



(MUDIMA)



Organoleptic Evaluation of Manyung Fish Nugget Enriched with Moringa Leaves

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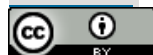
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ABSTRACT

This study examined the potential of using local ingredients such as Manyung fish (*Arius thalassinus*) and moringa leaves to create nutritious nuggets. The objectives of this study were to assess the organoleptic acceptability of Manyung fish nugget enriched with Moringa leaves concerning color, taste, aroma, and texture. The research followed an experimental approach using a randomized design. Findings indicated that the formulation F1 (90 g Manyung fish and 10 g moringa leaves), was favorable due to its superior attributes in color, taste, aroma, and texture. Among the formulations, F1 exhibited the most preferred in terms of sensory aspects. This research highlighted the potential of these local ingredients for nugget formulation especially for adolescent consumption

INTRODUCTION

Adolescent girls constitute a high-risk group for iron deficiency anemia due to insufficient iron intake (Pati et al., 2022; Indrawatiningsih et al., 2021). Iron deficiency anemia is a common issue among adolescent girls (Hidayah, 2022), who may lose approximately 1.25 mg of iron per day (Nurjannah & Putri, 2021), primarily attributed to monthly menstruation (Savitri et al., 2021). About 50% of anemia cases result from inadequate iron intake (Nuraeni et al., 2019). According to WHO, the global prevalence of anemia in women aged 15-49 was 29.9% in 2021, while National Basic Health Research (RISKESDAS) reported an anemia prevalence of 58.8% in Indonesia (Kemenkes RI, 2018). In the city of Bengkulu, the prevalence of iron-deficiency anemia among adolescent girls is 43% (Haya & Wahyu, 2021).

Nuggets are widely popular across all age groups, from schoolchildren to adults. Nuggets can be modified using local ingredients such as Manyung fish and moringa leaves (Rahmawati et al., 2022; Hasan et al., 2022). Utilizing fish as a source of animal protein needs to be developed to maximize the potential of fisheries, especially in coastal areas (Mughtar & Bahar, 2022). The combination of Manyung fish and moringa leaves can create nutrient-rich nuggets. Manyung fish (*Arius thalassinus*) is a common fish found in the waters of Bengkulu Province, containing beneficial nutrients

such as 12.7 grams of protein, 2.5 mg of iron, and 98.0 mg of calcium (Sanjaya et al., 2022).

Moringa leaf, a food with high nutritional content and iron, contributes significantly to this modification. According to Indonesian Food Composition Table (Indonesia, 2019), moringa leaves contain per 100 grams: 75.55 g of water, 92 kcal of energy, 5.1 g of protein, 1.6 g of fat, 14.3 g of carbohydrate, 8.2 g of fiber, 6.0 mg of iron, 61 mg of sodium, 298 mg of potassium, and 0.6 mg of zinc. Moringa leaves not only contain a complete range of nutrients but also have health benefits (Winnar, 2020). Therefore, this study aimed to determine the organoleptic acceptability of color, taste, aroma, texture of Manyung fish nuggets with the addition of Moringa leaves as snacks for young women from three formulations.

METHODS

This research was an experimental study using a completely randomized design to assess the acceptability of Manyung fish and moringa leaf nuggets based on color, taste, aroma, and texture through organoleptic evaluation. The equipment used in nugget production included a bowl, blender, stainless steel knife, aluminum pot, spatula, digital food scale, frying spoon, cutting board, steamer pot, cooking pot, and oil strainer.

The main ingredients for making nuggets were Manyung fish and moringa leaves, with additional ingredients such as cornstarch, wheat flour, fine breadcrumbs, eggs, pepper powder, salt, sugar, garlic, and onions (Vidayana, 2020).

Table 1. Nugget Formulation

Formulation	Manyung fish %	Moringa %
F1	90	10
F2	80	20
F3	70	30

Table 2. Composition of Manyung Fish Nugget Enhanced with Moringa Leaves

	Nugget Composition (g)		
	F1	F2	F3
Manyung fish	90	80	70
Moringa leaves	10	20	30
wheat flour	50	50	50
corn starch	20	20	20
breadcrumbs	50	50	50
egg	60	60	60
pepper	2,5	2,5	2,5
salt	5	5	5
sugar	3	3	3
garlic	10	10	10
onion	25	25	25

The nugget-making experiment and Technology Laboratory, Bengkulu Health organoleptic evaluation were conducted in the Food Polytechnic of Ministry of Health in May 2023.

