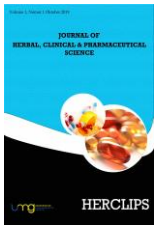

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Analysis of Specific and Non-Specific Parameters of Fragant Pandan Leaf Extract In The Bungah Region of Gresik (*Pandanus amaryllifolius*)

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Abstract

Pandanus amaryllifolius leaves are herbal plants known to have various pharmacological activities such as antibacterial, antidiabetic, anticancer, and antioxidant. These activities are supported by the content of active compounds such as flavonoids, saponins, tannins, and alkaloids. This study aims to determine the results of specific and non-specific parameters of pandan leaf extract from Bungah Village, Gresik Regency. The extraction method used maceration with 96% ethanol solvent. The research design used an experimental type. The yield of the extract obtained was 6.45%. In this study, specific parameter tests were carried out which included organoleptic tests and non-specific parameters which included water content tests, total ash content and acid-insoluble ash content. The results of the organoleptic specific parameter test showed that the extract was brown, had a distinctive odor, and had a bitter taste. The results of the non-specific parameter test include a water content of 1.9% ± 0.8 which meets the FHI requirements of no more than 10.8%, but the total ash content of 22.9% ± 6.2 does not meet the requirements set by FHI of no more than 8.9%, and the results of the acid-insoluble ash content of 20.1% ± 77.9 do not meet the requirements set by FHI of no more than 0.2%. Based on the results of the study, the extract of fragrant pandan leaves meets the standards for water content and organoleptic parameters, but does not meet the standards for total ash content and acid-insoluble ash content.

Keywords: **:** Ash content, Extract, Maceration, Moisture content, *Pandanus amaryllifolius*

Introduction

Indonesia is a tropical country rich in traditional medicinal plants that are readily available, affordable, and have relatively few side effects. One such plant is the fragrant pandan leaf (Pandanus amaryllifolius), which has pharmacological activities as an antibacterial, antidiabetic, anticancer, and antioxidant (Zuraida et al., 2021). Fragrant pandan extract contains polyphenols, flavonoids, saponins, tannins, and alkaloids (Muftiah et al., 2019), with polyphenols acting as antioxidants (Kartika et al., 2021), while flavonoids, saponins, tannins, and alkaloids have antibacterial properties (Juariah et al., 2022).

The extraction of active compounds is carried out using the maceration method using 96% ethanol, as it effectively extracts the compounds without damaging them (Handoyo, 2020). Pandanus extract has been shown to inhibit the growth of Staphylococcus aureus by 11 mm and Escherichia coli by 7 mm (Puspitasari et al., 2023).

To ensure the quality and efficacy of the extract, standardization is necessary by determining quality parameters (Noviyanti et al., 2019). Specific parameters include organoleptic testing, while non-specific parameters include water content, ash content, and acid-insoluble ash content (Dayanti et al., 2022). In Bungah Village, fragrant pandan is traditionally used to treat diarrhea, so testing specific and non-specific parameters on fragrant pandan leaf extract is necessary.

The purpose of this study was to determine the results of specific and non-specific parameter tests on fragrant pandan leaf extract (Pandanus amaryllifolius) from Bungah Village, Gresik Regency.

Material and Methods

This study used an experimental approach to determine the specific and non-specific parameters of pandan leaf extract from Bungah Village. The study was conducted from October 2024 to June 2025. Data collection took place from May to June 2025 at the Chemical Engineering Laboratory of Muhammadiyah University of Gresik. The research variables were the results of qualitative and quantitative analyses, including organoleptic analysis, water content, total ash content, and acid-insoluble ash content of pandan leaf extract (Pandanus amaryllifolius).

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The materials used in this study included fragrant pandan leaves (Pandanus amaryllifolius) from Bungah Village, Gresik Regency, 96% ethanol, and 0.1 M hydrochloric acid.

