

Making Organic Masks from Avocado Peel, Green Tea and Rice Powder by Conducting Quality Test on Masks

Deani Dwi Rahma Doni¹, Fajri Ikhsan^{2*}, Suryelita³, Okta Suryani⁴, Dzulhijjah Nur
Meisincea⁵, Fadia Mutiara Putri⁶

^{1,2,3,4,5,6}Departemen Kimia, Fakultas Matematika dan Ilmu Pengetahuan Alam
Universitas Negeri Padang Jalan Prof. Dr. Hamka, Air Tawar Barat, Padang, Indonesia, 25132

Email : fajri.ikhsan@fmipa.unp.ac.id *

Abstract

Article Information

Received: 05/08/25

Accepted: 30/10/25

Organic face masks derived from natural ingredients are increasingly favored because they are considered safer and more sustainable than chemical-based products. Avocado peel, green tea, and rice powder are rich in bioactive compounds such as flavonoids, antioxidants, vitamins, and minerals, which provide significant benefits for skin health. This study aimed to develop an organic face mask formulation from avocado peel, green tea, and rice powder, and to evaluate its quality through pH analysis, flavonoid identification, effectiveness testing, and organoleptic assessment. The raw materials were processed by drying, grinding, and blending, then combined in a ratio of 50% avocado peel, 20% green tea, and 30% rice powder to produce a homogeneous mask powder. Quality evaluation showed that the mask had a pH of 5, which falls within the standard range (4.5–8.0) for skin safety according to SNI. The flavonoid test yielded a positive result, confirming the presence of bioactive antioxidant compounds. The effectiveness test demonstrated that the mask dried in approximately 18 minutes, meeting the ideal drying time for consumer comfort and functionality (5–30 minutes). Organoleptic testing with 10 panelists indicated that the mask was generally well accepted, particularly in terms of texture and color, though aroma was less favored due to the natural scent of avocado peel. Overall, the formulation fulfilled the essential criteria for a safe and effective organic face mask. This research highlights the potential of agricultural by-products such as avocado peel to be developed into value-added, eco-friendly cosmetic products.

Keywords: Antioxidants, Flavonoids, Organic cosmetics, Skin health

Introduction

The increasing demand for safe and environmentally friendly cosmetic products has encouraged the development of natural-based skincare. Synthetic masks, although widely available, may cause irritation or long-term side effects due to the presence of chemical additives. Therefore, organic masks formulated from natural ingredients are gaining popularity as they are considered safer and more sustainable. Organic masks are rich in bioactive compounds such as vitamins, minerals, flavonoids, and antioxidants that play an important role in protecting the skin from free radicals, delaying premature aging, and maintaining overall skin health (Reksa Agami et al., 2021). Several natural materials have been investigated for their potential in cosmetic applications. Avocado peel, commonly regarded as agricultural waste, contains flavonoids, vitamin C, and polyphenols with antioxidant and antimicrobial activities that contribute to skin brightening, moisturizing, and protection (Salsa Billa et al., 2024). Green tea (*Camellia sinensis*) is well known for its high polyphenol and catechin content, which provide anti-inflammatory and anti-aging properties (Pengabdian Komunitas et al., 2023). Meanwhile, rice powder contains compounds such as kojic acid, vitamin E, and oryzanol that help brighten the skin, maintain moisture, and protect against UV damage (Mu'tamar, 2022).

Previous studies have mostly explored these ingredients individually, focusing on their separate benefits for skincare. However, limited research has investigated the combination of avocado peel, green tea, and rice powder into a single mask formulation, along with a systematic evaluation of its quality parameters. This research gap highlights the need to develop a formulation that integrates the complementary properties of these natural materials (Setianingsih & Halim, 2022).

In addition to their functional benefits, organic masks also play a role in promoting sustainability by utilizing agricultural by-products. The use of avocado peel, which is often discarded as waste, represents an environmentally friendly approach to reduce waste and create value-added products. Previous studies have emphasized that the integration of agricultural residues into cosmetic formulations can reduce environmental impact while providing bioactive compounds beneficial for skin health (Sapuan Tanggapili et al., 2021).

Furthermore, natural ingredients such as green tea and rice powder have been extensively studied for their antioxidant and brightening properties. Green tea polyphenols are reported to inhibit collagen degradation and reduce inflammation, thereby delaying the appearance of wrinkles and fine lines (Daniela et al., 2024). Rice powder, with its kojic acid and oryzanol content, has been proven to reduce hyperpigmentation and improve overall skin tone (fatanah

& dewi, 2023). These findings reinforce the scientific rationale for combining such ingredients in cosmetic formulations.