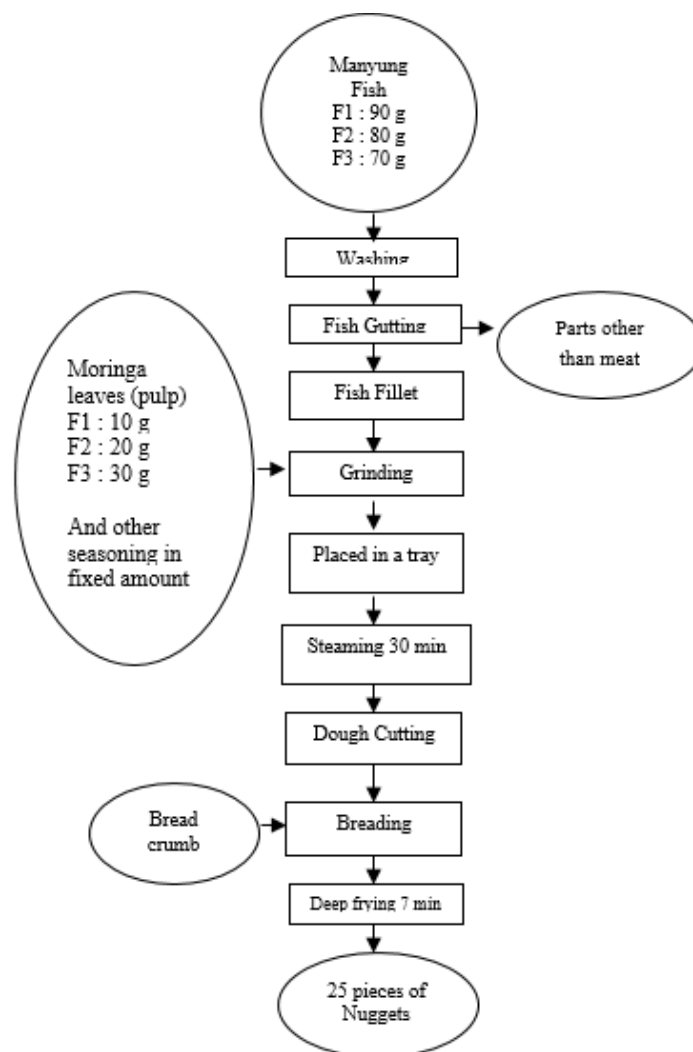


Figure 1. Flow Chart of Nugget Production

Organoleptic Acceptability

Organoleptic acceptability involved forty consumer panelists. The evaluation included color, taste, aroma, and texture. The panelists were asked to assess all those organoleptic parameters based on a ranking scale, where 1=strongly dislike, 2=dislike, 3=somewhat, 4=like, and 5=like very much.

Data Analysis

Data obtained from the organoleptic test were analyzed statistically using the Kruskal-Wallis to determine whether there was a significant difference in the organoleptic acceptance of nuggets made from Manyung fish with the addition of moringa leaves concerning color, taste, texture, aroma. A value of $p < 0.05$ indicated a significant differences. Further analysis was conducted using the Mann-Whitney test.

RESULTS AND DISCUSSION

Color Acceptance

The organoleptic test results for Manyung fish nuggets incorporating moringa leaves by 40 consumer panelists were illustrated in Figure 2. The higher the proportion of moringa leaves in the nugget formulation, the lower preference of panelists. As per Table 3, the color evaluation of the nuggets with moringa leaf additions (F1: 3.5, F2: 3.5, F3: 3.3) fell within the moderately (somewhat) liked category. Notably, slight variations in color were observed among the three formulations: F1 (10g moringa) displays a light green hue, F2 (20g moringa) appears leaf green, and F3 (30g moringa) exhibits a dark green shade. Statistical Kruskal-Wallis test on the color acceptance evaluation yielded a p -value of 0.392 ($p > 0.05$). This statistical outcome indicated that the average liking scores of consumer panelists for the color of Manyung fish nuggets enriched with moringa leaves did not differ significantly among the formulations.

