

**SYNERGISTIC EFFECT OF ERBAKA (*Artemisia vulgaris L.*) LEAF AND
GUMAMELA (*Hibiscus rosa-sinensis L.*) FLOWER EXTRACTS
AS A TOPICAL PAIN RELIEF**

A Research Study

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Bangar, La Union

In Partial fulfillment of
the Requirements in the subject
Research IV

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This research entitled, **SYNERGISTIC EFFECT OF ERBAKA (*Artemisia vulgaris* L.) LEAF AND GUMAMELA (*Hibiscus rosa-sinensis* L.) FLOWER EXTRACTS AS A TOPICAL PAIN RELIEF**, prepared and submitted by **ERICH GLIZ M. APOLINAR, YEHZKA NAARIAH C. LI, and IAN CHRIS L. SEMILLANO** in partial fulfillment of the requirements for the subject, **Research IV**, has been examined and is recommended for Oral Examination.

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- **Researchers**

DEDICATION

This study is wholeheartedly dedicated to our beloved parents, who have been our source of inspiration and motivations and gave us strength, who continually provide their moral, spiritual, emotional, and financial support.

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RESEARCH ABSTRACT

TITLE: **SYNERGISTIC EFFECT OF ERBAKA (*Artemisia vulgaris* L.) LEAF AND GUMAMELA (*Hibiscus rosa-sinensis* L.) FLOWER EXTRACTS AS A TOPICAL PAIN RELIEF**

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ABSTRACT

This study aimed to determine the synergistic effect of Erbaka (*Artemisia vulgaris* L.) leaf and Gumamela (*Hibiscus rosa-sinensis* L.) flower extracts as a topical pain relief which is effective and efficient to use. This study was conducted in School Year 2022-2023 at the Regional Science High School for Region I. The experiment was done on a nearby residence of the researcher. Based on the results and findings, it was concluded that *Artemisia vulgaris* L. leaf extract contains a significant presence of polyphenolic compounds. It also contains trace presence of alkaloids, saponins, tannins, and fixed oils. On the other hand, *Hibiscus rosa-sinensis* L. flowers extract contains significant amounts of reducing sugars, tannins/polyphenols. The sample also contains traces amounts of flavonoids and essential oils. Meaning, the Gumamela flower and Erbaka leaf extracts contain bioactive contributors that can relieve pains. Treatment 0, the commercial product, yielded the best result in terms of effectiveness and comfortability for garnering a mean of

4.73 and 4.87, respectively. However, the formulated treatments were still comparable for slight differences. Finally, it was proven that there is no significant difference between the two treatments in terms of two dependent variables, as it acquired (*FM Cal* 4.74 < *FM crit* 10.92) on effectiveness. Likewise, it obtained (*FM Cal* 5.66 < *FM crit* 10.92) on comfortability. Therefore, varying concentrations of *Hibiscus rosa-sinensis* L. flowers and *Erbaka leaf* extracts were a good alternative to the commercial product.

Keywords: Hibiscus flower, Artemisia leaf, Pain, Pain Reliever Ointment, Natural Anti-inflammatory and Analgesic activity, Acceptability test

TABLE OF CONTENTS

	Page
TITLE PAGE.....	i
ACKNOWLEDGEMENT.....	ii
DEDICATION.....	iii
ABSTRACT.....	iv
TABLE OF CONTENTS.....	vi
LIST OF TABLES.....	viii
LIST OF FIGURES.....	ix
LIST OF PLATES.....	x
CHAPTER I	1
CHAPTER II	
Research Design.....	7
Materials and Equipment.....	8
Data Gathering Process.....	8
Data Management.....	12
Ethical Considerations.....	13
CHAPTER III.....	15

CHAPTER IV

Conclusion.....	21
Recommendation.....	22
REFERENCES.....	23
APPENDICES.....	28
Phytochemical Analysis.....	29
Communication Letters.....	31
Medical Evidence.....	32
Raw Data.....	35
Friedman Test.....	41
Plagiarism Check Results.....	45
Plates.....	49
Data Book.....	56
CURRICULUM VITAE.....	58

LIST OF TABLES

Table 1. Phytochemical Analysis of <i>H. rosa-sinensis</i> flower.....	15
Table 2. Phytochemical Analysis of <i>A. vulgaris</i> leaf.....	17
Table 3. Acceptability test result on effectiveness in relieving pain.....	18
Table 4. Acceptability test result on comfortability assessment of the ointment.....	19
Table 5. Statistical result for the effectiveness of the products.....	19
Table 6. Statistical result for the comfortability assessment of the ointments.....	20

