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Acceptability Evaluation and Nutritional Composition of Mayonnaise Produced from a Blend of Sesame and Olive oil

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Abstract

This study investigated the proximate, nutritional and sensory properties of mayonnaise produced with varying blends of sesame oil and olive oil to enhance its health benefits and consumer acceptability. The mayonnaise formulations included 100% pure olive oil as sample A, 100% sesame oil as sample B, 50:50 % olive to sesame oil blends ratio as sample C, 75:25% olive to sesame oil blends as sample D, 25: 75% olive to sesame oil as sample E and purchased commercial Bama Mayonnaise as sample F which served as the control. The proximate analysis revealed significant variations in moisture (15.67% to 19.55%), fat (46.90% to 68.90%), and protein (4.20% to 18.533%) contents among the samples. Sensory evaluation indicated that the type of oil used significantly ($p<0.05$) affected the flavor, texture, and overall acceptability of the mayonnaise, with blends generally preferred while the control sample had the highest acceptability, the sesame-olive oil blends exhibited moderate consumer preference, indicating their potential for health-conscious markets. Sesame oil-based samples were rich in protein, sodium, and potassium, while olive oil contributed high calcium levels. Blended samples achieved balanced profiles, offering improved nutritional qualities. This study highlights the feasibility of using sesame and olive oil blends in mayonnaise production to achieve nutritionally enhanced and acceptable alternatives to conventional formulations. Further investigations into the shelf-life and stability of these blends are recommended to optimize their industrial applications.

Introduction

Mayonnaise is important in the food system as it is used in the preparation of several dishes like salads and can be consumed by both children and adults (Onwuzuruike *et al.,* 2022). It is a thick semisolid oil-in-water emulsion that is basically made by blending vegetable oil, with egg yolk and then flavoring with vinegar, Mustards herbs and spices (Mirzanajafi-Zanjani *et al.,* 2019). A good source of calories, micronutrients like calcium, magnesium, vitamins A and E, as well as linoleic acid and alpha-linolenic acids which are highly unique and of health importance (Aswir *et al.,* 2017). It is prepared using a wide array of edible oil which provides a base for the rest of the ingredients (Ghulam *et al.,* 2013), provide energy, essential fatty acids and serve as a carrier of fat-soluble vitamins (Zahir *et al.,* 2014; Ravisankar *et al.,* 2015). A typical formulation for conventional commercially made mayonnaise can contain as much as 65 - 80% vegetable oil, typically soybean, rapeseed, sunflower, or corn oil (Ferreira de Menezes *et al.,* 2023) depending on region of production, but, in specialty products, sometimes olive or avocado oil, fat are used, which contributes to its texture, appearance, flavor, and shelf life (Sun *et al.,* 2018; Warra *et al.,* 2011). Water makes up about 7% to 8% and egg yolks about 6%. Some formulas use whole eggs instead of just yolks. The remaining ingredients include vinegar (4%), salt (1%), and sugar (1%). Low-fat formulas will typically decrease oil content to just 50% and increase water content to about 35%. Egg content is reduced to 4% and vinegar to 3%. Sugar is increased to 1.5% and salt lowered to 0.7%. Gums or thickeners (4%) are added to increase viscosity, improve texture, and ensure a stable emulsion (Wikipedia 2023).