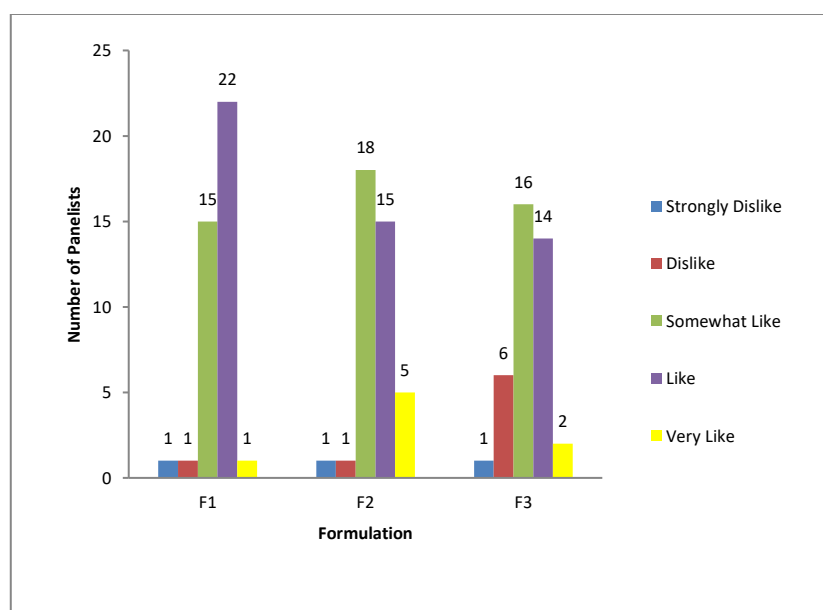


Figure 2. Color Acceptance of Manyung Fish Nugget with Moringa Leaves

Table 3. Statistical Analysis of the Color Acceptance of Manyung Fish Nugget Enriched with Moringa Leaves

Formula	Panelist Amount	Mean	SD	<i>p-Value</i>
F1	40	3,5		
F2	40	3,5	0,838	0,392
F3	40	3,3		

Taste Acceptance

Table 4 displayed the taste acceptance for Manyung fish nuggets with additions of moringa leaves under treatments F1, F2, and F3. The average taste ratings for F1, F2, and F3 were 3.8, 3.3, and 3.2, respectively. Each formulation exhibited distinct taste profiles attributed to different moringa leaf quantities. F1 stands as the most favored due to its pronounced Manyung fish flavor, while F2 subtly hinted at the presence of moringa leaves. Conversely, F3, characterized by a dominant moringa leaf taste emerging as the least preferred. Researchers (Vidayana et al., 2020) studying catfish nuggets with the addition of moringa leaves stated that with a slight addition of moringa leaves, the taste becomes

more delicious and savory. This is because the more fat content in the fish, the more savory the taste.

Conducting the Kruskal-Wallis test on the samples of Manyung fish nuggets with moringa leaf additions yielded a significant p-value of 0.013 ($p < 0.05$). This result highlighted a notable divergence in taste quality, subsequently validated through the Mann-Whitney test for comparisons (Table 4). This finding was consistent with Hasniar (2019), which showed a significant difference in the taste of meatballs with the addition of moringa leaves. Our study revealed a difference in taste quality among the three formulations, with a p-value of 0.013. There were a taste difference between F1-F2 and F1-F3, while F2-F3 showed no significant difference