LIST OF FIGURES

Figure I. Flowchart of General Procedures.....	14
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LIST OF PLATES

Plate 1. Picture of <i>Artemisia vulgaris</i> L. leaves.....	48
Plate 2. Picture of <i>Hibiscus rosa-sinensis</i> L. flowers.	49
Plate 3. Washing of Plant Samples.....	50
Plate 4. Drying of Plant Samples.....	51
Plate 5. Mechanical Extraction.....	52
Plate 6. Treatments.....	53
Plate 7. Testing the Treatments.....	54

CHAPTER I

INTRODUCTION

Nowadays, pain has become one of the most extensive problems faced worldwide, especially for arthritic patients. According to WHO statistics, it was most diagnosed between the ages of 20 to 40, the productive time in which affecting the quality of life (Yap et. al., 2018). Every year, out of every 100,000 people, 41 of them are being diagnosed with it (Saxena et. al., 2013) that implies a serious problem and imposes a substantial burden upon these patients.

Rheumatoid Arthritis (RA) is a chronic autoimmune inflammatory disease characterized by synovial membrane inflammation, which leads to progressive destruction of articular cartilage, bone erosion, and deformities (Guo et. al., 2018).

During the last 30 years, numerous scientists have extensively studied variation of the prevalence and incidence of arthritis. These studies have demonstrated that RA is a global disease distributed regardless of race, sex, ethnicity, nationality, age, etc. However, the results of prevalence and incidence measurements vary depending on the population characteristics and have changed over time (Safiri et. al., 2019).

Looking at it holistically, chronic pain has a negative impact on patients; the resulting immobility leads to a high prevalence of depression, irritability, inability to cope with stress, increased fatigue, and decreased life satisfaction (Keshavarzian & Shahgholian, 2017). On the grounds of that, the development of anti-inflammatory and analgesic medicine has become crucial in the situation of them generally.

Currently, either narcotic such as opioid analgesic or nonsteroidal anti-inflammatory drugs like corticosteroids, salicylates have been used for the aiding of pain and inflammation. However, they exhibit serious adverse and toxic effects. Moreover, the total cost for the development of a synthetic novel drug is incredibly high, therefore, screening of potential anti-inflammatory and analgesic drugs having fewer adverse effects on natural plant sources and making use of pads and ointments as well, are alternative ways to overcome this problem (Afsar et al., 2013).

Getting claimed by Rull G. (2018), topical non-steroidal and inflammatory painkillers are the medication that works by moving deeper into areas of the body by rubbing over the skin and relieving inner pain. Moreover, employing a topical preparation implies that the overall amount of analgesic transmitted in the body is not that high. Said otherwise, it is much less likely to have a side-effect in an individual. Subsequently, it could also be purchase in over-the-counter drug stores, with such an effective result, and a product that lasts in long period time of usage.

As stated in the paper of Roy et al. (2011), about 70–80% of the world's population depend upon nonconventional medicine mainly from herbal sources in their primary health care. Especially that the demand was increasing day by day in developing countries where the value of consulting a physician and price of medicine is beyond the limit of most people (Barua, 2010).

Nowadays, the investigation of medicines of plant origin is the current trend of research because of their affordability and accessibility with mini side effects (Ibrahim et al., 2012). Additionally, usual ointments have bioactive components containing anti-inflammatory and analgesic property to be extracted on a plant sample, for it has the ability

to ease pain and soreness, respectively. In accordance to the study of Magdalita & Pimentel (2013); Dolores et al. (2016), Gumamela is a malvaceous ornamental plant commonly grown in the Philippines, which is also known for its medicinal value and is noted for its health and wellness components. Its flower serves as herbal remedy that treats many illnesses and acts as anti-infectious, anti-inflammatory, antipyretic anodyne, and refrigerant. It also used as treatment of prevention of constipation, headaches, abscesses and mumps, and swelling, this is according to Barraquia et al., (2017).

It has been reported by Magalong and Lopez (2007) that alkaloids, cardenolides and guaianolides, tannins, protein, and carbohydrates were discovered in all floral extracts from different gumamela cultivars, however anthraquinones and oils were found to be absent. The red and pink gumamela flower was found to contain polyphenol, resin, and flavonoids that has analgesic and anti-inflammatory properties.

