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The Effect of Corn Cob Powder and Oat Fibre Incorporation in Physicochemical Properties and Sensory Acceptance of *Otak-Otak*

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Abstract: *Otak-otak* is well-known as a traditional local food in Malaysia. It is made from fish meat, tapioca flour, and many spices. This study investigates the effect of corn cob powder and oat fibre incorporation on the physicochemical properties and sensory acceptance of *otak-otak* with different formulations. The formulations used control A (100% tapioca flour), B (0% CCP: 100% oat fibre), C (25% CCP: 75% oat fibre), D (50% CCP: 50% oat fibre), E (75% CCP: 25% oat fibre), and F (100% CCP: 0% oat fibre). The proximate analysis showed that *otak-otak* incorporated with CCP and oat fibre significantly differed ($p<0.05$) regarding crude fibre and fat. Physical analysis showed that the colour of the otak-otak for L* value ranges from 53.71 to 57.58, a* value ranges from 13.15 to 15.10, b* value ranges from 32.80 to 35.21 and the ΔE 0.96 to 4.86. For texture profile analysis, the hardness ranges from 2147.60 to 5006.00 (g), springiness ranges from 0.39 to 0.66 (mm), cohesiveness ranges from 0.35 to 0.48, and chewiness ranges from 370.40 to 1459.90 (gf). For sensory evaluation, the control formulation still the highest chosen by the panellist but has no significant difference ($p<0.05$) with formulation E (75% CCP: 25% oat fibre) and formulation C (25% CCP: 75% oat fibre). Therefore, from this study, we successfully developed *otak-otak* by adding corn cob powder and oat fibre.

Keywords: Local food, Fibre, Healthy foods, Fish product

Introduction

Otak-otak is well-known as a traditional local food in Malaysia. *Otak-otak* commonly can be taken as a side dish or as a snack. *Otak-otak* is made from a fish-based product with high protein and moisture content. Not only does it contain fish meat, but *otak-otak* also has many ingredients, such as spices, that have been added. Adding spices and other ingredients to the fish meat will enhance the flavour of otak-otak, making the otak-otak different from other food. The type of fish used to make *otak-otak* varies, but mackerel is most commonly used in Malaysia because it contains low fat and good gel-forming capability. In Malaysia, *otak-otak* is a popular street food among tourists and locals, especially in Kelantan and Terengganu, Malaysia.

In this study, corn cob powder and oat fibre will be added to the fish mixture by replacing tapioca flour. This is because corn cob powder (CCP) and oat fibre are known to have a high fibre content. Corn cob is commonly known as a waste product from corn. This invention also helps reduce waste production in the agricultural industry. It has been stated that corn cob has 33.33 grams or 0.21% of crude fibre content (Abubakar et al., 2016). Oats are also known for their high crude fibre content. Oat is high in protein and fibre, and its fatty acid composition is beneficial (Liukkonen et al., 1992). Adding oats fibre with the combination of CCP can increase the fibre content in food production. Besides, it also helps to enhance the taste of the product. It helps improve the texture and colour of the food product. In this study, a newly formulated *otak-otak* will be produced. Combining the new CCP and oat fibre formulation will replace tapioca flour in *otak-otak* production. Using corn cob as a powder can help reduce the waste from corn production, where corn cob is the leading waste

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produced. Food that has high fibre content can help to smooth the digestive system and help diabetic people consume the food product, as the fibre helps to slow down the blood sugar response after a meal. Thus, this study aimed to determine the effect of CCP and oat fibre incorporation on physicochemical properties and sensory acceptance of *otak-otak.*

Method

Corn Cob Powder (CCP) and Oat Fibre Preparation

The corn cob was cut using a slicer to get a thin corn cob for drying. Then, the corn cob undergoes steam blanching to stop the enzymatic reaction. Then, the corn cob is placed in the cabinet dryer for approximately 15 hours at 60°C (final moisture content 8%). After the drying process was done, the corn cob was ground using the blender. Then, the corn cob powder will be sieved using the sieve shaker 125µm to get the fine powder. Next, for the oat fibre powder production, the oat fibre was ground using the dry blender and was sieved using the sieve shaker at 125µm (Hamzah and Wong, 2012).