Sesame (*Sesamum indicum)* otherwise known as sesamum or benni seed is one of the Worlds important oil crops Worldwide. It is a member of *Pedialaceae* family and an annual shrub with white bell-shaped flowers with a hint of blue, red, or yellow with or without branches (Kandangath, *et al.,* 2010; Jacob, 2018). Sesame is one of the oldest known oil seed crops (Ogbona *et al., 2013*). Its cultivation dates as far as 1500 BC in the Middle East, Asia and Africa (Ali *et al.,* 2007). It took the 9th position among the top 13 oil seed crops which make up 90% of the world production of edible oil (Adeola *et al.,* 2010). Sesame oil contains high amount of lignan compounds such as sesamol, sesamin, sesamolin, sesaminol, sesamolinol which particularly resulted to the inhibition of lipid oxidation (Lee *et al.,* 2008). Sesame oil contains high concentration of monounsaturated fatty acids and tocopherols and other phenolic compounds that makes it resistant to oxidation. Sesame seed (Sesamum indicum L.) is an oil seed with a chemical composition of about 50-52% oil, 17-19% protein and 16-18% carbohydrate (Sahu et al., 2016). The hull contains large quantities of oxalic acid, crude fiber, calcium and other minerals. When the seed is properly dehulled, the oxalic acid content is reduced from about 3 % to less than 0.25 % of the seed weight (Sahu *et al*., 2016). Sesame oil has been widely used in everyday life, generally, sesame oil is used as cooking and salad oil. Sesame oil has a slightly nutty taste, making it excellent for stir-fried dishes. In addition, the sesame seed oil can be used directly without refining in natural salad (Akinoso 2006). Sesame oil is also used as an ingredient in other products such as mayonnaise (Ebtihal 2016), oleogels (Fayaz 2017), and cocoa cream fat (Lončarević *et al.,* 2016).

Olive oil is a product that is widely produced and consumed throughout the ages in Mediterranean cuisine and is highly appreciated for its delicious taste and aroma, as well as for its nutritional properties (Ashokkumar *et al., 2018*). The history of olive tree farming is steeped in legend and custom, according to (Muzzalupo and Perri 2008), it most likely began between 5000 and 6000 years ago in a large area of land by the eastern Mediterranean Sea and in the nearby regions that include Asia Minor, a portion of India, Africa, and Europe. Olive oil is very rich in nutritional and pleasant flavour which has led to an increase in consumption of olive oil (Patumi *et al.,* 2002). Olive oils possess numerous nutritional benefits which are primarily related to the fatty acid composition, mainly due to both the high content of oleic acid and the balanced ratio of saturated and polyunsaturated fatty acids. Olive oil is rich in monounsaturated fatty acids and low in saturated fatty acids. In addition, olive oil contains considerable amounts of natural antioxidants and is considered important in the prevention of many diseases (Bouaziz *et al.,* .2010). Despite the individual benefits of both oils, they are both used solely in food formulations. Sesame oil, for instance, is prone to developing strong flavors, while olive oil can lead to higher oxidative instability in some applications. Blending these oils in different proportions could address these challenge able properties while mitigating their drawbacks. This study also addresses the broader challenge of balancing health and consumer acceptability in food products. With the rising prevalence of obesity and chronic diseases linked to diet, there is a pressing need for condiments that align with modern dietary recommendations. This study investigated the proximate, nutritional and sensory properties of mayonnaise produced with varying blends of sesame oil and olive oil to enhance its health benefits and consumer acceptability.

Materials and Method

2.1 Experimental Location

The experiment was carried out in the Department of Food Science and Technology Laboratory, Modibbo Adama University, Yola, Adamawa State.

2.2 Source of Material

The Sesame (*Sesamum indicum)* seed that was used in this work was obtained from Girei Market of Adamawa State of Nigeria and was processed to oil in the department laoratory. Processed Goya extra virgin Olive oil was purchased at Yakubu Supermarket Girei for the experiment

2.3 Mayonnaise Production

Mayonnaise was produced using the recipe in Table 1 below and according to the method described by Ghulam *et al.,* (2013). The egg yolk was first denatured using a rotating electric blender, the oil was then introduced into the blended egg bit by bit for incorporation, Mustard powder, sugar and salt were introduced into the egg yolk oil mixture followed by the addition of vinegar, blending of all this continued until a desired texture and mayonnaise was obtained. The mayonnaise samples produced were placed inside air-tight plastic container and labelled accordingly.