On the other hand, *Artemisia vulgaris* L., also known as Erbaka, is a perennial long-stemmed shrub belonging to the family Compositae. It is native to temperate Europe, Asia, and northern Africa (Ashok and Upadhyaya, 2013). This species has a long history in medicine and was formerly referred to as the mother of herbs in the Middle Ages for its biological activities. In addition, it was used in traditional Chinese, Hindu, and European medicine to cure a variety of disorders involving pain (Ekier, et al 2020). According also to a previous report of Ashok & Upadhyaya (2013), diverse classes of bioactive compounds such as flavonoids, sesquiterpenoids, essential oils, tannins, phenols, and saponins were present in *A. vulgaris* that may produce a response by inhibiting the activity. Taken also into account, its easy availability and significant potency of with minimum side effects can

make this plant an appropriate candidate for the development of novel anti-inflammatory and analgesic medicine (Pandey et al., 2021).

To sum up, medicinal plants with pharmacological evidence supporting their usage in folk medicine agents could be useful as natural medical therapy for inflammatory and pain-related illnesses (Dara & Belamkar, 2014).

Founded by related literatures mentioned, this study can benefit all people in a community, especially arthritic patients to ease their discomfort with less side-effects. Moreover, to improve one's daily functioning and contribute on increased rate of productivity. In which, herbal constituents utilized were accessible, yet effective and efficient to use.

This study was conducted in School Year 2022-2023 at the Regional Science High School for Region I. The experiment was conducted on a nearby residence of the researcher. The study was delimited to four (4) treatments, in which arthritic patients are the respondents.

This study aimed to determine the synergistic effect of Erbaka (*Artemisia vulgaris L.*) leaf and Gumamela (*Hibiscus rosa-sinensis L.*) flowers extracts as topical pain reliever. Specifically, this study sought to answer the following questions:

- 1) What are the bioactive compounds present in Erbaka (*Artemisia vulgaris L.*) leaf and Gumamela (*Hibiscus rosa-sinensis L.*) flower extracts which could aid pain?
- 2) Which among the treatments (**T₀** - Commercial pain reliever ointment; **T₁** - 70% *Hibiscus rosa sinensis* flowers and 30% *Artemisia vulgaris L.* leaves extracts; **T₂** - 50% *Hibiscus rosa sinensis* flowers and 50% *Artemisia vulgaris L.* leaves extracts; **T₃** - 30% *Hibiscus rosa sinensis* flowers and 70% *Artemisia vulgaris L.* leaves extracts) will yield the best result in terms of:

- 2.1) Effectiveness and;

- 2.2) Comfortability?

- 3) Is there a significant difference between the commercialized product and the treatments in terms of:

- 3.1) Effectiveness and;

- 3.2) Comfortability?

Key Terms

For clarification and understanding, the following terms, with their operational meaning are given.

Analgesic activity is a medicinal property that can reduce pain

Anti-inflammatory is the ability of something to aid inflammation

Arthritis is a condition that adversely affects people

Extraction is a procedure in which the bioactive compounds needed are being extracted by the means of using a solvent

Flower is the part of Gumamela (*H. rosa-sinensis*) to be investigated

Leaf is the part of Erbaka (*A. vulgaris*) to be assessed

Olive Oil is a solvent that was used in the extraction of *A. vulgaris* leaves and *H. rosa-sinensis* flowers

Phytochemical Analysis is a process that examines what are the constituents present or absent in the plant samples.

Phytochemicals are various bioactive compound that are present in the *A. vulgaris* leaf and *H. rosa-sinensis* flower

Synergistic is used to describe things that produce, result from, or otherwise involve interaction and combination

Topical is a material that are prepared for external use and is intended for application to the skin

CHAPTER II

METHODOLOGY

This chapter shows the research design that is most appropriate for accomplishing the study. The materials were presented how they were used on the experiment and in the data gathering process. These materials were also utilized for the formulation of the treatments. Moreover, the data gathering procedures were elaborated thoroughly on how they were executed in order to avoid errors and incidents throughout the research process. Likewise, the management of data was presented and ethical standards were observed to preserve the integrity of the research paper and the researcher as well.

Research Design

Quantitative research is a research strategy that emphasizes the quantification of data collection and analysis in which presented in this study. The researchers applied the post-test only control group design to evaluate the synergistic effect of Erbaka (*Artemisia vulgaris* L.) leaves and Gumamela (*Hibiscus rosa-sinensis* L.) extracts as topical pain reliever. According to Frey (2018), posttest-only control group design is a type of true-experimental design in which there is a minimum of two groups, where one of which is controlled. Afterwards, data were accumulated on the assessment after the procedure.