The tools used in this study included a maceration vessel, a 60-mesh sieve (Retsch), a silicate crucible (B2-C6), an oven (Memmert), a blender (Maspion), an analytical balance (Ohaus), a desiccator (Pyrex), a porcelain crucible (Herma), tongs, a water bath (Thermostat Water Bath HH-6), aluminum foil, a 1000 ml measuring cylinder (Herma), a 100 ml measuring cylinder (Herma), flannel, a furnace, crucible tongs, and Whatman No. 42 filter paper.

Research Procedure

1. Sample Preparation

   Three kilograms of fragrant pandan leaves (Pandanus amaryllifolius) are separated from impurities and unnecessary parts. Then the simple ingredients are washed with running water to remove microbes or dirt. They are then dried in an oven at 50°C (Widayanti et al., 2023). The dried pandan leaves are then ground using a blender until they become powder, then sieved to get the same powder results by sieving with a sieve No. 60 mesh.

2. Extraction of Pandan Leaves Using the Maceration Method

   The fragrant pandan leaf powder used was 310 grams. It was then extracted with 3000 ml of 96% ethanol solvent, then mixed in a maceration vessel. The vessel was covered with aluminum foil for 3 days. After three days, the solution was filtered using flannel cloth, resulting in a filtrate. The resulting filtrate was then evaporated to reduce the solvent volume, then continued with evaporation using a water bath at a temperature of 40°C until a thick extract was obtained.

3. Specific Parameter Test

   Organoleptic test: this test includes the shape, taste and smell of fragrant pandan leaf extract.

4. Non-Specific Parameter Test

   Water Content: 1 gram of extract was weighed in a tared cup. It was dried at 105ºC for 5 hours in an oven. It was then cooled in a desiccator and weighed (Zahra et al., 2025).

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Total Ash Content : weigh 2 grams of pandan leaf extract into a silica crucible and place it in a furnace. Heat it at 600°C for 30 minutes (Fikayuniar et al., 2023). Then, cool it in a desiccator and weigh it (Dayanti et al., 2022).

Acid Insoluble Ash Content : the ash obtained from determining the ash content was boiled with 25 ml of 0.1M HCl for 5 minutes, collected the part that was insoluble in acid, filtered using ash-free filter paper, then washed with hot water, then heated, weighed and the weight of the acid-insoluble ash content was calculated (Dayanti et al., 2022).

Results and Discussion

Sample Preparation

Three kilograms of fresh pandan leaves were obtained from Bungah Village, Gresik. The material was first wet sorted to remove dirt or unwanted parts, such as yellow, wilted, or damaged leaves (Pangondian et al., 2023). Next, it was washed with well water to reduce microbial contamination, then drained in a shaded area to reduce the free water content and prevent microbial growth (Sathierbach et al., 2015).The next step was drying in an oven at 50°C for three days, resulting in 380 g of dry raw materials. Afterward, dry sorting was performed to separate the raw materials from dirt or unwanted parts (Widodo & Subositi, 2021). The final stage was grinding into a powder, followed by sieving with a 60-mesh sieve to obtain 310 g of uniformly sized raw materials (Parfati et al., 2018).

Wet Sorting

Washing

Draining

Drying

Refining

Sifting

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Pandanus Leaf Extract

Extraction was carried out using the maceration method using 96% ethanol for 3 days with 2 stirring times per day, the container was covered with aluminum foil to prevent damage to the compounds due to light (Alviola et al., 2023). After filtration, evaporation with a rotary evaporator and water bath produced a thick extract of 20 g from 1600 ml of filtrate, with a yield of 6.45%. The yield is affected by the method, solvent, temperature, time, and especially the quality of the raw materials, where low yields can be caused by poor quality pandan leaves.

Table 1. Yield Results Of Pandan Wangi Leaf Extract Using 96% Ethanol

Crude Drug	Solvent	Weight of Crude Drug	Extract Weight	Yield
Fragrant Pandan Leaves	Etanol 96%	310 gram	20 gram	6,45%

Specific Parameter Test

1. Organoleptic

Organoleptic testing was conducted to assess the physical characteristics of pandan leaf extract, including appearance, aroma, and taste (Yana et al., 2022). The results showed the extract was brown in color, had a distinctive pandan odor, and a bitter taste, thus maintaining the original characteristics of the ingredient and meeting the requirements of the Indonesian Herbal Pharmacopoeia (FHI).