Despite the promising benefits, one of the main challenges in developing organic masks is ensuring their quality, stability, and consumer acceptance. Parameters such as pH, presence of bioactive compounds, drying time, and sensory properties must be carefully evaluated to guarantee product safety and effectiveness. Previous formulations of single-ingredient masks have often shown limitations in consumer preference, particularly regarding aroma and texture (Tarbiyah dan Keguruan et al., 2024). Therefore, combining avocado peel, green tea, and rice powder in a single formulation is expected to address these limitations while providing synergistic benefits for skin care. Based on this background, the purpose of this study is to formulate an organic face mask from avocado peel, green tea, and rice powder, and to evaluate its quality through pH testing, flavonoid analysis, effectiveness testing, and organoleptic assessment. The findings are expected to contribute to the development of safe, effective, and eco-friendly skincare products.

Material and Methods

Materials

The materials used in this research were avocado peel, green tea, rice powder, distilled water, and 10% NaOH. The tools included blender, knife, oven, beakers (250 mL and 50 mL), stirring rod, stopwatch, dropper, filter, universal indicator paper, mortar, and pestle.

Processing of Raw Materials

Avocado peel was separated from the flesh, washed, dried under sunlight, and oven-dried at 50 °C before being ground into powder. Green tea leaves were blended and refined using a mortar and pestle. Rice was washed, soaked, dried, roasted, and ground into fine powder.

Formulation of Face Mask

The mask formulation consisted of 50% avocado peel, 20% green tea, and 30% rice powder. All ingredients were mixed until homogeneous and sieved to obtain a fine mask powder. The mixture was then weighed and packaged with proper labeling.

Quality Tests

The prepared mask was evaluated through several tests:

1. pH test using universal indicator paper after dissolving the sample in water (1:2 ratio).
2. Flavonoid test by adding two drops of 10% NaOH to the sample.
3. Effectiveness test by measuring drying time of a 10 g sample applied on skin surface.

4. Organoleptic test conducted with 10 panelists (aged 20–23 years) to evaluate aroma, color, and texture.

Results and Discussion

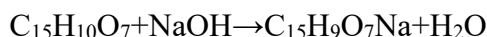
pH Test

The pH value of the formulated face mask was 5, which meets the standard requirement for facial masks according to SNI 16-6070-1999 (4.5–8.0). A balanced pH is crucial to maintain the skin's natural barrier and prevent irritation. This finding is consistent with (Rakmadhani et al., 2023). Who emphasized that facial masks within this range are safe for daily use and compatible with skin physiology. Therefore, the pH result indicates that the mask is safe and suitable for cosmetic application. Standard pH for Human Skin and Discussion of the Result the normal pH range of human skin typically lies between 4.5 and 6.5, maintaining a slightly acidic environment known as the “acid mantle.” This acidic layer functions as a natural barrier to protect the skin from pathogenic microorganisms, maintain moisture, and regulate enzyme activity responsible for healthy skin renewal. The pH value obtained in this study was 5, which falls within this ideal physiological range. This indicates that the formulated organic mask is skin-friendly and will not cause irritation or disrupt the skin's natural protective barrier. Products with a pH higher than 8.0 may damage the lipid layer and cause dryness, while those with a pH below 4.0 can trigger stinging sensations or inflammation. Therefore, the pH result (pH 5) demonstrates that the mask is safe, compatible with the skin's natural acidity, and suitable for daily cosmetic application, aligning with the SNI 16-6070-1999 standard (pH 4.5–8.0) for topical skincare products.

Flavonoid Test

The flavonoid test showed a positive result, marked by an orange color change after the addition of NaOH. This confirms the presence of flavonoid compounds in avocado peel, which are known for their antioxidant, antimicrobial, and anti-aging properties. (Pauner & Hamzah, 2022). Also reported that avocado peel contains abundant flavonoids that effectively neutralize free radicals and protect the skin from oxidative stress. Thus, the positive flavonoid result supports the potential of this mask in providing antioxidant protection for the skin. Flavonoids present in avocado peel, such as quercetin, kaempferol, and rutin, contain multiple hydroxyl (–OH) groups attached to aromatic rings. When sodium hydroxide (NaOH) is added during the flavonoid test, a chemical reaction occurs in which the hydroxide ions (OH⁻) from NaOH deprotonate these phenolic –OH groups, producing sodium phenolate (flavonolate) salts. This

deprotonation causes a shift in the conjugated π -electron system of the flavonoid, resulting in a visible color change from yellow to orange. The reaction can be represented as follows:



This reaction confirms the presence of phenolic hydroxyl groups characteristic of flavonoid structures. The orange color observed in this study therefore indicates that avocado peel powder contains active flavonoid compounds, particularly quercetin derivatives, which possess strong antioxidant properties. Upon neutralization with acid, the color typically fades or returns to its original state, demonstrating the reversible nature of the reaction. These findings support the conclusion that the mask formulation is rich in bioactive flavonoids capable of protecting the skin from oxidative stress and environmental damage.