The researcher administered this experimental design by using control and experimental groups to assess the cause-and-effect relationship between variables, where one is the commercialized product. The independent variable of the study is the kind of ointment to be used, while the dependent variable is the rating of respondents in terms of pain severity improvement and comfortability of the products.

In data gathering, survey form was constructed by the researchers. Treatments were applied and survey was carried out into the control and experimental groups.

Materials and Equipment

The experimentation process includes plant samples. About 500g of *Hibiscus rosa-sinensis* L. and 500g of *Artemisia vulgaris* L. leaves were collected from the backyards of few houses in Bangar, La Union, and Tagudin, Ilocos Sur. The plant samples were thoroughly washed to remove any unwanted dirt that could contaminate the sample. The required amount of *Hibiscus rosa-sinensis* L. flowers and *Artemisia vulgaris* L. leaves were calculated using a weighting scale. Researchers provided other ingredients for the making process; while the Shea butter, Beeswax, Menthol Crystals, Olive Oil, and Camphor were purchased online by using Shopee as platform. Finally, apparatuses were from the laboratory of Regional Science High School for Region 1.

General Procedure

Gathering of Materials

The experimentation process includes plant samples. About 500g of *Hibiscus rosa-sinensis* L. and 500g of *Artemisia vulgaris* L. leaves were collected from the backyards of few houses in Bangar, La Union, and Tagudin, Ilocos Sur. The plant samples were thoroughly washed to remove any unwanted dirt that could contaminate the sample. The required amount of *Hibiscus rosa-sinensis* L. flowers and *Artemisia vulgaris* L. leaves were calculated using a weighting scale. Researchers provided other ingredients for the making process; while the Shea butter, Beeswax, Menthol Crystals, Olive Oil, and Camphor were purchased online by using Shopee as platform. Finally, apparatuses were from the laboratory of Regional Science High School for Region 1.

Extraction and Phytochemical Screening

Dried *Hibiscus rosa-sinensis* L. flowers and *Artemisia vulgaris* L. leaves were mechanically extracted using Olive oil as the solvent. Phytochemical analysis is a process where the plant sample extracts are analyzed for the presence of secondary metabolites like alkaloids, terpenes, and flavonoids, while extraction is being conducted to insituate those constituents (Srivastava et al., 2020). The use of Olive Oil as a solvent according to Verri et. al. (2012) is essential for it to release these bioactive compounds responsible for anti-inflammatory properties.

Preparation of Treatments

The treatments were prepared by the process of making the treatments 1, 2, and 3. A flask was heat up but only in low. Afterwards, a 10g of beeswax and 200g shea butter was placed in the measuring cup until completely melted. Then, varying concentrations of Erbaka leaf and Gumamela flower extracts were added, as well as the 10g each menthol crystals and camphor. It was stirred for a few minutes, and was transferred the solution in the container, letting it cool down for about two hours until hardening up. The treatment 0 used was the commercialized pain reliever ointment. This concentration and treatment preparation protocol was adopted from the study of Marzouk (2010), entitled “Screening of analgesic and anti-inflammatory activities of *Citrullus colocynthis* from southern Tunisia.”

The Treatments

T0 or the controlled variable was the commercial product. Likewise, T1, T2, T3 were varying concentration of *Hibiscus rosa-sinensis* flower and *Artemisia vulgaris* leaf extracts. Below is the summary of the prepared treatments:

Treatments	Concentration
T0	Commercial pain reliever ointment
T1	70% <i>Hibiscus rosa sinensis</i> flowers and 30% <i>Artemisia vulgaris</i> L. leaves extracts
T2	50% <i>Hibiscus rosa sinensis</i> flowers and 50% <i>Artemisia vulgaris</i> L. leaves extracts
T3	30% <i>Hibiscus rosa sinensis</i> flowers and 70% <i>Artemisia vulgaris</i> L. leaves extracts

Methods in Testing the Treatments

During this procedure, 15 arthritic patients aged 25 to 75 years old, from Bangar, La Union and Tagudin, Ilocos Sur participated. The groups received light massage on the trauma site for one week per treatment. However, before the intervention, the existence of any allergies was determined in all participants. A sample of product were applied in their

upper arm without vascular approach, and after 24 hours, it was then assessed for itchiness, irritation, redness, rash, and a burning sensation. In the absence of allergic responses, the respondents then proceed for the experimentation. Finally, the said process was conducted with three (3) replicates. This entire protocol was adapted from the study of Keshavarzian, S., & Shahgholian, N. (2017) entitled “*Comparison of the Effect of Topical Application of Rosemary and Menthol for Musculoskeletal Pain in Hemodialysis Patients.*”