Table 1: Recipe for Production of Mayonnaise

Ingredients	Sample A	Sample B	Sample C	Sample D	Sample E
Olive Oil	70	0	35	52.5	17.5
Sesame Seed Oil	0	70	35	17.5	52.5

Vinegar	11	11	11	11	11
Egg yolk	10.5	10.5	10.5	10.5	10.5
Distilled water	3.5	3.5	3.5	3.5	3.5
Salt	0.5	0.5	0.5	0.5	0.5
Sugar	4.0	4.0	4.0	4.0	4.0
Mustard powder	0.5	0.5	0.5	0.5	0.5

Sample F is the control (Bama Mayonaise)

Source: Belal *et al.,* (2019)

2.4. Proximate and Physiochemical properties of Mayonnaise samples

2.4.1 Proximate properties

Proximate analysis was determined according to the official method of analysis described by the Association of Official Analytical Chemist (AOAC 1995, AOAC 2010)

2.4.1.1 Energy (Kcal.)

The energy content (kcal) of the mayonnaise samples was determined by applying the method described (Aswir *et al.,* 2017) The energy value for each sample was calculated using the formula:

Energy (kcal) = (Protein (g)×4) + (Carbohydrate (g)×4) + (Fat (g)×9)

The results were expressed as kilocalories per 100 grams of the sample.

2.4.1.2 Determination of Moisture Content

Moisture content was determined according to AOAC (1995), 5g of each mayonnaise sample was weighed. The samples were dried in a preset oven (Fisher Scientific Isotemp Oven, Model 655F, (Chicago USA)) at 105^{o}C for 7hrs. After cooling in desiccator, they were weighed and noted, the samples were returned to the oven at same temperature for another 30mins. This was repeated until a constant weight was obtained for each sample. The difference in weight before and after was recorded. The weight loss was obtained as the moisture content and will be calculated as.

$$\textbf{Moisture}\,\% = \frac{difference\ in\ weight}{sampleWeight}\ x\ 100$$

2.4.1.3 Determination of Ash Content

The ash content was determined by gravimetric method AOAC (1995). 5g of the sample was weighed in a crucible, then placed in a muffle furnace at 550 °C for 3 hours until ashes were carbon free. The crucibles will then be cooled in desiccators and weighed. The ash content will be calculated using the following equation:

$$\%\ \textbf{Ash Content} = \frac{weight\ of\ ash}{Weight\ of\ original\ sample}$$

2.4.1.4 Determination of Protein Content

The protein content was determined according to the method described by Ukpanikpong, (2019), where 10ml of the sample was weighed into a beaker, 1ml phenolphthalein and 0.4ml saturated potassium oxalate solution was added. Sample was allowed to stand for 2 minutes, then neutralized to a faint colour with 0.1M sodium hydroxide solution from burette, 2 ml of 40 % formaldehyde was added and sample was titrated with 0.1M sodium hydroxide to the same pink colour of the first titration. Values was recorded and calculated as follows:

% Protein = Aldehyde value × 0.17

Were aldehyde value is equivalent to ml of 0.1ml NaOH required per 100ml of mayonnaise for the reduction of acidity produced by formaldehyde

2.4.1.5 Determination of Fat

The fat content was determined according to the method described by Onwuka, (2005), 3ml of wet food with mixture of methanol and chloroform was mixed to give a portion of single phase miscible with water, 2ml of extra chloroform was added to give a separation of phases, sample was centrifuge at 4,000rpm for 20 minute, the chloroform layer was removed, sample was poured into an empty dish of known weight and dried in drying mantle, weight of fat residue was recorded

$$\%\ Fat = \frac{Weight\ of\ residue}{Weight\ of\ sample}\ x100$$

2.4.1.6 Carbohydrate Content

The carbohydrate content of the mayonnaise samples was determined by the difference method, which involves subtracting the sum of the other proximate components from 100%. The carbohydrate content was then calculated using the formula:

Carbohydrate (%) = 100% − (Moisture % + Ash % + Protein % +Fat %)

2.4.2 Minerals Content

Mineral content of the mayonnaise determination which includes, calcium (Ca), sodium (Na), magnesium (Mg), iron (Fe), zinc (Zn) and potassium (K) were performed using Inductively Coupled Plasma Optical Emission Spectrometry (ICP-OES) (Perkin Elmer, USA). Approximately, 3g of homogenized samples were digested using dry ash method (AOAC 2005). The resulting ash was dissolved in 7 mL concentrated hydrochloric acid and then diluted to 100 mL with deionized water. The solution was filtered, and the mineral content determined using ICPOES against the standard solution.

