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Bangka-bangkaan/Aksibal's (*Ephemerum discolor Moench*) Potential Properties as an Alternative Cleaning Agent

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Abstract: ***In providing a product well-used in common encounters specifically a cleaner, finding an alternative from a natural and organic source considering its lower cost provides a more potentially affordable product and safe environment. This study explores the potential properties of the bangka-bangkaan/aksibal (Ephemerum discolor Moench) as an alternative cleaning agent. This study aimed to explore the characteristics/properties of bangka- bangkaan/aksibal and its effectiveness in different variables. This research highlights the organic use in making cleaners originally made with chemicals. It provides environmental benefits necessary for encouraging the use of natural products. Further improvements could increase the product's efficiency in production procedures.***

Keywords: Bangka-bangkaan, Aksibal, Properties, Liquid Form, Solid Form

I. INTRODUCTION

In a world that is full of dirt and contaminants, the spread of germs and bacteria cannot be avoided around the environment (Chemical Safety Facts, 2022) [1]. In the Philippines around 2010, there are still rates of 50% of Methicillin-resistant Staphylococcus aureus (MRSA) that remains as one of the leading causes of community infections (Masim et al., 2021) [9]. This type of bacteria can cause a bad effect on the body like diseases. In the Philippines, cleaning agents are one of the best ways to maintain cleanliness in the environment, especially inside houses. It is used to remove dirt, like dust, stains, and bad smells, from any contaminated surface (Libretexts, 2022) [8].

An herbal plant called Bangka-Bangkaan/Aksibal, has anti-oxidant, and its safe as organic medicines for humans. Aksibal also contains insecticidal, anti-microbial, anti- bacterial properties that can help the alternative cleaning agent be effective (Khanal, S. 2023) [6]. One of the main components of cleaning agents are saponins. and additionally useful as a cleaner. It is a natural foaming agent and detergent that works well to remove oil, dirt, and grease from fabrics. A plant's ability to clean increases with its saponin content (Permacrafters, 2018) [10]. In most cleaning agents, surfactants are also present. The main component in cleaning detergents is surfactant. In order to effectively trap and remove debris from the surface, surfactants improve surface activity while you clean (International Products, 2022) [3]. As reported by Judy (2023) [5], there are substances that are saponins distributed in the leaves of Bangka-bangkaan/Aksibal. Moreover, Jesitha, K., Jaseela, C., Harikumar, P. S. (2021) [4] claimed that there are surfactants existing amongst the plant called Bangka-bangkaan that can be used as a cleaning agent. For the reason that there are less studies conducted about Bangka bangkaan/Aksibal, this research study highlights the possible benefaction of the herbal plant Bangka-bangkaan/Aksibal potential properties as cleaning agents to prevent the lack of hygiene in surfaces.

II. METHODOLOGY

An experimental research design under the branch of quantitative research is used for this study. Experimental research is a scientific approach aimed at understanding the connections between two or more variables.

In Green Chemistry's Theory for Corrosion Science and Engineering (2024) [13] states that organic substances have been proven to be most efficient, cost-effective, and practical alternatives. Organic substances mainly of their natural nature, biodegradability, they are regarded as the finest environmentally friendly alternatives.

In this theory, the use of organic alternatives is highly encouraged, this is why the researchers in accordance with their study have found this source as connecting to the research. It provides information and insight on how organic alternatives can have a good performance, especially in cleaning.

The process of production includes the use of the main ingredient which is the Bangka- bangkaa/Aksibal, distilled water as the base for utilizing the extract of aksibal, base soap for the solid form, spray bottle for the liquid form, to break apart the aksibal into tiny little bits, a blender along with a mortar and pestle is used, silicon mold to acquire desired shape of solid form, a strainer to isolate the extract, thermal scanner for measuring the temperature, and a weighing scale to properly ensure measurements of the materials.

To assess the effectiveness of Bangka-bangkaan/Aksibal as an alternative cleaning agent in terms of reaction time in solid and liquid form in different types of surfaces, the researchers applied a one-sample t-test. This analytical approach is a statistical hypothesis test that compares a sample mean to a specified value to determine if they are different, or which the effectiveness. The one-sample t-test is a statistical hypothesis test used for determining whether the mean of an unknown population differs from a specific value (Statistics Knowledge Portal, 2024) [12].