Gathering of data

Acceptability Test. In determining the acceptability of the *Hibiscus rosa-sinensis* flower and *Artemisia vulgaris L.* leaf extracts ointment and the commercial product, five (5) respondents each replicate, which are arthritic patients aged from 25 to 65 years old, from Bangar, La Union and Tagudin, Ilocos Sur were chosen. An acceptability questionnaire survey form was employed to the respondents and rated the treatments in terms of the pain severity improvement and its comfortability. In the process of data gathering, human participants as respondents in a topical pain reliever acceptability testing was allowed. Nonetheless, assessing allergic reactions of them must be determined before the experimentation. This protocol was also taken from the previous study of Keshavarzian & Shahgholian (2017).

A. Effectiveness in Relieving Body Pain

Rate	Indicator	Description
5	Excellent	Relieves the pain completely
4	Good	Moderately relieves the pain
3	Average	It relieves the pain but not completely
2	Poor	Somewhat relieves pain
1	Extremely Poor	No effect at all

The pain severity improvement of T0, T1, T2, and T3 in relieving muscle pain were evaluated by the respondents through the use of survey form. They rated the product using the hedonic rating scale with 5 being the highest and 1 as the lowest.

B. Comfortability

Rate	Indicator	Description
5	Excellent	The product is exceedingly comfortable
4	Good	The product is comfortable
3	Average	The product gives moderate comfort
2	Poor	The product gives adequate comfort
1	Extremely Poor	The product is not comfortable at all

The pain severity improvement of T0, T1, T2, and T3 in comfortability were evaluated by the respondents through the use of survey form. They rated the product using the hedonic rating scale with 5 being the highest and 1 as the lowest.

Data Management

The first affirmation of the problem was acknowledged through phytochemical screening of the plant samples. The second affirmation was resolved by comparing the two treatments' calculated mean that determined which treatment yielded the best. Lastly, the third affirmation of the problem was responded by the ratings and feedback from the participants by the conducted survey. The data were presented in a tabular form including its mean. The analyzing and interpretation of data was based on this table. Friedman test were utilized in the current study. It is a statistical tool that deals with the significant difference with more than 2 treatments and variables.

Ethical Considerations

The researchers demonstrated integrity, honesty, uprightness, and objectivity to all aspects of research in conducting the study. They developed teamwork, maintain the good relationship with each other, truly detailed the data of the experiment and not falsify the result. Moreover, proper credits were given to the owners of information that was used in the research paper. Procedures and methods were appropriately read and finished accurately. Carefulness and mindfulness were also exemplified during the experiment that kept the good records of the research activities and avoid the waste of time, money, and effort. Lastly, protocols were strictly followed by the researchers.

Before starting the interventions on patients, the researchers obtained the informed consent, verbally explained about the research, and assured the patients of confidentiality and anonymity of their data. Also, the patients were blinded to the intervention allocation. During the intervention, the patient did not know which containers are the treatments.

