

CHAPTER I

INTRODUCTION

1.1 The Background of the Study

Aloe vera (*Aloe vera* Linn.) has long been recognized and utilized in various skincare products for its remarkable skincare benefits, boasting soothing, moisturizing, and healing properties¹. Skincare itself encompasses a multifaceted approach to maintaining and enhancing the health and beauty of the skin, encompassing efforts to prevent dryness, ensure adequate hydration, and protect against environmental stressors². One of the bioactive components found in Aloe vera is antioxidants, which play a significant role in safeguarding the skin from the detrimental effects of free radicals. Free radicals are unstable molecules that can inflict significant damage on skin cells, accelerating aging and contributing to various skin concerns.

Skin damage, frequently attributed to exposure to ultraviolet (UV) radiation, pollution, and other environmental factors, is often mediated by the harmful effects of free radicals³. Consequently, skincare products enriched with antioxidants have gained significant prominence in modern skincare regimens, playing a crucial role in protecting and enhancing skin health. Notably⁴, Aloe vera extract stands out as a rich source of natural antioxidants, including vitamin C, vitamin E, and beta-carotene, all of which possess potent free radical scavenging properties⁵.

¹ Angga Saputra Yasir and Martinus Perangin Angin, 2022 'Uji aktivitas antioksidan gel kombinasi ekstrak etanol daun lidah buaya (*Aloevera*) dan ekstrak daun kemangi (*Ocimum Basillicum l*) Berbasis sodium alginat dengan metode DPPH' *Journal of pharmacy and tropical issues* 2 (n.d.).no. 1:01-10

² Evi Marlina, Naelaz Zukhruf Wakhidatul Kiromah, and Titi Pudji Rahayu, 2022 *Formulasi Sediaan Antioksidan Facial Wash Ekstrak Metanol Daun Ganitri (Elaeocarpus Ganitrus Roxb.) Dengan Variasi Sodium Lauril Sulfat Sebagai Surfaktan*, *Jurnal Ilmiah Manuntung* 8, no. 1: 181–90.

³ Yasir and Angin, 2022 'Uji aktivitas antioksidan gel kombinasi ekstrak etanol daun lidah buaya (*Aloevera*) dan ekstrak daun kemangi (*Ocimum Basillicum l*) Berbasis sodium alginat dengan metode DPPH'. *Journal of pharmacy and tropical issues* 2 (n.d.) no. 1:1-10.

⁴ Dyah Aryantini et al.,2020 'Formulasi dan Karakteristik Fisik Soothing Gel Kombinasi Lidah Buaya dan Buah Naga', *Cendekia Journal of Pharmacy* 4, no. 1 : 1–9, <https://doi.org/10.31596/cjp.v4i1.51>.

⁵ Azizah nada septiawan, emelda, and Sadam husein, 2020 'Aktivitas Antioksidan Kombinasi Ekstrak Etanol Lidah Buaya (*Aloe Vera L.*) Dan Ganggang Hijau (*Ulva Lactuca L.*).Pdf', *Inpharmmed Journal (Indonesian Pharmacy and Natural Medicine Journal)* Vol. 4, no. No. 1: 11–24, <https://doi.org/10.21927/inpharmmed.v4i1.1601>.

Antioxidants play a crucial role in cellular defense by neutralizing free radicals, highly reactive molecules that can damage cellular components. Chemically, antioxidants function by donating electrons to these oxidizing agents, effectively inhibiting their activity and mitigating oxidative stress. The role of antioxidants includes deactivating or stabilizing excess free radicals in the body before they can attack cells. This is achieved by delaying the oxidation of substrates, neutralizing excess free radicals, reducing peroxide concentrations, and repairing membrane oxidation within the body⁶.

Allah SWT explains the creation and growth of plants in several verses of the Qur'an,

one of which is found in Surah Al-An'am (6:99):

وَهُوَ الَّذِي أَنْزَلَ مِنَ السَّمَاءِ مَاءً فَأَخْرَجْنَا بِهِ نَبَاتَ كُلِّ شَيْءٍ فَأَخْرَجْنَا مِنْهُ خَضِرًا نُخْرِجُ مِنْهُ حَبًّا مُتَرَاكِبًا وَمِنَ النَّخْلِ مِنْ طَلْعِهَا قِنْوَانٌ دَانِيَةٌ وَجَنَّاتٍ مِنْ أَعْنَابٍ وَالزَّيْتُونَ وَالرُّمَّانَ مُشْتَبِهًا وَغَيْرَ مُتَشَابِهٍ انظُرُوا إِلَى ثَمَرِهِ إِذَا أَثْمَرَ وَيَنْعِهِ إِنَّ فِي ذَلِكَ لَآيَاتٍ لِقَوْمٍ يُؤْمِنُونَ (الأنعام/6: 99)