Otak-Otak Preparation

In the first step in *otak-otak* preparation, the dried chillies were soaked in hot water for 10 minutes. The seeds were discarded to reduce the spiciness and then set aside. Then, chop the rest of the spices and herbs into smaller pieces. Then, all the ingredients were blended until they became smooth. The oil was added to the blender to make the blending process easier. Add some oil to sauté blended spices in a pan over medium to low heat until cooked. The process was continued by stirring the ingredients to prevent the paste from burning. Then, the paste was completely cooked and set aside to cool.

The excess oil was discarded once the chilli paste was no longer warm. Then, chilli paste was added with the fish fillet, coconut milk, water, salt, sugar, and tapioca flour and blended together until it became a fine paste. Scoop 40 grams of fish paste onto a nipah leaf. Then, fold and wrap the fish paste. Secure the ends with toothpicks. The final step was repeated until the all *otak-otak* paste was finished. All samples were frozen before being used and grilled using the standard procedure for coking before further analyses and sensory evaluations. The treatment is as follows: control A (100% tapioca flour), B (0% CCP: 100% oat fibre), C (25% CCP: 75% oat fibre), D (50% CCP: 50% oat fibre), E (75% CCP: 25% oat fibre), and F (100% CCP: 0% oat fibre) and the others ingredients were constant.

Texture Profile Analysis

The texture profile analysis was determined using the texture analyser TA-XT-plus (Stable Micro System, United Kingdom) (Samakradhamrongthai et al., 2017). In this method, the pre-test speed was 2mm/sec, the test speed was 1mm/sec, and the post-test speed was 2mm/sec. The percentage of strain used was 50%, and the load cell was 30kg. The distance from the platform was 30.0mm, and double compression was performed. The attributes measured were hardness, springiness, cohesiveness, and chewiness.

Colour Profile Analysis

Colour measurement was performed using the Minolta Chroma Meter (Konica Minolta, CR-400, Japan). The measurement was taken three times for each sample. Data were stored in the CIE L*a*b* colour model, and colour changes were evaluated. The Total Colour Difference (ΔE*) was generated based on differences of colour space L*, a*, b* and a single number metric. The colour difference was calculated using the Equation 1 (Purlis and Salvadori, 2007). The Minolta CR-400 Chroma Meter D65 calibration plate was used for calibration. All measurements were repeated in three replicates.

$$\Delta E^* = \sqrt{\left(L_0^* - L^*\right)^2 + \left(a_0^* - a^*\right)^2 + \left(b_0^* - b^*\right)^2} \quad \text{.......... (1)}$$

Where L_o*, a_o* and b_o* indicate colour parameters of control, parameter L* refers to the lightness of the different formulations and ranges from black (L=0) to white (L=100), and a negative value of parameter a* indicates green. A positive one indicates red-purple colour, a positive value of parameter b* indicates yellow, while a negative value indicates blue.

Proximate Analysis

The proximate analysis of the control and different formulations of *otak-otak* products were measured using AOAC methods (AOAC, 2000). Oven drying and weighing methods (926.12, 41.1.02) were used to measure the moisture content. Ash content was measured by weighing and furnace methods at 600°C for 3-5 h (942.05, 4.1.10). Fat extraction using soxhlet distillation and chloroform as a solvent was used to measure the fat content (948.22, 40.1.05). The protein content was measured using Kjeldahl distillation, and the nitrogen value was converted to protein value using conversion factors (960.52, 12.1.07). The carbohydrate content was measured using different methods.

Sensory Evaluation

The sensory evaluation used the acceptance test (Samakradhamrongthai et al., 2017). The evaluation involved 35 semi-trained panelists. The panellists were not allergic to seafood and fibre. The seven-point hedonic scale was used with 1 for extremely dislike and 7 for extremely like. The characteristics evaluated were appearance, colour, aroma, texture, taste, and overall acceptance. Each of the formulations was packed individually, and the sample was given a three-digit random number code.

Statistical Analysis

The data obtained after completing the experiments was reported as a mean ± standard deviation. The data for physical analysis was subjected to a one-way analysis of variance (One-way ANOVA) using Minitab 21. The significance difference of mean values ($p<0.05$) is examined using Tukey's test for all responses.