III. RESULTS AND DISCUSSION

Table 1. Coffee Stain & Type of Surface in Liquid Form

TYPE OF SURFACE	SPRAY	SCRUB	SPRAY	SCRUB
Melamine	7	13	4	16
Glass	7	5	4	8
Cotton Fabric	7	132	4	164

Table 1. The table results show that the alternative cleaning agent in liquid form has a varying number of scrubs for 7 sprays and 4 sprays. The researchers used a coffee stain for the different type of surface and a piece of cloth as a medium for cleaning. The spray cleaner sprays a certain number at the piece of cloth to start the cleaning process. For the 7 sprays, melamine had 13 scrubs, glass had 5 scrubs, and cotton fabric had 132 scrubs. For the 4 sprays, melamine had 16 scrubs, glass had 8 scrubs, and cotton fabric had 164 scrubs. This indicates that the more product used, the less scrubs it will take, making it more effective in removing stain. Composed of modified natural oils and surfactants, this agent excels in dirt removal while being gentle on surfaces, making it ideal for diverse materials (Chen, 2023) [2].

Table 2. One-sample Test of the Coffee Stain & Type of Surface in Liquid Form

One-Sample Test

Test Value = 6.75

	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
LIQUID FORM	1.516	11	.158	24.167	-10.93	59.26

Table 2. The table indicates the one-sample test of the stain removal and type of surface of the Aksibal in its liquid form. With the significance level of 0.158, it shows no significant difference as a liquid form cleaner and rejects the alternative hypothesis. Following the significant level of 0.05, This shows that there is no significant difference in the bangka-bangkaan/aksibal as a liquid cleaning agent. However, the product still proved to be effective. According to Jesitha et al. (2021) [4], the Bangka-bangkaan has components called surfactants that are also found in common cleaners. Surfactants are one of the primary components of cleaning agents, it helps in cleaning dirt and removing stains from surfaces (International Products Corporation, 2022) [3].

Table 3. Coffee Stain & Type of Surface in Solid Form

TYPE OF SURFACE	GLIDE	SCRUB	GLIDE	SCRUB
Melamine	7	7	4	5
Glass	7	3	4	5
Cotton Fabric	7	20	4	26

Table 3. The table results show that the alternative cleaning agent in solid form has a varying number of scrubs for 7 glides and 4 glides. The researchers used a coffee stain for the different type of surface and a piece of cloth as a medium for cleaning. The soap has been glided on the piece of cloth and letting it bubble to start the cleaning process. For the 7 glides, melamine had 7 scrubs, glass had 3 scrubs, and cotton fabric had 20 scrubs. For the 4 glides, melamine had 5 scrubs, glass had 5 scrubs, and cotton fabric had 26 scrubs. This indicates that the more product (is glided) used, the less scrubs it will take, making it more effective in removing stain. The solid form of alternative cleaning agent demonstrates effectiveness across various surfaces due to their unique compositions and properties. Many solid cleaning agents contain nonionic surfactants, which improve wetting and emulsifying properties, allowing for better dirt and grease removal (Schneider, 2022) [11].

Table 4. One-sample Test of the Coffee Stain & Type of Surface in Solid Form

One-Sample Test

Test Value = 8.25

	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
SOLID FORM	.000	11	1.000	.000	-4.54	4.54

Table 4. The table indicates the significant difference of the reaction time of bangka- bangkaan in terms of solid form. With the p-value of 1.000, it concludes to having no significant difference as a cleaning agent. Following the significant level of 0.05, the data failed to reject the null hypothesis. This shows that there is no significant difference in the bangka-bangkaan/aksibal as a solid cleaning agent. However, the product still performed effective. According to Judy (2023) [5], the Bangka-bangkaan also has components called saponins that are also found in natural detergents. Saponins that can be found in plant- based products, has been used in natural detergents, since they have properties of foaming and emulsifying cleaning agents (Kręgiel et al. 2017) [7].

The study evaluated the stain removal of coffee stain in different type of surface of Bangka-bangkaan/Aksibal (Ephemerum discolor Moench) in liquid form on three surfaces: melamine, glass, and cotton fabric. Statistical analysis using a one-sample t-test (p-value = 0.158) indicated no significant difference as an alternative cleaning agent. However, this result suggests that Bangka-bangkaan/Aksibal in liquid form itself has effectiveness as a cleaning agent, likely due to the properties of its natural surfactants and active ingredients.

For the Bangka-bangkaan/Aksibal in solid form as cleaning agents on three surfaces: melamine, glass, and cotton fabric. The statistical analysis showed no significant difference (p-value = 1.000, significance level = 0.05) as an alternative cleaning agent, however with similar results from the liquid form, as a solid form cleaning agent itself, it suggests effectiveness. Therefore, it is effective in both forms.

IV. LIMITATIONS

The general intent of this study finds out the Bangka-bangkaan/Aksibal's potential properties as alternative Cleaning Agent. Additionally, since certain chemicals in cleaning agents might have harmful effects, the use of an organic plant is an ideal alternative for cleaners. The research only utilized the main ingredients of Bangka-bangkaan/Aksibal, distilled water, base soap, and extracts from Bangka-bangkaan/Aksibal.