“And it is He who sends down water from the sky, and We produce thereby the growth of all things. We produce from it greenery from which We produce grains arranged in layers. And from the palm trees—of its emerging fruit—are clusters hanging low. And We produce gardens of grapevines, olives, and pomegranates, similar yet varied. Look at their fruit when they begin to bear and its ripening. Indeed, in that are signs for a people who believe.” (Q.S. Al-An'am: 99). These verses emphasize that Allah creates and nurtures various types of plants, each with numerous benefits for humanity. Aloe vera, although not mentioned explicitly, is among the plants with significant advantages. The recommendation to use aloe vera is also found in a hadith of the Prophet Muhammad SAW, narrated by Muslim from Uthman bin Affan, which states:

⁶ Christine Yohana Sianturil, 2019 ‘Manfaat Lidah Buaya Sebagai Anti Penuaan Melalui Aktivitas Antioksidan.Pdf’, *Essential: Essence of Scientific Medical Journal* 17, no. 1 : 34–38.

"The Messenger of Allah (SAW) once came across a man complaining about his eyes while in a state of Ihram. The Prophet said, 'Treat your eyes with aloe vera.'" (Hadith narrated by Muslim).

The primary antioxidant potential in Aloe vera (Aloe vera Linn.) lies in its polyphenol content. Polyphenols in Aloe vera play a significant role as antioxidants, offering protection against oxidative damage and providing various other health benefits. With active compounds such as aloin, emodin, aloe-emodin, chrysophanol, and quercetin, Aloe vera serves as a potent natural source of antioxidants. Further research is needed to explore the detailed mechanisms and potential clinical applications of polyphenols in Aloe vera⁷.

Gel facial washes have gained significant popularity in the skincare market due to their gentle cleansing properties while maintaining skin's natural moisture barrier⁸. This study aims to develop an optimal formulation of Aloe vera extract gel facial wash, leveraging its inherent antioxidant properties to enhance skin health⁹. Aloe vera extract is anticipated to not only provide effective cleansing but also offer additional benefits, including antioxidant protection, moisturization, and soothing effects¹⁰. Gel formulations were selected for their desirable characteristics, including long-lasting stability, resistance to rancidity, lack of odor, and aesthetically pleasing appearance. The quality assessment of the developed gel facial wash will focus on evaluating its effectiveness in cleansing, its antioxidant activity, and its overall impact on skin health¹¹.

⁷ Elseena Jose, Shilpa Joseph, and Mariya Joy, 2021 'Aloe Vera And Its Biological Activities', *World Journal of Current Medical and Pharmaceutical Research*, 16 April, 21–26, <https://doi.org/10.37022/wjcmpr.vi.167>.

⁸ Ciska Nabilah Wusono et al. 2023, 'Pengaruh Penambahan Aloe vera Glycolic Extract Pada Produk Kosmetik Micellar Water', n.d. <http://jurnal.umj.ac.id/index.php/semnaslit>

⁹ Aryantini et al., 2020 'Formulasi dan Karakteristik Fisik Soothing Gel Kombinasi Lidah Buaya dan Buah Naga'. 4 (1) <http://cjp.jurnal.stikeskendekiautamakudus.ac.id>

¹⁰ Septilina Melati Sirait, 2019 'Formulasi Sediaan Gel Ekstrak Lidah Buaya (Aloe Vera).Pdf', *Warta Akab* 43, no. 2 : 44–47.

¹¹ Ajeng Mardiana Mulia Ningsih and Neneng Siti Silfi Ambarwati, 2021 'Pemanfaatan Lidah Buaya (Aloe vera) Sebagai Bahan Baku Perawatan Kecantikan Kulit', *Jurnal Tata Rias* 11, no. 1 : 91–100, <https://doi.org/10.21009/11.1.11.2009>.

1.2 The Research Questions

The research questions in this study are:

1. How was the physical quality evaluation of the formulation of Aloe Vera's facial wash gel extraction?
2. What was the antioxidant activity of the Aloe vera (Aloe vera Linn.) extract gel facial wash formulation?
3. Which formulation provide the best antioxidant content among the three Aloe vera (Aloe vera Linn.) extract gel facial wash formulations?

1.3 The Aims of the Study

The aims of the study are:

1. To identify the evaluation results of the quality of Aloe vera (Aloe vera Linn.) extract gel facial wash formulation.
2. To assess the antioxidant activity in Aloe vera (Aloe vera Linn.) extract gel facial wash formulation.
3. To evaluate the formulation with the best antioxidant content in Aloe vera (Aloe vera Linn.) extract gel facial wash formulation.