Results and Discussion

Texture Profile (TPA)

The texture profile analysis (TPA) results in Table 1 provide valuable insights into the textural attributes of the different formulations (A to F). Hardness, springiness, cohesiveness, and chewiness were the parameters assessed in this study. Formulation F exhibited the highest hardness at 5006.00g, significantly surpassing the other formulations. This suggests that formulation F may possess a denser or more compact structure. The water-starch-protein interactions of the different flours significantly impact the textural properties of o*tak-otak* (Fustier et al., 2008). The gradual reductions in protein and starch content, combined with a significant increase in fibre content, resulted in accelerated increases in textural hardness. Additionally, formulation F also demonstrated the highest chewiness value at 1459.90 g, indicating that it requires more effort to masticate and potentially contains components with higher resistance to deformation. Conversely, the control (formulation A) exhibited the lowest hardness and chewiness values among the formulations, suggesting it may have a softer and less resilient texture.

Regarding springiness, Formulation F again stood out with a springiness value of 0.66, indicating that it quickly returns to its original shape after deformation, likely due to its elastic properties. In contrast, Formulation C displayed the lowest springiness value at 0.39, suggesting it may exhibit a more sluggish recovery after compression. The capacity of a product to rebound after deformation is represented by resilience, and a decrease in resilience post supplementation of corn cob powder may be related to the product's denser matrix (Baixauli et al., 2008). Cohesiveness, which measures the degree of internal bonding within the formulation, varied but generally fell within a narrow range. Notably, Formulation F demonstrated the highest cohesiveness and remarkable hardness and chewiness values, indicating a well-integrated structure resistant to breakdown during chewing.

Control A (100% tapioca flour), Formulation B (0% CCP: 100% oat fibre), Formulation C (25% CCP: 75% oat fibre), Formulation D (50% CCP: 50% oat fibre), Formulation E (75% CCP: 25% oat fibre), and Formulation F (100% CCP: 0% oat fibre). Values are expressed as mean ± SD of triplicate measurement. Superscripts with different letters are significantly different at $p<0.05$ in the same column.

Table 1.Results for texture profile analysis

Formulation	Hardness (g)	Springiness (mm)	Cohesiveness	Chewiness (gf)
A	2421.00 ± 6.71^{c}	0.46 ± 0.05^{cd}	0.37 ± 0.04^{ab}	414.10 ± 3.26^{c}
B	2147.60 ± 5.37^{c}	0.50 ± 0.04^{bc}	0.45 ± 0.04^{ab}	477.70 ± 2.18^{c}
C	2727.00 ± 7.86^{c}	0.39 ± 0.08^{d}	0.35 ± 0.05^{b}	370.40 ± 2.42^{c}
D	3891.40 ± 8.31^{b}	0.51 ± 0.09^{bc}	0.40 ± 0.06^{ab}	773.63 ± 2.58^{b}
E	3527.70 ± 6.45^{b}	0.59 ± 0.07^{ab}	0.48 ± 0.03^{a}	984.20 ± 2.66^{b}
F	4006.00 ± 5.22^{a}	0.66 ± 0.08^{a}	0.45 ± 0.08^{ab}	1459.90 ± 3.11^{a}

Colour Profile

The results presented in Table 2 depict the colour profile analysis of six distinct formulations (A to F), characterized by their respective L*, a*, and b* values and the corresponding ΔE values. L*, a*, and b* values represent the lightness, greenness-redness, and blueness-yellowness components of colour, respectively, while ΔE quantifies the overall colour difference between the two samples. Notably, formulation F exhibited the highest L* value at 57.58, indicating its lighter appearance than the other formulations. The results show that the lightness of the formulation was increased when the amount of corn cob powder was increased. Therefore, the formulation with corn cob powder shows brighter in colour compared to the formulation that contained a high amount of oat fibre. Conversely, formulation F displayed the lowest a* value at 13.15, suggesting a shift towards greenness in its colour profile. Formulation E closely followed formulation F in terms of L* and a* values, indicating similarities in their lightness and greenness characteristics.

Interestingly, formulation D and E exhibited similar L* values but demonstrated variations in their b* values, with formulation E displaying a slightly higher b* value (34.83) than formulation D (34.76), indicating a slightly more yellowish hue. These nuanced differences are reflected in their respective ΔE* values, with formulation E displaying an ΔE* value of 3.77, indicative of a moderate colour difference compared to formulation D, with an ΔE* value of 3.45. Overall, the analysis highlights subtle variations in the colour profiles of the formulations, with formulation F standing out as the lightest and most greenish, while formulation D presents a slightly less yellowish hue compared to formulation E. The value of ΔE* between 0 and 1.5 is thought to imply that the formulations are almost similar to the naked eye. The colour difference may already be seen when the AE* value is between 1.5 and 5, and it gets more noticeable when the AE* value is larger than 5 (Obón et al., 2009).