2.5 Sensory Evaluation

A 30-member semi trained panel aged 18 to 27 years old and composed of 15 females and 15 males evaluated the sensory properties of the mayonnaise samples. Panelists were trained according to the method described by Iwe (2014). Each sample will be coded, labelled and presented to the panelists for analysis. Panelists will also be presented with score sheets coded on a 9-point hedonic scale ranging from 1 for disliked extremely to 9, liked extremely and sachets of water to rinse their mouth after tasting each sample to prevent carry over after taste. Sensory characteristics include Appearance, Aroma, Taste, Flavour, texture, and overall acceptability. After the sensory analysis, data was collated from score sheets for statistical analysis.

2.6 Statistical Analysis

One-way analysis of variance was carried out on the data generated in this study as described by (Hussein *et al.,* 2021) using the SPSS version 19.0 software. The analyzed data was expressed as means alongside their respective standard deviations. The Duncan multiple range test was also used to compare the means of experimental data at 95% confidence interval when a difference has been reported to exist.

RESULTS

Table 3.1. Proximate Composition of Mayonnaise Samples (%)

Parameters Tested	A	B	C	D	E	F
Energy (KCalories)	625.06^{ab} ± 8.42	589.83^{bc} ± 3.70	561.03^{c} ± 10.48	576.1^{bc} ± 3.8	616.07^{b} ± 7.33	666.69^{a} ± 10.71
Moisture (%)	15.67^{b} ± 0.68	16.71^{b} ± 1.31	19.04^{a} ± 0.89	19.44^{a} ± 0.38	19.55^{a} ± 0.23	19.130^{a} ± 0.96
Ash (%)	0.94^{bc} ± 0.03	1.00^{b} ± 0.00	0.93^{c} ± 0.02	0.92^{c} ± 0.01	1.31^{a} ± 0.02	0.89^{c} ± 0.04
Protein (%)	15.40^{ab} ± 3.12	18.533^{a} ± 1.72	10.97^{b} ± 1.27	10.93^{b} ± 1.27	11.00^{b} ± 1.08	4.20^{c} ± 0.85
Fat (%)	58.31^{b} ± 1.17	52.10^{bc} ± 1.22	46.90^{c} ± 1.03	51.50^{bc} ± 7.45	59.91^{ab} ±1.31	68.90^{a} ± 3.10
Carbohydrates (%)	9.67^{b} ± 2.90	11.67^{b} ± 1.32	23.79^{a} ± 3.11	17.20^{ab} ± 7.00	8.23^{b} ± 2.18	7.45^{b} ± 2.98

Values are means ± SD of 3 replications. Means within a row with the same super scripts are not significantly (P> 0.05) different.

Keys

Sample A: Olive Oil 100%, Sample B (Control I): Sesame Oil 100%, Sample C: Olive Oil 50% Sesame 0il 50%, Sample D. Olive Oil 75% Sesame 0il 25%, Sample E: Olive Oil 25% Sesame Oil 75% Sample F: Control II