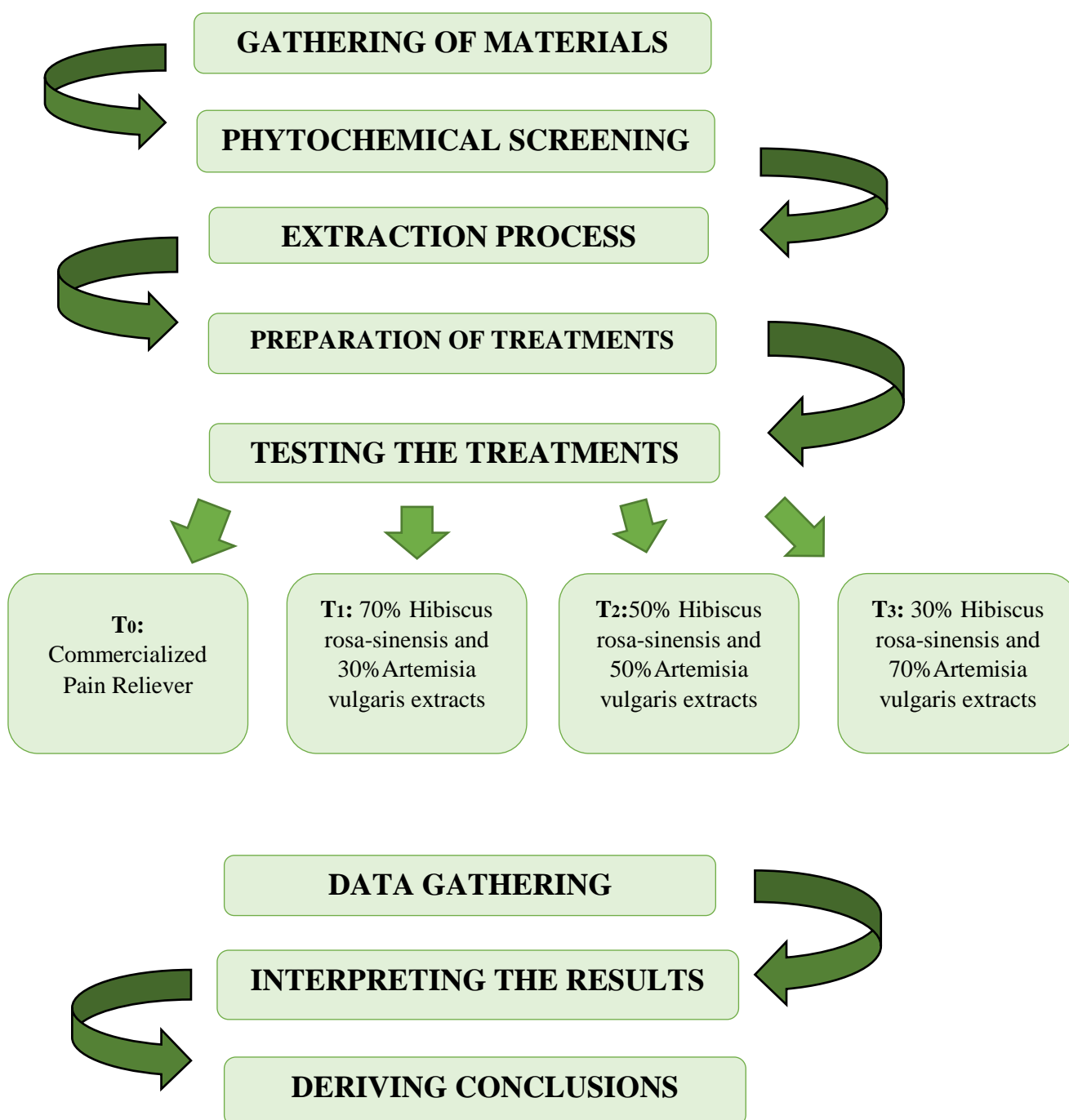


Figure I. Flowchart of General Procedure

CHAPTER III

RESULTS AND DISCUSSION

This chapter shows the results and findings on the different parameters such as phytochemical analysis of the Gumamela (*Hibiscus rosa-sinensis l.*) flower and Erbaka (*Artemisia vulgaris l.*) leaf extracts, acceptability test result, and the analysis and interpretation on the presence of significant differences between the treatments.

Phytochemical Analysis

Table 1. Phytochemical analysis results of Gumamela (*Hibiscus rosa-sinensis l.*) flowers extract

<i>Phytoconstituents</i>	<i>Type of Test</i>	<i>Result</i>
Alkaloids	Mayer's test	(-)
Alkaloids	Hager's test	(-)
Alkaloids	Wagner's test	(-)
Alkaloids	Dragendorff's test	(-)
Carbohydrates	Molisch test	(+)
Reducing Sugars	Benedict's test	(++)
Reducing Sugars	Fehling's test	(++)
Flavonoids	Lead acetate test	(+)
Flavonoids	Alkaline Reagent test	(+)
Tannins	Ferric chloride test	(++)
Polyphenolic Compounds	Froth test	(+)
Saponins	Gelatin test	(+)
Fixed oils	Spot test	(+)

Legend: (-) negative; (+) trace amount; (++) positive; (+++) highly positive

Table 1 shows the phytochemical analysis result of Gumamela (*Hibiscus rosa-sinensis* L.) flowers extract. As gleaned from it, the sample contains significant amounts of reducing sugars, tannins / polyphenols. The sample also contains trace amounts of carbohydrates, flavonoids and essential oils. However, the sample does not contain any amounts of proteins, and alkaloids.