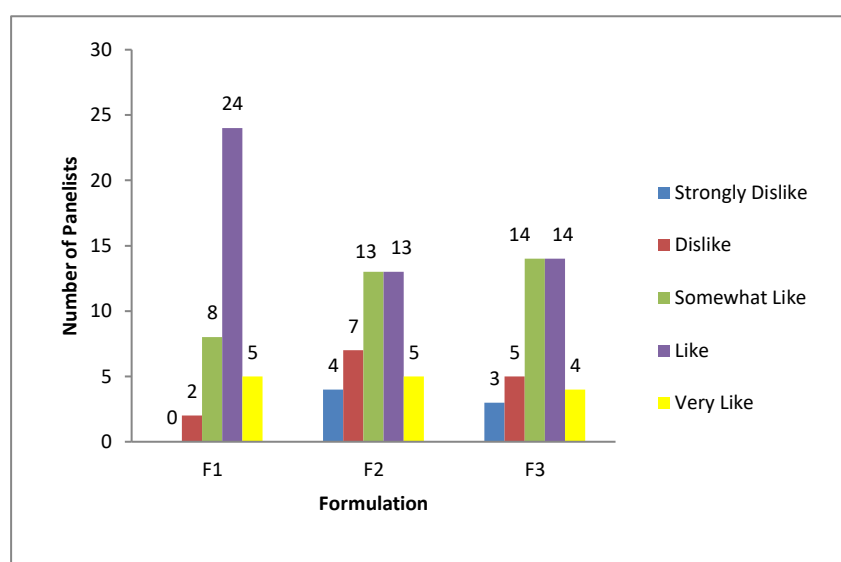


Figure 3. Taste Acceptance of Manyung Fish Nugget with Moringa Leaves

Table 4. Statistical Analysis on the Taste Acceptance of Manyung Fish Nugget Enriched with Moringa Leaves

Formula	Panelist Amount	Mean	SD	<i>p</i> -Value
F1	40	3,8 ^b		
F2	40	3,3 ^a	0,995	0,013
F3	40	3,2 ^a		

An increased addition of moringa leaves makes the nugget slightly bitter, attributed to the amino acid content in moringa leaves acting as a component in flavor and taste formation. Bitterness results from amino acid hydrolysis during the heating process in processing (Ansar et al., 2022). In line with Cahyati

et al. (2020), products with added moringa leaves have a somewhat bitter taste due to the presence of phenolic compounds and alkaloids. Excessive addition of moringa leaves (beyond 30%) will dominate the taste of the nugget, resulting in a stronger bitter taste.

Aroma Acceptance

Table 5 presented the aroma evaluation for Manyung fish nuggets incorporating moringa leaves across treatments F1, F2, and F3. The averaged values for F1 (3.9), F2 (3.6), and F3 (3.6) reflected diverse aromas attributed to differing moringa leaf proportions.

The statistical scrutiny via the Kruskal-Wallis test on samples of Manyung fish nuggets supplemented with moringa leaves revealed a p-

value of 0.161 ($p > 0.05$), suggesting that the inclusion of moringa leaves does not significantly impact the aroma acceptance of Manyung fish nuggets. Previous research (Vidayana et al., 2020) indicates that an increased addition of moringa leaves intensifies their aroma in the nuggets. This phenomenon is attributed to an enzyme, protease, present in moringa leaves, contributing to their distinctive odor (Sanjaya et al., 2022).

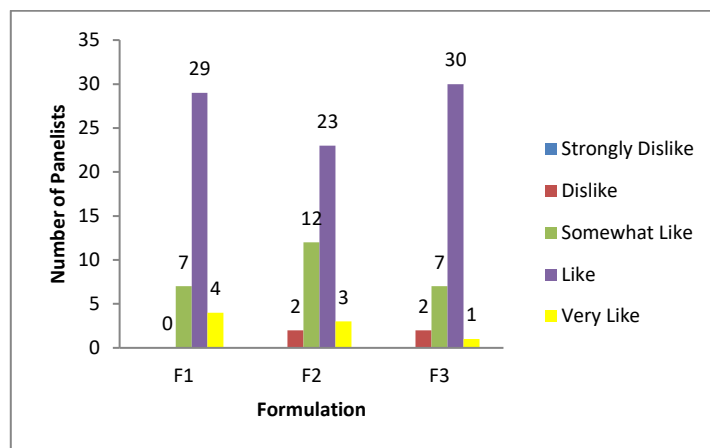


Figure 4. Aroma Acceptance of Manyung Fish nugget with Moringa Leaves

Table 5. Statistical Analysis on the Aroma Acceptance of Manyung Fish Nugget Enriched with Moringa Leaves

Formula	Panelist Amount	Mean	SD	<i>p</i> -Value
F1	40	3,9		
F2	40	3,6	0,651	0,161
F3	40	3,6		

Texture Acceptance

Table 6 displayed the texture evaluation for Manyung fish nuggets incorporating moringa leaves, presenting average values of 3.9, 3.7, and 3.5, respectively. Notably, the textures across these three formulations were nearly identical. F1 exhibited a denser texture due to a higher proportion of Manyung fish compared to moringa leaves, while F2 and F3 possess slightly softer textures due to increased moringa leaf concentrations compared to F1.