3.1 Proximate composition of mayonnaise

The energy contents of mayonnaise samples range from 561.03 kcal/100g to 666.69 kcal/100g (Table 3.1). In comparison to USDA (2014) data, which reported mayonnaise to contain approximately 700 kcal (2900 kJ)/100g of energy content, our study recorded a lesser amount of energy, and a lesser amount than the energy level on the labeling of the commercial mayonnaise (Bama), which has 752 kcal/100g. Our finding falls within the report of Aswir *et al., (*2017) who recorded a total energy content of 626.40 kcal/100g. The moisture contents of mayonnaise samples ranged from 15.67% to 19.55%, which agreed with Tri-Umar (2022) in his report on Physicochemical quality of low-fat mayonnaise using whey protein concentrate and falls below the range reported by Elsebaie *et al.,* (2022) and Gina *et al.,* (2011) in their various reports. Samples C, D, E, and F had significantly ($P < 0.05$) higher moisture content than samples A and B. Moisture content in mayonnaise can affect its shelf life and microbial stability, higher moisture levels, as in samples D, E, and F suggest a need for better preservation techniques Tri-Umar (2022). The ash Contents ranged between 0.89% and 1.31%, which Indicates the mineral content. The ash contents in this study are lower than 1.15 - 1.80 % reported by Palma *et al.,* (2004) for low-fat mayonnaise samples and 1.57% by Aswir *et al., (*2017) for mayonnaise sold in the Malaysian market but higher than 0.64% reported by Babajide and Olatunde (2010) for Heinz mayonnaise, and in agreement with Amany (2011). Sample E (Olive oil 25%, Sesame oil 75%) had the highest ash content, suggesting a higher mineral content than the other samples, while samples C, D, and F had significantly ($P < 0.05$) lower ash content. Higher ash content indicates more minerals, which aligns with findings that sesame oil contains a higher mineral content. The protein contents of the samples ranged from 4.20% to 18.53%, greater than the value reported by Onwuzuruike *et al*., (2021) in assessment of Mayonnaise Produced from Blends of Soybean Oil and African Pear Pulp Oil. Sample B (Sesame oil 100%) has the highest protein content, which aligns with sesame oil being rich in proteins. Sesame oil blends (especially sample B) show higher protein and iodine values, indicating better nutritional quality, its significantly different from all other samples except A. Sample F had the lowest protein content ($p < 0.05$). Sesame oil's high protein content is consistent with previous research indicating its nutritional benefits Edwige *et. al* (2023). The fat contents ranged from 46.90% to 68.90% like those of Muhammad *et al., (*2015) who investigated the effect of sesame sprouts on quality and oxidative stability of mayonnaise during storage. Fat content is crucial for mayonnaise consistency. Sample F (Control) had the highest fat content, which might explain its better sensory properties, it is significantly different from samples B, C, and D. Sample C has the lowest fat content ($p < 0.05$). High-fat content in mayonnaise is crucial for its creamy texture and mouthfeel Ebba (2017). The control's high fat aligns with typical commercial mayonnaise. Carbohydrate Contents ranged from 7.45% to 23.79% which agreed with the reports by Gaikwad (2017), Sample C (Olive oil 50%, Sesame oil 50%) had the highest carbohydrate content, while samples A, B, E, and F were lower ($p < 0.05$) on carbohydrate contents.

=**Table 3.2. Mineral Content for Mayonnaise Sample (Mg/l)**

Samples / parameters	Magnesium (Ma)	Sodium (Na)	Calcium (Ca)	Potassium (K)	Iron (Fe)	Zinc (Zn)
A	$0.56^{c} \pm 0.02$	$64.73^{b} \pm 0.64$	$145^{c} \pm 0.02$	$629.67^{c} \pm 1.53$	$0.60^{d} \pm 0.10$	$0.35^{a} \pm 0.01$
B	$0.62^{b} \pm 0.01$	$71.63^{a} \pm 1.30$	$132^{a} \pm 0.15$	$672.23^{a} \pm 2.5$	$2.87^{b} \pm 0.15$	$0.38^{a} \pm 0.02$
C	$0.56^{c} \pm 0.01$	$53.42^{d} \pm 1.06$	$132^{e} \pm 1.27$	$448.33^{e} \pm 2.8$	$1.07^{c} \pm 0.06$	$0.26^{b} \pm 0.06$
D	$0.60^{b} \pm 0.01$	$61.27^{c} \pm 1.16$	$122^{b} \pm 0.01$	$641.67^{b} \pm 2.08$	$4.20^{a} \pm 0.20$	$0.34^{a} \pm 0.03$
E	$0.58^{bc} \pm 0.02$	$41.84^{e} \pm 0.78$	$109^{d} \pm 0.02$	$533.00^{d} \pm 1.00$	$0.80^{cd} \pm 0.10$	$0.01^{d} \pm 0.01$
F	$0.86^{a} \pm 0.02$	$61.02^{c} \pm 0.42$	$86.67^{b} \pm 1.16$	$637.00^{b} \pm 2.05$	$0.47^{d} \pm 0.15$	$0.13^{c} \pm 0.06$

Values are means ± SD of 3 replications. Means wihin a row with the same super scripts are not significantly ($P > 0.05$) different.