As claimed by Lai et al. (2010) Oliviero et al., (2017), tannins, a plant secondary metabolite, represents a wide variety of compounds, with different chemical structures and activities. These compounds possess several biological functions and effects, including anti-inflammation and analgesic, which acts as pain relief medication. It can be utilized as inflammation modulatory agent by various mechanism, which enforces an ability to deal with different pain causes.

According to the findings of Raduan et al. (2013), flavonoids and steroids were found to be present in extracts of flower of *Hibiscus rosa-sinensis* L. (red). These phytoconstituents exhibited anti-inflammatory activity through different structures. The presence of these metabolites probably explains the various uses of this plant in traditional medicine, which predominant presence of anti- inflammatory agents that were responsible for significant inhibition of inflammation of the extracts.

A lot of researchers have been concentrating in recent years on medicinal plants derived natural compounds such as flavonoids, steroids, and polyphenols, due to their wide spectrum of pharmacological significance including anti-inflammatory, analgesic activities with fewer side effects (Shah and Alagawadi, 2011, Shukla et al., 2010).

Table 2. Phytochemical analysis results of Erbaka (*Artemisia vulgaris* L.) leaves extract

<i>Phytoconstituents</i>	<i>Type of Test</i>	<i>Result</i>
Alkaloids	Mayer's test	(+)
Alkaloids	Hager's test	(+)
Alkaloids	Wagner's test	(+)
Alkaloids	Dragendorff's test	(+)
Carbohydrates	Molisch test	(-)
Reducing Sugars	Benedict's test	(-)
Reducing Sugars	Fehling's test	(-)
Flavonoids	Lead acetate test	(-)
	Alkaline Reagent test	(-)
Tannins	Ferric chloride test	(+)
Polyphenolic Compounds	Froth test	(++)
Saponins	Gelatin test	(+)
Fixed oils	Spot test	(+)

Legend: (-) negative; (+) trace amount; (++) positive; (+++) highly positive

Table 2 shows the phytochemical analysis results of the Erbaka (*Artemisia vulgaris* L.) leaves extract. As shown on the table, the sample contains a significant presence of polyphenolic compounds. It also contains trace presence of alkaloids, saponins, tannins, and fixed oils. However, the sample does not contain any carbohydrates, reducing sugars, flavonoids, nor essential oils.

As stated by Bai, et. al. (2021), as one of the secondary metabolites of plants, alkaloids possess multiple physiological and pharmacological activities such as analgesia, anti-inflammatory effects providing abundant resources for drug discovery.

Indeed, Afsar et al. (2018) reported potent activities of polyphenolic compounds isolated from herbal plants possess analgesic property, anti-inflammatory, and antioxidant to have a potential on applicability in pharmaceutical development. In this manner, it might prove the dose dependent exhibited of *A. vulgaris* due to the existence of this compound.

Table 3. Mean Result of the Effectiveness Rating of the Topical Pain Reliever Ointments

Treatments	Mean or Average per Treatment
Treatment 0	4.73
Treatment 1	4.33
Treatment 2	4.20
Treatment 3	4.67

Legend: The higher the mean, the more effective the product is in relieving pain

Table 3 shows the mean result of the effectiveness rating of the topical pain reliever. As gleaned from the table, treatment 0 which is the commercial product yielded the best result for having a mean of 4.73 during the three replication survey procedures. It was then followed by treatment 3 which comprises of 30% Gumamela (*Hibiscus rosa-sinensis* L.) flowers and 70% Erbaka leaves (*Artemisia vulgaris* L.) extracts for 4.67 mean while treatment 1, 70% Gumamela (*Hibiscus rosa-sinensis* L.) flowers and 30% Erbaka leaves (*Artemisia vulgaris* L.) extracts garnered 4.33 mean. On the other hand, treatment 2 which is 50% Gumamela (*Hibiscus rosa-sinensis* L.) flowers and 50% Erbaka leaves (*Artemisia vulgaris* L.) extracts got the least mean of 4.20 in this acceptability test. In conclusion, treatment 3 garnered the best result, thus it yielded the best results in terms of various concentrations, therefore high amount of Erbaka leaf extracts increases its potential.

