
Total		**23**	**100**
Age (Years)	(20 - 35)	2	7.69
	(36 – 45)	19	69.56
	(46 – 50)	2	7.69
Total		**23**	**100**

Based on Table 2, the vast majority of the panelists were female (n = 20; 86.96%), while males accounted for the remaining 13.04% (n = 3). Regarding age distribution, most panelists were aged 36–45 years (n = 19; 82.61%), with the remaining respondents evenly split between the 20–35 (n = 2; 8.70%) and 46–50 (n = 2; 8.70%) age categories.

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Table 3. Organoleptic Acceptability Scores of "Sari–Mie Ispi" Formulations in Gisik Cemandi Village, Sidoarjo, July 2025 (n = 23)

Katagori	Formula	Dislike		Moderately Like		Like		n	%
		f	(%)	f	(%)	f	(%)		
Taste	Control	5	21.73	16	69.56	6	26.08	23	100
	P-1	11	47.82	4	17.39	8	34.78	23	100
	P-2	5	21.73	10	43.47	8	34.78	23	100
	P-3	8	34.78	4	17.39	11	47.82	23	100
Aroma	Control	6	26.08	10	43.47	7	30.43	23	100
	P-1	8	34.78	10	43.47	5	21.73	23	100
	P-2	2	08.69	14	60.86	7	30.43	23	100
	P-3	6	26.08	8	34.78	9	39.13	23	100
Color	Control	4	17.39	8	34.78	11	47.82	23	100
	P-1	3	13.04	7	30.43	13	56.53	23	100
	P-2	3	13.04	6	26.08	14	60.86	23	100
	P-3	4	17.39	7	30.48	12	52.17	23	100
Texture	Control	4	17.39	6	26.08	13	56.53	23	100
	P-1	9	39.13	7	30.48	7	30.43	23	100
	P-2	4	17.39	10	43.47	9	39.13	23	100
	P-3	3	13.04	6	39.13	14	60.86	23	100

Table 3. Sensory Acceptability Scores of the Best "Sari–Mie Ispi" Formulation in Gisik Cemandi Village, Sidoarjo (n = 23)

categori	Skor	x̄K	x̄P1	x̄P2	x̄P3	Total K	Total P1	Total P2	Total P3
Taste	4	2.04	1.86	2.13	2.13	8.16	7.44	8.52	8.52
Aroma	3	2.04	1.86	2.21	2.13	6.12	5.58	6.63	6.39
Color	3	2.30	2.43	2.47	2.34	6.90	7.29	7.41	7.02
Textur	2	2.39	1.91	2.21	2.47	4.78	3.82	4.42	4.94
Total Skor	12					25.96	24.13	26.98	26.87
Mean						2.16	2.01	2.25	2.24

Discussion

This study evaluated the acceptability of "Sari–Mie Ispi"—a healthy packed meal innovation designed to improve the nutritional status of school-aged children in Gisik Cemandi Village, Sidoarjo. The formulation modifies standard noodle processing by fortifying the dough with bok choy (Brassica rapa subsp. chinensis) and milkfish (Chanos chanos). Given children's high preference for noodle-based foods, this product was developed to provide a balanced macronutrient and micronutrient profile comprising essential carbohydrates, proteins, fats, vitamins, and minerals to support optimal growth and development in school-aged children.

Acceptability assessment was conducted through organoleptic (sensory) testing, which evaluates four key attributes taste, aroma, color, and texture as indicators of product quality and alignment with consumer preferences. Organoleptic testing utilizes human senses as the primary tool for assessing product acceptability. This testing process is essential for gauging how panelists perceive the product. In this study, a hedonic test method was employed, in which panelists rated their level of preference for each "Sari-Mie Ispi" formulation on a 3-point scale: 1 (dislike), 2 (somewhat like), and 3 (like). The evaluation began with trained panelists in from parents with school-aged children, recruited from the vicinity of the college in the Gisik Cemandi sub-district,

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Sidoarjo. As shown in Table 2, the majority of the panelists were female (n=23; 88.46%), while 3 (11.55%) were male. Regarding age, 19 panelists (69.56%) were between 36 and 45 years old, while 2 panelists (7.69%) fell into each of the 20–35 and 46–50 age ranges.

The sensory evaluation results for taste (Table 3) revealed that 11 panelists (47.83%) disliked Formulation P1, while 16 panelists (69.57%) expressed a neutral preference ("moderately liked") toward the control formulation (K). In contrast, 11 panelists (47.83%) favored Formulation P3 (30% vegetables, 50% milkfish, and 20% base ingredients). The noodles in Formulation P3 were perceived as significantly moresavory than the other variants. This finding is consistent with previous research [12], which reported that higher proportions of fish meat enhance savory umami flavors in noodle products. The incorporation of 50% milkfish meat in P3 contributed to a distinct and prominent savory taste.

Regarding the sensory evaluation for aroma (Table 3), 8 panelists (34.78%) disliked Formulation P1, whereas 14 panelists (60.87%) held a neutral sentiment toward Formulation P2. Conversely, Formulation P3 received the highest preference for aroma. In Formulation P1, pakchoy accounted for 40% of the total formulation, imparting a strong leafy vegetable odor. This intense vegetable aroma is generally less appealing to children, alignment with findings from earlier studies [13]. The high concentration of pakchoy in P1 likely contributed to a strong, pungently grassy aroma that reduced its sensory preference among the panel.

Regarding color (Table 3), Formulation P2 was the most preferred, chosen by 14 panelists (60.87%). Formulation P2 consists of 50% vegetables, 30% fish, and 20% base ingredients. Its color was highly favored due to its natural appearance, closely reflecting the vibrant green hue of the fresh pakchoy. For texture (Table 3), panelists preferred Formulation P3, which exhibited a desirable chewiness. This finding aligns with previous research [1], which indicated that flour and protein additions significantly influence the rheological and physical properties of noodles. The textural variations are primarily attributed to dough moisture content: higher moisture levels produce softer dough, whereas lower moisture levels result in a firmer structure that is difficult to shape or extrude.

To determine the optimal formulation of "Sari–Mie Ispi" for improving the nutritional status of school-aged children in Gisik Cemandi Village, Sidoarjo, weighted average acceptability scores were calculated across all attributes based on their relative sensory importance. The mean acceptability scores derived from the 23 panelists are denoted as $\bar{x}F1$, $\bar{x}F2$ and $\bar{x}F1$ (Table 4). These mean scores were multiplied by their respective attribute weights to obtain the total scores for P1, P2, and P3. The total scores for each formulation were summed and divided by the maximum possible weighted score (12) to compute the final overall average acceptability index. Table 4 summarizes the acceptability assessment across taste, aroma, color, and texture. Overall, Formulation P2 achieved the highest overall acceptability with a mean score of 2.25, followed by Formulation P3 (2.24), the Control formulation (2.16), and Formulation P1 (2.01).

Conclusion

Based on the overall sensory acceptability assessment in this study, Formulation P2 demonstrated the highest acceptability for "Sari–Mie Ispi" developed as a healthy packed meal option to support the nutritional status of school-aged children in Gisik Cemandi Village, Sidoarjo achieving an overall mean score of 2.25.

Ethics approval and consent to participate

This study complied with ethical standards for human research and received approval from the Health Research Ethics Committee (KEPK) of Hang Tuah College of Health Sciences Surabaya, under ethical clearance certificate No. PE/55/II/2025/KEP/2025.

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