Keys

Sample A: Olive Oil 100%, Sample B(Control I): Sesame Oil 100%, Sample C: Olive Oil 50% Sesame 0il 50%, Sample D. Olive Oil 75% Sesame 0il 25%, Sample E: Olive Oil 25% Sesame Oil 75% Sample F: Control II

3.2 Mineral Content for Mayonnaise Samples

Magnesium is essential for various biological functions, including energy production and muscle function. The magnesium contents ranged from 0.56 mg/l to 0.86 mg/l, which was bit far from the findings of Aswir *et al., (*2017). The higher content in the control (Sample F) might indicate a richer nutrient profile in the base formula, while the use of sesame oil in Sample B could be contributing to a slightly higher magnesium level compared to the samples with more olive oil. Sample B (100% Sesame Oil) showed the highest sodium content (71.63 mg/l), followed by Sample A (100% Olive Oil) with 64.73 mg/l. Sample E (25% Olive Oil, 75% Sesame Oil) had the lowest sodium content (41.84 mg/l). Sodium is crucial in determining the taste and shelf life of mayonnaise. The higher sodium levels in Sample B and A suggest that these may have stronger flavor profile, while Sample E could have a milder taste. Sodium is also a key factor in food preservation. Calcium is essential for bone health and other metabolic functions. Sample A (100% Olive Oil) had the highest calcium content (145 mg/l), while Sample F (Control) had the lowest (86.67 mg/l). Samples C (50% Olive Oil, 50% Sesame Oil) and D (75% Olive Oil, 25% Sesame Oil) had lower calcium levels than pure olive oil or sesame oil samples. Potassium is important for heart health and muscle function. The high potassium content in Sample B suggests it might have ingredients like potassium-based preservatives or flavor enhancers. Sample B stands out for its high sodium and potassium levels, which could be a result of the specific salts or preservatives used. The potassium contents ranged from 448.33 mg/l to 672.23 mg/l. Iron is essential for blood production, the variation in iron content suggests differences in the source of ingredients like egg yolks or spices, which can influence the iron levels. Sample D (75% Olive Oil, 25% Sesame Oil) had the highest iron content (4.20 mg/l), which is significantly higher than the other samples. Sample F (Control) has the lowest iron content (0.47 mg/l). Zinc is essential for immune function and wound healing. The relatively higher zinc content in Samples A and B suggests that both olive oil and sesame oil contribute to the zinc content of mayonnaise, with sesame oil possibly offering a slight edge. Aswir *et al., (*2017) reported 0.29 mg/100g for mayonnaise and 0.19 mg/100g for salad dressing. The type of oil used in the mayonnaise significantly influenced its mineral contents. Sesame oil (Sample B) contributed to higher levels of potassium, sodium, and zinc, whereas olive oil (Sample A) seems to boost calcium content. The blend ratios (e.g., Sample D with 75% Olive Oil and 25% Sesame Oil) can also affect the mineral profile, as seen with the high iron content in Sample D.