Table 2. Results for colour profile analysis

Formulation	L*	a*	b*	ΔE*
A	53.71 ± 0.04^{c}	14.87 ± 0.52^{a}	32.80 ± 0.20^{c}	0.00 ± 0.00^{c}
B	54.38 ± 0.38^{bc}	15.10 ± 0.81^{a}	33.43 ± 0.65^{bc}	0.96 ± 0.49^{c}
C	55.16 ± 0.26^{b}	14.68 ± 0.44^{ab}	33.96 ± 0.16^{abc}	1.86 ± 0.03^{c}
D	56.56 ± 0.49^{a}	14.87 ± 0.63^{a}	34.76 ± 0.47^{ab}	3.45 ± 0.65^{b}
E	56.88 ± 0.57^{a}	15.04 ± 0.73^{a}	34.83 ± 0.74^{ab}	3.77 ± 0.72^{ab}
F	57.58 ± 0.54^{a}	13.15 ± 0.47^{b}	35.21 ± 0.75^{a}	4.86 ± 0.36^{a}

Control A (100% tapioca flour), Formulation B (0% CCP: 100% oat fibre), Formulation C (25% CCP: 75% oat fibre), Formulation D (50% CCP: 50% oat fibre), Formulation E (75% CCP: 25% oat fibre), and Formulation F (100% CCP: 0% oat fibre). Values are expressed as mean ± SD of triplicate measurement. Superscripts with

Proximate Compositions

The proximate analysis results presented in Table 3 provide valuable insights into the nutritional composition of the formulations analysed. The parameters evaluated include moisture content, protein content, fat content, fibre content, ash content, and carbohydrate content for six different samples labelled from A to F. Moisture content, an important indicator of the water content in the formulations, ranged between 51.48% to 52.11%, with minimal variation observed among the formulations. This consistency suggests that the formulations were processed or stored under similar conditions, maintaining uniformity in moisture levels. The trend in this study shows the moisture content of the *otak-otak* increasing as the amount of corn cob increased. This shows that the corn cob has the ability to hold the water molecules in the food product compared to the oat fibre and tapioca flour. However, based on statistical analysis, there was no significant difference ($p>0.05$) among the formulations. Thus, oat fibre and CCP additions did not affect moisture content.

Protein content, a crucial nutrient for growth and repair, displayed relatively consistent values across all formulations, ranging from 14.03% to 14.33%. This consistency suggests that the protein content of the formulations was maintained during processing, indicating the reliability of the production process in preserving this essential nutrient. The trend of the crude protein content in this study shows the decreasing amount of crude protein when the amount of corn cob powder was increased. However, based on statistical analysis, there was no significant difference ($p>0.05$) among the formulations. Thus, oat fibre and CCP additions did not affect protein content.

Fat content varied slightly among the formulations, ranging from 5.64% to 6.32%. Formulation A exhibited the lowest fat content, while sample F displayed the highest. The total fat content of corn cob powder was 4.72% (Abubakar et al., 2016), while the amount of fat content in oat fibre was 6.91% (Syed et al., 2020) and tapioca flour's fat content is only 0.60% (Balogun et al., 2012). This variation could be attributed to differences in the amount of oat fibre and CCP in the formulations. Therefore, the additions of oat fibre and CCP resulted in a significant difference between treated formulations and control.

Fibre content ranged from 0.49% to 0.86%. Control A exhibited the lowest fibre content, while formulation F had the highest. This variation suggests differences in the fibre content of the raw materials used or variations in processing methods affecting fibre retention. Adding com cob powder and oat fibre to the otak-otak formulation increased crude fibre content. This was because the crude fibre content of corn cob powder was higher, giving it a higher fibre content in the food products incorporated with corn cob powder (Aniola et al., 2009). According to (Abubakar et al., 2016), the amount of fibre in the corn cob powder was 33.33%, which shows that the corn cob contains a high amount of fibre. This is also supported by Ahmad et al. (2021), who found that adding corn cob powder and oats into *putu piring* increased its total crude fibre content. This shows that the ability of com cob powder to replace the tapioca flour in *otak-otak* has successfully increased the total crude fibre content. Therefore, corn cob powder is also known to have insoluble fibre (Kuan et al., 2011).