Effectiveness Test

The drying time of the mask was 18 minutes, which falls within the ideal range of 5–30 minutes for cosmetic masks (Setianingsih & Halim, 2022). Proper drying time ensures comfort during application and allows active compounds to be absorbed effectively. According to (Radyanita et al., 2025). Masks with optimal drying time form a thin uniform film, enhancing both consumer acceptance and functional performance. Hence, the result indicates that the mask is effective and practical for skincare use.

Organoleptic Test

The organoleptic evaluation with 10 panelists revealed that the mask's texture and color were well accepted, while the aroma was less preferred due to the natural scent of avocado peel. Similar findings were reported by (Tarbiyah dan Keguruan et al., 2024). Who noted that natural-based masks are often favored for texture but may require formulation adjustments to improve aroma. Despite this, the overall sensory acceptance was satisfactory, showing potential consumer appeal.

Conclusion

This study successfully formulated an organic face mask from avocado peel, green tea, and rice powder. The quality evaluation showed that the mask had a pH value of 5, which falls within the safe range for skin application. The flavonoid test confirmed the presence of antioxidant compounds, while the effectiveness test demonstrated that the mask dried in 18 minutes, meeting the ideal criteria of 5–30 minutes. The organoleptic test indicated that the mask was generally well accepted by panelists, particularly in terms of texture and color, although the aroma was less favored due to the natural scent of avocado peel.

Overall, the results demonstrate that the formulated organic mask fulfills the criteria of a good cosmetic product, as it is safe, effective, and made from natural ingredients without harmful chemicals. These findings answer the research objectives and highlight the potential of avocado peel and other natural materials to be developed into eco-friendly and value-added skincare products.

Acknowledgements

The authors would like to express their sincere gratitude to the supervisors and laboratory staff of the Department of Chemistry, Faculty of Mathematics and Natural Sciences, Universitas Negeri Padang, for their valuable guidance and technical assistance throughout the research. Appreciation is also extended to fellow students who contributed as panelists in the organoleptic evaluation.

References

- Daniela, C., Restuana Sihombing, D., & Zagoto, C. (2024). Sosialisasi Pemanfaatan Masker Teh Hijau Dalam Mencegah Jerawat Serta Memilih Produk Masker Teh Hijau yang Aman. *Jurnal Pengabdian Kepada Masyarakat Nusantara*, 5(1), 1307–1313. <https://doi.org/10.55338/jpkmn.v5i1.2968>
- fatanah, I., & dewi, R. (2023). Analisis Usability Sistem Pakar Masker Organik Menurut Jenis Kulit Menggunakan Metode Forward Chaining Berbasis Web. *Jurnal JUTEI*, 5(1), 16–30. <https://jurnal.ugp.ac.id/index.php/jutei>
- Mu'tamar, M. F. fauzul. (2022). Kajian Pembuatan Masker Wajah Organik dari Campuran Ampas Kopi, Ampas Teh Hijau, Kunyit, dan Tepung Beras. *Agroindustrial Technology Journal*, 6(2), 37–45. <https://doi.org/10.21111/atj.v6i2.7908>
- Pauner, A., & Hamzah, B. (2022). Analisis Kadar Flavonoid pada Kulit Buah Alpukat (*persea americana* Mill.) yang Beredara Di Pasar Inpres Palu. *Media Eksakta*, 18(1), 69–73. <https://doi.org/10.22487/me.v18i1.1406>
- Pengabdian Komunitas, J., Rahardjoputro, R., & Rahma Widyaningrum, N. (2023). *Sardjiman, Rolando Rahardjoputro, Nova Rahma Widyaningrum*.
- Radyanita, T., Sofyan, A., Syamsi, N., & Fitriani, J. (2025). Uji Efektivitas Masker Wajah Peel-Off Ekstrak Kopi Robusta (*Coffea Canephora*) Konsentrasi 2,5% Terhadap Kelembapan Kulit Wajah. 3. <https://doi.org/10.38035/jsmd.v3i1>