Table 3.3. Sensory Properties

Sensory Parameters	A	B	C	D	E	F
Appearance	5.60^{b}± 0.27	6.07^{ab}± 0.97	5.90^{ab} ± 0.44	6.30^{ab} ± 0.8	6.40^{ab} ± 0.85	7.77^{a} ±,0.9
Aroma	5.67^{b}± 0.49	5.77^{b} ± 0.35	6.13^{b} ± 0.67	6.20^{b} ± 0.20	6.17^{b} ± 0.56	7.63^{a} ± 0.58
Taste	5.00^{b} ± 0.17	5.13^{b} ±0.55	5.00^{b} ± 0.61	5.07^{b} ± 0.15	4.77^{b} ± 0.78	6.67^{a} ± 0.74
Flavour	5.20^{b} ± 0.60	5.57^{ab} ± 0.21	5.50^{ab} ± 0.61	5.07^{b} ± 0.15	5.17^{b} ± 0.38	6.90^{a} ± 1.33
Texture	5.03^{b} ±0.76	5.60^{ab} ± 0.66	5.70^{ab} ± 0.82	5.60^{ab} ± 0.52	5.57^{ab} ± 0.57	6.93^{a}± 0.38
Overall Acceptability	5.50^{b} ± 0.62	5.63^{ab} ± 0.06	5.63^{ab} ±0.63	5.50^{b} ± 0.62	5.90^{ab} ± 0.53	7.10^{a} ±0.92

Values are means ± SD of 30 replication. Means wihin a row with the same super scripts are not significantly (P> 0.05) different.