Ash content, representing the inorganic mineral content of the formulations, showed minimal variability, ranging from 5.18% to 5.39%. Table 4.3 shows that the total ash content of *otak-otak* incorporated with corn cob powder and oat fibre did not have a significant difference at $p>0.05$ with the control sample. This was because the total ash content in the corn cob powder, oat fibre and tapioca flour was almost the same, where corn cob powder had 2.49% ash (Abubakar et al., 2016), oat fibre had 1.97% ash (Syed et al., 2020) and tapioca flour had 2.20% of ash (Balogun et al., 2012). This is also supported by the fact that the mineral content of the product determined the ash content of the food product. The higher the mineral, the higher the ash content in the food product. Hence, substituting corn cob powder and oat fibre with tapioca flour did not affect the total ash content of the *otak-otak*. This study was supported by the finding by Hamzah and Wong (2012), where the percentage of ash did not show any significant difference when the amount of corn cob powder increased in the formulation of high-fibre bread.

Table 3. Results for proximate analysis

Formulation	Moisture	Protein	Fat	Fibre	Ash	Carbohydrates
A	51.50 ± 1.00^a	14.33 ± 0.29^a	5.64 ± 0.05^b	0.49 ± 0.04^b	5.18 ± 0.12^a	21.85 ± 0.59^a
B	51.66 ± 1.06^a	$14\ 32\pm0.07^a$	6.14 ± 0.04^a	1.78 ± 0.06^a	5.38 ± 0.10^a	20.72 ± 1.21^a
C	51.48 ± 0.33^a	14.23 ± 0.11^a	6.28 ± 0.03^a	1.80 ± 0.02^a	5.20 ± 0.10^a	$21.01\pm0\ 49^a$
D	51.60 ± 0.66^a	14.17 ± 0.09^a	6.22 ± 0.04^a	1.82 ± 0.04^a	5.39 ± 0.02^a	20.79 ± 0.68^a
E	52.01 ± 0.26^a	14.10 ± 0.08^a	6.05 ± 0.04^a	1.84 ± 0.03^a	5.20 ± 0.16^a	20.84 ± 0.15^a
F	52.11 ± 0.36^a	14.03 ± 0.09^a	6.32 ± 0.03^a	1.86 ± 0.03^a	5.36 ± 0.03^a	20.32 ± 0.31^a

Carbohydrate content ranged from 21.32% to 22.85%, with slight variations observed among the formulations. This consistency suggests that carbohydrates constitute a significant portion of the formulation composition, contributing to their energy content. Based on Table 3, the results obtained from this study show no significant difference ($p>0.05$) between all formulations.

The carbohydrates remain the same as the total amount of each substituted ingredient, such as corn cob and oat fibre, which contain almost the same amount of carbohydrates. This was supported by the study by Ahmad et al. (2021), where the amount of carbohydrates in putu piring does not change when the CCP and oat fibre are in the *putu piring* formulation. Overall, the proximate analysis results indicate that the formulations exhibit relatively consistent nutritional profiles, with minor fat and fibre content variations.

Control A (100% tapioca flour), Formulation B (0% CCP: 100% oat fibre), Formulation C (25% CCP: 75% oat fibre), Formulation D (50% CCP: 50% oat fibre), Formulation E (75% CCP: 25% oat fibre), and Formulation F (100% CCP: 0% oat fibre). Values are expressed as mean ± SD of triplicate measurement. Superscripts with different letters are significantly different at *p*<0.05 in the same column.

Sensory Evaluation

The sensory acceptance results presented in Table 4 provide valuable insights into the perceived qualities of different samples based on appearance, colour, aroma, texture, taste, and overall acceptance. Respondents evaluated each sample, labelled A through F, providing ratings on a scale accompanied by standard deviations to indicate the variability within each assessment. There was no significant difference (*p*>0.05) among all formulations regarding appearance, colour, aroma and taste. Thus, adding oat fibre and CCP will not affect these attributes.