Conducting the Kruskal-Wallis test on samples of Manyung fish nuggets with moringa leaf additions yielded a p-value of 0.146 ($p > 0.05$). This indicates that the inclusion of moringa leaves did not significantly influence the panelist preference towards the texture of the nuggets. This corresponded with Faidah & Rohmawati (2022), which no substantial texture differences were observed in catfish sausage with moringa leaf additions. While Hasyim (2019) indicated that increased concentrations of added moringa leaves lead to lower preference levels among panelists.

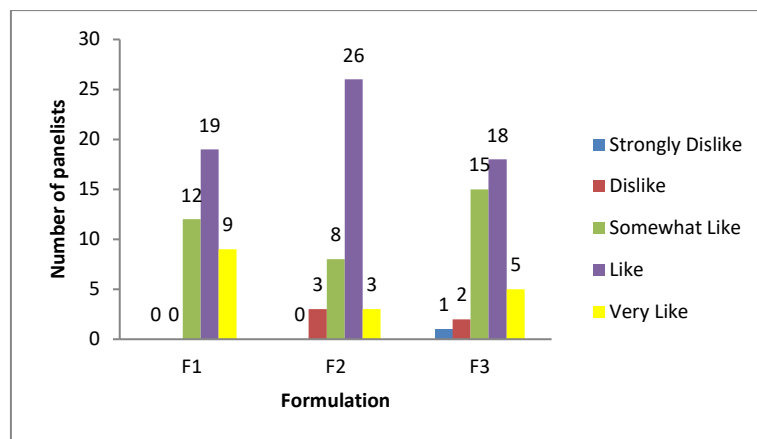


Figure 5. Texture Acceptance of Manyung Fish Nugget with Moringa Leaves

Table 6. Statistical Analysis on the Texture Acceptance of Manyung Fish Nugget Enriched with Moringa Leaves

Formula	Panelist Amount	Mean	SD	<i>p</i> -Value
F1	40	3,9		
F2	40	3,7	0,775	0,146
F3	40	3,5		

CONCLUSION

It can be concluded that the most preferred organoleptic acceptance regarding color, taste, aroma, and texture was evident in formulation F1 (90 g Manyung fish and 10 g moringa leaves). Further elaboration is needed on processing techniques or preliminary treatments to reduce the bitter taste of moringa leaves for application in food to enhance the nutritional value, particularly iron.

REFERENCES

- Ansar, N. M. S., Mandeno, J. A., Tanod, W. A., & Cahyono, E. (2022). Program Kemitraan Masyarakat Pembuatan Nugget Ikan di Kampung Bengketang Kabupaten Kepulauan Sangihe, Sulawesi Utara. *Jurnal Ilmiah Tatengkorang*, 6(2), 49-53.
- Cahyati, D. P., Simanjuntak, B. Y., & Rizal, A. (2020). Peningkatan Kadar Hemoglobin Remaja Putri dengan Pemberian Kukis Pelangi Ikan Gaguk (*Arius thalassinus*). *Jurnal Kesehatan*, 11(2), 223-229. doi:10.26630/jk.v11i2.2133.
- Faidah, S. N., Sulistiyani, S., & Rohmawati, N. (2022). Pengaruh Penambahan Tepung Daun Kelor (*Moringa oleifera*) Terhadap Daya Terima Sosis Ikan Lele (*Clarias gariepinus*). *Jurnal Agroteknologi Merdeka Pasuruan*, 6(2), 1-8.
- Hasan, R., I'annah, F. C., & Bahi, R. R. R. (2022). DOCKING MOLEKULER SENYAWA POTENSIAL DAUN KELOR (*Moringa oleifera*) TERHADAP RESEPTOR FOLAT. *Journal of Innovation Research and Knowledge*, 2(2), 519-526.
- Hasniar, R. M., & Fadilah, R. (2019). Analisis kandungan gizi dan uji organoleptik pada bakso tempe dengan penambahan daun kelor (*Moringa oleifera*). *Jurnal pendidikan teknologi pertanian*, 5(1), 5189-5200.
- Haya, M., & Wahyu, T. (2021). Effect of Education With the Method and Video Animation on Balanced Nutrition Knowledge for Prevention Anemia. *Jurnal Vokasi Keperawatan (JVK)*, 4(1), 253-266.
- Hidayah, N. (2022). Pengaruh Penambahan Serbuk Daun Kelor Terhadap Kadar Fe, Vitamin C, Dan Daya Terima Coklat Kelor (*Kokoa Moringa Oleifera*): Effect of Addition of