A. Other Recommendations

This study recommends future researchers to include a wider range for the type of surface and additional observations for the different type of stain. Concluding that the solid form is more effective than the liquid form, the researchers of this study recommend the future researchers to find another material for making the both forms to perform equal or improving the liquid form.

V. ACKNOWLEDGEMENTS

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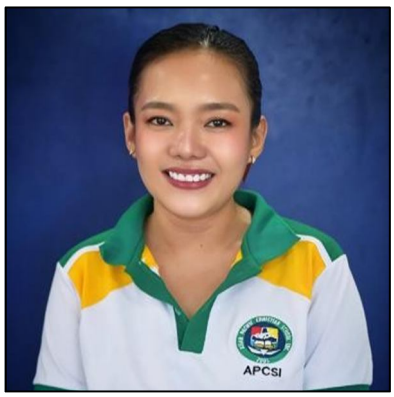

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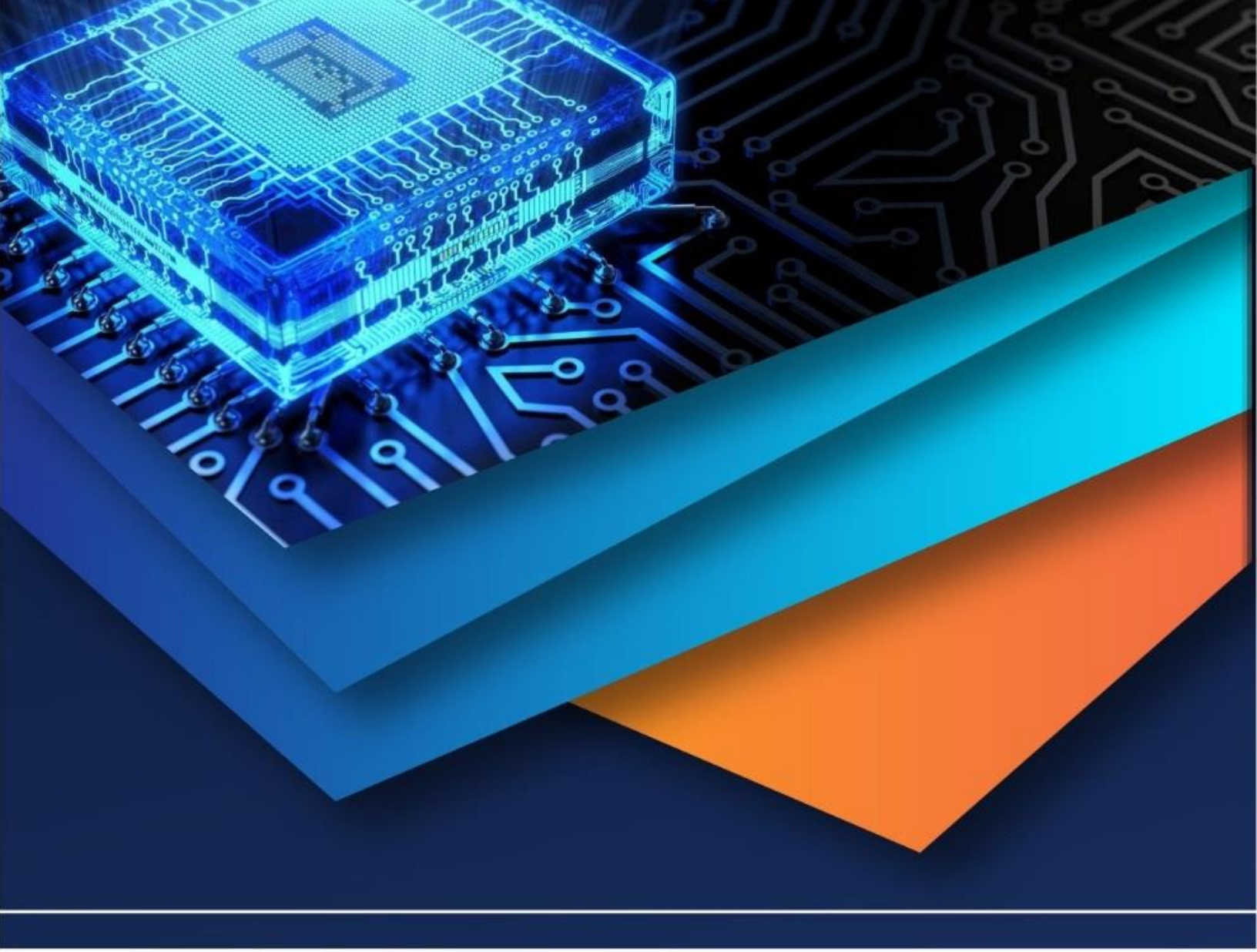

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