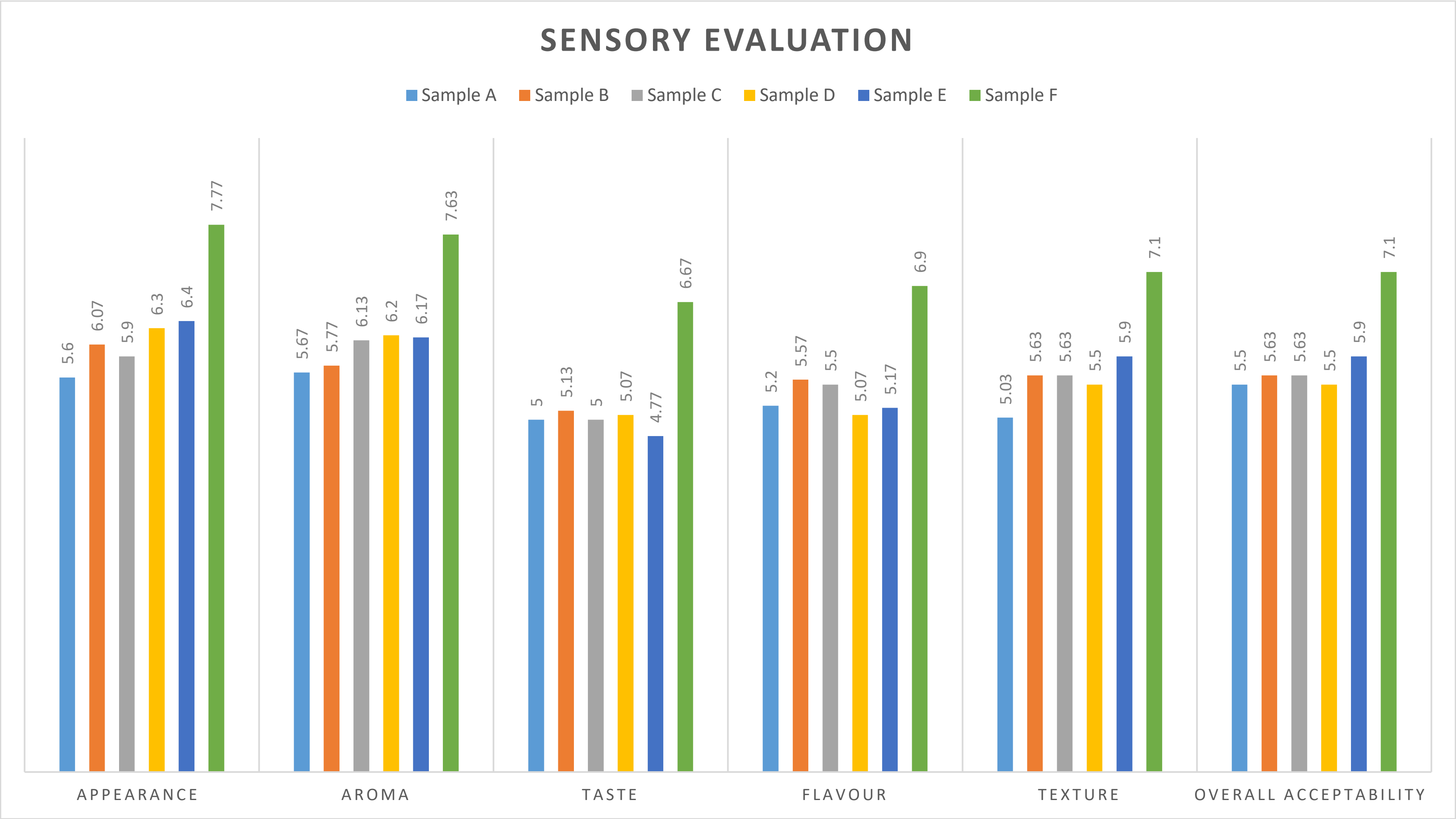
Keys

Sample A: Olive Oil 100%, Sample B(Control I): Sesame Oil 100%, Sample C: Olive Oil 50% Sesame 0il 50%, Sample D. Olive Oil 75% Sesame 0il 25%, Sample E: Olive Oil 25% Sesame Oil 75% Sample F: Control II

3.3 Sensory Properties

The success of a healthy foods in the market space depends heavily on the decisions that is influenced by the consumer preference to the food characteristics such as appearance, aroma, taste, flavour, Texture and overall acceptability. The control sample (F) had the highest score and preference for appearance, aroma, taste, flavour, texture and overall acceptability, which were like those of the characteristics and preference for a commercial mayonnaise. Sample F was significantly ($p<0.05$) different from all other samples, suggesting it looks most appealing with consumer acceptability compared to other samples. Aroma scores ranged from 5.67 to 7.63, the control's high aroma score aligns with consumer preference over other samples. There was no significantly ($p < 0.05$) different in the taste of samples A, B, C, D and E which the ranged from 4.77 to 6.67. Taste is a primary determinant of consumer preference, with the control being most favored. Flavour scores ranged from 5.07 to 6.90 the samples aside from the control samples, where neither liked nor disliked and some were liked slightly. The control sample (F) had the best texture, which was significantly ($p < 0.05$) different from Sample A, indicating good emulsification while others where approximately liked slightly but sample A was neither like nor dislike. The control sample (F) was the most accepted, likely due to its balanced sensory properties and its significantly different from A and D, but there was no significant different among Sample B, C and E ($p < 0.05$), The samples where all approximately like Slightly.

Figure 1. Sensory Evaluation Chart



Conclusion

This study explored the proximate, nutritional, and sensory characteristics of mayonnaise produced using blends of sesame oil and olive oil in varying ratios. Results demonstrated that the blends offer significant potential for enhancing the nutritional value and sensory acceptability of mayonnaise, with each sample exhibiting unique attributes. Mayonnaise made with sesame oil (Sample B) showed the highest protein content, while olive oil-based samples (Sample A) were rich in calcium. Blended samples achieved balanced nutritional profiles, indicating their potential as healthier alternatives to conventional mayonnaise. The blend of 50% sesame oil and 50% olive oil (Sample C) exhibited the highest carbohydrate content, suggesting its suitability for energy-intensive diets. Variations in moisture, fat, and ash content highlighted the influence of different oil compositions on mayonnaise properties. For example, the high ash content in Sample E (75% sesame oil, 25% olive oil) suggested enhanced mineral contributions from sesame oil. The control sample (F) received the highest scores for sensory attributes such as aroma, taste, and texture, aligning closely with consumer preferences for commercial mayonnaise. However, the sesame-olive oil blends exhibited moderate acceptability, with no significant differences in taste across the blends, highlighting their viability in appealing to health-conscious consumers. Incorporating sesame and olive oil blends into mayonnaise production can enhance its nutritional value while maintaining acceptable sensory qualities. This study demonstrates the potential of these oil blends to address dietary recommendations and consumer demands for healthier condiments, making them viable for commercial applications. Further research on the shelf-life and stability of these blends is recommended to optimize their industrial utilization.

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