Meanwhile, texture, an important aspect of food sensory evaluation, showed some divergence among the samples. Formulations A, E, C, D and B scored higher in texture, suggesting they possessed desirable mouthfeel characteristics. Conversely, Formulation F received lower scores in this category, implying potential issues with texture that may have detracted from the overall enjoyment. This result also showed similar trends for overall acceptability. Formulations A and F significantly differed from formulation F, which was added with 100% CCP. Thus, the higher percentage of CCP will affect the texture and overall acceptability of the *otak-otak*.

Table 4. Results for sensory acceptance

Formulation	Appearance	Color	Aroma	Texture	Taste	Overall Acceptance
A	$4.87{\pm}1.63^{a}$	$4.90{\pm}1.65^{a}$	$4.43{\pm}1.52^{a}$	$5.03{\pm}0.89^{a}$	$4.67{\pm}0.84^{a}$	$4.90{\pm}0.85^{a}$
B	$4.43{\pm}1.31^{a}$	$4.43{\pm}1.25^{a}$	$4.67{\pm}1.56^{a}$	$4.13{\pm}1.52^{ab}$	$4.00{\pm}1.49^{a}$	$4.07{\pm}1.36^{ab}$
C	$4.83{\pm}1.34^{a}$	$4.80{\pm}1.54^{a}$	$4.93{\pm}1.34^{a}$	$4.43{\pm}1.48^{ab}$	$4.23{\pm}1.74^{a}$	$4.57{\pm}1.48^{ab}$
D	$4.40{\pm}1.63^{a}$	$4.73{\pm}1.39^{a}$	$4.50{\pm}1.76^{a}$	$4.23{\pm}1.46^{ab}$	$3.70{\pm}1.69^{a}$	$3.87{\pm}1.72^{ab}$
E	$4.97{\pm}1.45^{a}$	$4.80{\pm}1.61^{a}$	$5.00{\pm}1.49^{a}$	$4.80{\pm}1.52^{a}$	$4.47{\pm}1.57^{a}$	$4.73{\pm}1.72^{a}$
F	$4.43{\pm}1.48^{a}$	$4.57{\pm}1.31^{a}$	$4.17{\pm}1.76^{a}$	$3.77{\pm}1.50^{b}$	$3.60{\pm}1.61^{a}$	$3.60{\pm}1.48^{b}$

Control A (100% tapioca flour), Formulation B (0% CCP: 100% oat fibre), Formulation C (25% CCP: 75% oat fibre), Formulation D (50% CCP: 50% oat fibre), Formulation E (75% CCP: 25% oat fibre), and Formulation F (100% CCP: 0% oat fibre). Values are expressed as mean ± SD of triplicate measurement. Superscripts with different letters are significantly different at *p*<0.05 in the same column.

Conclusion

From this study, it was found that the use of corn cob powder and oat fibre can help in increasing the crude fibre content in *otak-otak*. The sample produced contained more crude fibre than the control sample. The other nutrients were maintained the same way, and adding corn cob powder and oat fibre did not affect any nutritional value other than fibre and fat. Thus, corn cob powder and oat fibre are suitable for other food formulations as they do not change the nutritional composition.

The physical analysis found that the hardness of the sample was directly proportional to the amount of corn cob powder used. Even though the hardness of the sample increased when the corn cob powder and oat fibre were added, the panellists still accepted it. Last but not least, increasing fibre in food products strengthens the ability of food by-products to be transformed into other ingredients that can help increase the nutritional value of the food. Thus, from this study, we have successfully improved the nutritional value of our local product to compete with other food products and meet consumer needs.

Recommendations

For further study, the shelf life of *otak-otak*, which contains corn cob powder and oat fibre, should be determined. This is due to the busy lifestyle of people nowadays, who always keep their food frozen and stored for a long period of time. This study can help identify whether the *otak-otak* can still be eaten if stored for a long time. Next, it is also suggested to study the effect of the type of cooking method of otak-otak on the texture and sensory acceptance of *otak-otak*. The cooking methods used are steaming, oven and air frying. This is because people nowadays love to eat healthy food that does not use oil in their cooking style. Hence, all of these cooking methods have a healthy benefit and may give different appearance and taste to the *otak-otak*.

Scientific Ethics Declaration

The authors declare that the scientific ethical and legal responsibility of this article published in EPHELS journal belongs to the authors.

Acknowledgements or Notes

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