- Rakmadhani, M., Rachmawaty, D., Pakadang, S. R., Dewi, R., Farmasi, J., Kementerian, K., & Makassar, K. (2023). *Formulasi dan Uji Fisik Sediaan Masker Gel Peel off Ekstrak Kulit Buah Pepaya (Carica Papaya L.) dengan Variasi Konsentrasi HPMC*.
- Reksa Agami, P., Yuniar Purbasari, I., & Rahmat, B. (2021). Penentuan Penggunaan Lulur dan Masker Organik Sesuai dengan Diagnosa Jenis Kulit Wajah Menggunakan Metode Decision Tree Algoritma C4.5. In *Jurnal Informatika dan Sistem Informasi (JIFoSI)* (Vol. 02, Issue 2).
- Salsa Billa, S., Widhia Agustin, E., Widowati, T., & Setyowati, E. (2024). Formula Ekstrak kulit Buah Alpukat (Persea Gratissima Gaetn) Sebagai Cream Masker Rambut Untuk Perawatan Rambut Berketombe. In *Beauty and Beauty Health Education Journal* (Vol. 13, Issue 2).
- Sapuan Tanggapili, H., Melini, A., Isrul, M., & Studi Farmasi STIKES Mandala Waluya Kendari, P. (2021). Review : Potensi Ekstrak Kulit Buah Alpukat (Persea americana Mill) Sebagai Bahan Aktif Formulasi Masker Peel-Off. *Jurnal Mandala Pharmacon Indonesia*, 7. <https://doi.org/10.35311/jmpi>
- Setianingsih, D., & Halim, M. (2022). Uji Efektivitas dan Uji Stabilitas Formulasi Makser Gel Peel-off Ekstrak Metabolit Kulit Binji Pinang Yaki (Areca Vestiaria Giseke). In *Indonesia Natural Research Pharmaceutical Journal* (Vol. 5, Issue 1).
- Tarbiyah dan Keguruan, F., Rifki, M., Harahap, N., MTsN, S., Banda Aceh, M., & MTsN, G. (2024). *Jurnal Ilmiah Mahasiswa Analisis Uji Organoleptik dan Pengaruh Masker Wajah Berbahan Daun Kelor, Tepung Beras, Kopi dan Daun Mint*. 2.

Appendix.

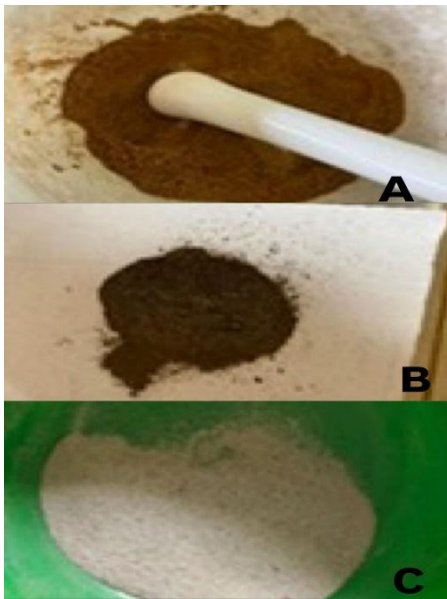


Figure 1. Face mask ingredients A. Avocado skin, B. Green tea, C. Rice powder)



Figure 2. Mask Shampooed and labeled



Figure 3. pH analysis of masks



Figure 4. Flavonoid test analysis



Figure 5. Effectiveness test analysis results

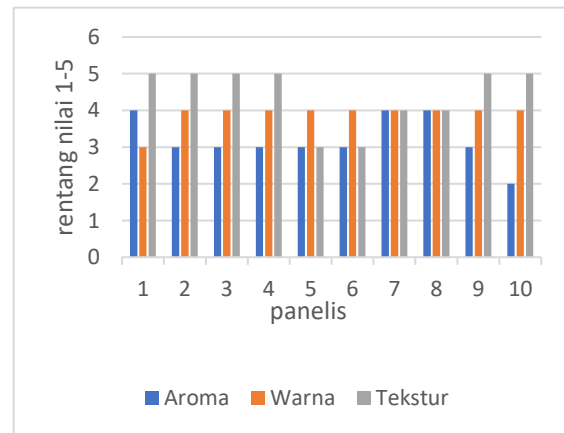


Figure 6. Graph of organoleptic questionnaire results

Table 1. Organoleptic Test Result of Panelists

Parameter	Minimal	maximal	Average
Aroma	2	4	3,2
Warna	3	4	3,9
Bau	3	5	4,4