1.4 The Significance of the Study

1.4.1 Theoretical Significance

The findings of this study are expected to contribute significantly to the existing body of knowledge regarding the formulation and development of Aloe vera (Aloe vera Linn.) extract gel facial washes. Furthermore, these findings are anticipated to provide valuable insights for future research and development endeavors in this field.

1.4.2 Practical Significance

The findings of this study can serve as a valuable reference for other researchers investigating the antioxidant activity and potential benefits of Aloe vera (Aloe vera Linn.) extract in gel facial wash formulations.

1.5 The Originality of the Research

Research on facial wash products as antioxidants has been conducted by several researchers, as shown in Table 1 below.

Table 1. Originality of Research

Research title	Research Methodology	Variables	Results	Differences from previous research
Formulation and Physical Properties Testing of Methanol Extract of Salam Leaves (<i>Eugenia polyntha</i>) Facial Wash as an Antioxidant Using the DPPH Method (1,1-diphenyl-2-picrylhydrazyl) ¹²	Eksperimental	Dependent Variable: Antioxidant activity (measured using the DPPH method) Independent Variable: Salam leaf extract concentration (2%) across six different formulations	The formulation that meets the physical test criteria can be seen in formulation number 3, as it passes the organoleptic test, pH, homogeneity, viscosity, and foam height tests. The antioxidant activity of vitamin C in combination with the facial wash containing methanol extract of Salam leaves is categorized as very strong.	Dependent Variable: Antioxidant activity Independent Variable: Aloe vera extract concentrations (2%, 4%, 6%)
Formulation of Antioxidant Facial Wash Using Methanol Extract of Ganitri Leaves (<i>Elaeocarpus ganitrus</i> Roxb.) with Variations of Sodium Lauryl Sulfate as a Surfactant ¹³ .	Eksperimental	Dependent Variable: Surfactant properties (effectiveness as a cleanser) Independent Variable: Methanol extract of Ganitri leaves (<i>Elaeocarpus ganitrus</i> Roxb.)	The results show that the variation in Sodium Lauryl Sulfate (SLS) concentration has a significant effect on the physical evaluation of the formulation, with a p-value <	Dependent Variable: Antioxidant activity Independent Variable: Aloe vera extract concentrations (2%, 4%, 6%)

¹² Mardiana Mulia Ningsih and Ambarwati. 2019 'Pemanfaatan Lidah Buaya (*Aloe vera*) Sebagai Bahan Baku Perawatan Kecantikan Kulit. *Jakarta*.

¹³ Evi Marlina, Naelaz Zukhruf Wakhidatul Kiromah, and Titi Pudji Rahayu, 2022 Formulasi Sediaan Antioksidan Facial Wash Ekstrak Metanol Daun Ganitri (*Elaeocarpus Ganitrus* Roxb.) Dengan Variasi Sodium Lauril Sulfat Sebagai Surfaktan', *Jurnal Ilmiah Manuntung* 8, no. 1: 181–90.

		with varying concentrations of Sodium Lauryl Sulfate	0.05. Formulation 3 (SLS 1%) demonstrated the best physical properties. The antioxidant activity test results indicate that Formulation 3 has an IC50 value of 17.36 ppm, which is categorized as very strong, compared to ascorbic acid (10.70 ppm) and the negative control (54.11 ppm).
Antioxidant Activity of the Combination of Aloe Vera (<i>Aloe vera</i> L.) and Green Algae (<i>Ulva lactuca</i> L.) Ethanol Extracts ¹⁴ .	Eksperimental	Dependent Variable: Antioxidant activity Independent Variable: Combination of Aloe vera (<i>Aloe vera</i> L.) and Green Algae (<i>Ulva lactuca</i> L.) ethanol extracts	The results of the antioxidant activity test using the DPPH method with the ratios 1:1, 1:2, and 2:1 show strong to very strong antioxidant activity. Therefore, the combination of Aloe vera ethanol extract and green algae at a 1:2 ratio exhibits the highest antioxidant activity, with an IC50 value of 16.51 µg/ml.

¹⁴ Azizah nada septiawan, emelda, and Sadam husein, 2020 'Aktivitas Antioksidan Kombinasi Ekstrak Etanol Lidah Buaya (*Aloe Vera* L.) Dan Ganggang Hijau (*Ulva Lactuca* L.).Pdf', *Inpharmmed Journal (Indonesian Pharmacy and Natural Medicine Journal)* Vol. 4, no. No. 1: 11–24, <https://doi.org/10.21927/inpharmmed.v4i1.1601>.