- Moringa Leaf Powder to Fe, Vitamin C, and Acceptability of Moringa Chocolate (Kokoa Moringa Oleifera). *Public Health and Safety International Journal*, 2(01), 83-90.
- Indonesia, P. A. G. (2013). Tabel komposisi pangan Indonesia. Elex Media Komputindo.
- Indrawatiningsih, Y., Hamid, S. A., Sari, E. P., & Listiono, H. (2021). Faktor-Faktor yang Mempengaruhi Terjadinya Anemia pada Remaja Putri. *Jurnal Ilmiah Universitas Batanghari Jambi*, 21(1), 331-337.
- Kemenkes, R. I. (2018). Hasil riset kesehatan dasar tahun 2018. *Kementrian Kesehatan RI*, 53(9), 1689-1699.
- Muchtar, F. dan Bahar, H. (2022). Edukasi Pembuatan Nugget Ikan Sebagai Upaya Pemanfaatan Potensi Perikanan di Desa Mekar Kecamatan Soropia Kabupaten Konawe. *Jurnal Pengabdian Masyarakat Bidang Sains dan Teknologi*, 1(4), 526–533. doi:10.55123/abdikan.v1i4.1118.
- Nuraeni, R., Sari, P., Martini, N., Astuti, S., & Rahmiati, L. (2019). Peningkatan Kadar Hemoglobin melalui Pemeriksaan dan Pemberian Tablet Fe Terhadap Remaja yang Mengalami Anemia Melalui “Gerakan Jumat Pintar”. *Jurnal Pengabdian Kepada Masyarakat (Indonesian Journal of Community Engagement)*, 5(2), 200-221. doi:10.22146/jpkm.40570.
- Nurjannah, S.N. dan Putri, E.A. (2021). Hubungan Status Gizi Dengan Kejadian Anemia Pada Remaja Putri Di Smp Negeri 2 Garawangi Kabupaten Kuningan. *Journal of Midwifery Care*, 1(02),hal.125–131. doi:10.34305/jmc.v1i02.266.
- Pati, W.C.B., Sirajuddin, M.S. dan Apriawal, J. (2022). Pelatihan Regulasi Emosi Untuk Menurunkan Kecemasan Pada Remaja Di Kabupaten Konawe (SMAN 1 Anggaber). *Jurnal Mandala Pengabdian Masyarakat*, 3(1), 22–27. doi:10.35311/jmpm.v3i1.47.
- Rahmawati, S. H., Fahrulsyah, F., Herdiana, N., & Wijayanti, A. (2022). ANALISIS UJI PROKSIMAT IKAN GABUS (*Channa striata*) LAMPUNG SEBAGAI BAHAN BAKU NUGGET IKAN. *Fisheries Of Wallacea Journal*, 3(2), 63-70. <http://dx.doi.org/10.55113/fwj.v3i2.1286>
- Sanjaya, M. A. P. A. A., Yulianingsih, G., Khasanah, M., Wahyudi, K. E., & Firdaus, B. S. (2022). Mie Basah Substitusi Tepung Daun Kelor dalam Upaya Pencegahan Stunting. *INCOME: Indonesian Journal of Community Service and Engagement*, 1(2), 178-185. doi:10.56855/income.v1i2.108.
- Savitri, M. K., Tupitu, N. D., Iswah, S. A., & Safitri, A. (2021). Hubungan Kepatuhan Konsumsi Tablet Tambah Darah Dengan Kejadian Anemia Pada Remaja Putri: A Systematic Review. *Jurnal Kesehatan Tambusai*, 2(2), 43-49. doi:10.31004/jkt.v2i2.1784.
- Vidayana, L.R., Sari, F.K. dan Damayanti, A.Y. (2020). Pengaruh Penambahan Daun Kelor Terhadap Penerimaan, Nilai Proksimat Dan Kadar Zat Besi Pada Nugget Lele. *Sagu*, 19(1), 27–39.