Table 2. Results Of Organoleptic Test Observations

Test Type	Organoleptic FHI Edition II, 2022	Organoleptic Test Results
Color	Brown	Brown
Smell	Distinctive Smell	Distinctive Smell
Taste	Bitter	Bitter

Non- Specific Parameter Test

1. Water Content

Water content testing aims to determine the water content that can affect the stability, quality, and shelf life of an extract (Utami, 2020). In this study, the

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water content of pandan wangi leaf extract was tested three times in replication with results of 1.1%, 2.7%, and 2.0%, resulting in an average value of 1.9%. This value is still far below the maximum limit set by the Indonesian Pharmacopoeia, which is no more than 10.8%. Low water content indicates that the extract has good stability, minimizes the risk of microorganism growth, and extends its shelf life. Thus, the fragrant pandan leaf extract produced meets the applicable quality requirements (Setiyanto, 2024).

Table 3. Results Of Water Content Test Observations

Parameter Test	Water Content FHI edition Ii, 2022	Water Content Test Results
Replication 1	Not More Than 10.8%	1,1 %
Replication 2		2,7 %
Replication 3		2,0 %
Average ± SD		1,9 % ± 0,8

2. Total Ash Content

Ash content testing aims to determine the amount of minerals contained in the extract, both those originating naturally and as contaminants (Utami, 2020). The results of the total ash content test of fragrant pandan leaf extract from three replications obtained 21.7%, 29.7%, and 17.3%, with an average of 22.9%. This value exceeds the maximum limit of the Indonesian Herbal Pharmacopoeia, which is 8.9%, indicating a high content of inorganic minerals. The causative factor is thought to originate from the growing environment, particularly the alluvial and grumosol soil types in Bungah Village which are rich in calcium, magnesium, and silicate, thus increasing the ash content in the extract (Ayu, 2023; Dewi, 2024).

Table 4. Results Of Observations Of The Total Ash Content Test

Parameter Test	Total Ash Content FHI edition Ii, 2022	Total Ash Content Test Results
Replication 1	Not More Than 8.9%	21,7%
Replication 2		29, 7%
Replication 3		17, 3%
Average ± SD		22,9% ± 6,2

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3. Acid Insoluble Ash Content

Testing for acid-insoluble ash content aims to detect the presence of foreign minerals or metals that are insoluble in acid (Ulfah et al., 2021). The results of the test on fragrant pandan leaf extract showed values of 16.8%, 16.8%, and 33.1%, with an average of 20.1%. This figure far exceeds the Indonesian Herbal Pharmacopoeia limit of 0.2%, so the sample does not meet the requirements. The high ash content is thought to be influenced by the mineral-rich alluvial and grumosol soil conditions, the use of inorganic fertilizers and pesticides, and exposure to dust in open areas (Ayu, 2023). In addition to environmental factors, the results were also less balanced due to a technical error in the form of spilling some of the sample during the heating process.

Table 5. Results Of Observations Of The Acid Insoluble Ash Content Test

Parameter Test	Acid-Insoluble Ash Content FHI edition II, 2022	Acid Insoluble Ash Content Test Results
Replication 1 Replication 2 Replication 3 Average ± SD	Not more than 0.2%	16,8% 33,1% 10,6% 20,1 ± 77,9

Conclusion

From the results of this study it can be concluded that the Pandan Wangi Leaf Extract in the Bungah Gresik Area. Specific parameter testing showed that the extract met the Indonesian Herbal Pharmacopoeia standards, namely brown in color, with a distinctive odor and a bitter taste. In the non-specific parameter test, the extract water content is on average 1.9% ± 0.8 which indicates the extract meets the Indonesian Herbal Pharmacopoeia standards, the total ash content is on average 22.9% ± 6.2 and the acid-insoluble ash content is on average 20.1% ± 77.9, both of which non-specific parameter tests do not meet the Indonesian Herbal Pharmacopoeia standards.

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