Table 4. Mean Result of the Comfortability Rating of the Topical Pain Reliever Ointments

Treatments	Mean or Average per Treatment
Treatment 0	4.87
Treatment 1	4.40
Treatment 2	4.33
Treatment 3	4.47

Legend: The higher the mean, the more comfortable the product is

Table 4 shows the mean result of comfortability rating of the topical pain reliever. As gleaned from the table, treatment 0 which is the commercial product yielded the best result for having a mean of 4.87 during the three replication survey procedures. It was then followed by treatment 3 which comprises of 30% Gumamela (*Hibiscus rosa-sinensis L.*) flowers and 70% Erbaka leaves (*Artemisia vulgaris L.*) extracts for 4.47 mean while treatment 1, 70% Gumamela (*Hibiscus rosa-sinensis L.*) flowers and 30% Erbaka leaves (*Artemisia vulgaris L.*) extracts garnered 4.40 mean. On the other hand, treatment 1 which is 50% Gumamela (*Hibiscus rosa-sinensis L.*) flowers and 50% Erbaka leaves (*Artemisia vulgaris L.*) extracts got the least mean of 4.33 in this acceptability test.

Table 5. Statistical Result for the Effectiveness of the Ointments

FRIEDMAN TEST
FM Cal 4.74 < FM Crit 10.92

Legend: If the FM Cal value was higher than FM Crit value, then reject the null hypothesis.

Based on the result of Friedman test for the effectiveness of the treatments, the FM Cal is 4.74 which is less than the FM Critical value of 10.92 at 0.01 level of significance with 3 degrees of freedom. In this case, the null hypothesis, therefore is accepted which indicates that there is no significant difference between the treatments in terms of effectiveness in relieving pain. Therefore, concentrations of the plant extracts could be an alternative to commercial product.

Table 6. Statistical Result for the Comfortability of the Ointments

FRIEDMAN TEST

FM Cal 5.66 < FM Crit 10.92

Legend: If the FM Cal value was higher than FM Crit value, then reject the null hypothesis

Based on the result of Friedman Test for the comfortability of the ointments, the FM Calculated value is 5.66 which is lesser than the FM critical value of 10.92 at 0.01 level of significance with 3 degrees of freedom. In this case, the null hypothesis is accepted which indicates that there is no significant difference between the treatments in terms of comfortability of the products. Therefore, concentrations of the plant extracts could be an alternative to conventional topical pain reliever.

CHAPTER IV

CONCLUSIONS AND RECOMMENDATIONS

This study aimed to determine the synergistic effect of Gumamela (*Hibiscus rosa-sinensis L.*) flowers and Erbaka (*Artemisia vulgaris L.*) leaves extracts as topical pain reliever. Specifically, it seeks out to determine the phytochemical components of the plant samples which has capability to alleviate pains. Based on the results, it was concluded that *Artemisia vulgaris L.* leaf extract contains a significant presence of polyphenolic compounds. It also contains trace presence of alkaloids, saponins, tannins, and fixed oils. On the other hand, *Hibiscus rosa-sinensis L.* flowers extract contains significant amounts of reducing sugars, tannins / polyphenols. The sample also contains trace amounts of carbohydrates, flavonoids and essential oils. Meaning, both vouchers contain phytochemical bioactive compounds that can relieve pain and inflammation.

Moreover, treatment 0 which is the commercial product yielded the best result in both variables for having a mean of 4.73 and 4.87 in three replication survey procedures, respectively. Despite that, it was clearly visible that varying concentrations of these extracts are still comparable for the results were close with of the treatment 0.

Lastly, it was proven that there is no significant difference between the treatments in terms of comfortability and effectiveness on relieving pain, as it acquired FM Cal 4.74 < FM Crit 10.92 at 0.01 level of significance with 3 degrees of freedom on effectiveness. Furthermore, the FM Cal 5.66 < FM Crit 10.92 at 0.01 level of significance with 3 degrees of freedom on comfortability of products. Therefore, varying concentrations of Gumamela (*Hibiscus rosa-sinensis L.*) flower and Erbaka (*Artemisia vulgaris L.*) leaf extracts could

be utilized as an alternative topical pain reliever. It is therefore concluded that Erbaka leaves and Gumamela flowers extracts are effective and efficient in easing discomforts encountered by every individual on a daily.

Based from preceding conclusions, the researchers recommend the utilization of Erbaka (*Artemisia vulgaris L.*) leaves and Gumamela (*Hibiscus rosa-sinensis L.*) flowers in the development of medicinal product that is accessible, yet effective and efficient to use. Furthermore, it is highly suggested to create products composed with different parts of the plant as samples. In addition, it was advised to incorporate other procedures to create the products or a different form of topical pain reliever, such as pads and capsule. Also, make use of different percentage composition of plant extract. Finally, the researchers recommend to make use of Erbaka (*Artemisia vulgaris L.*) and Gumamela (*Hibiscus rosa-sinensis L.*) plant samples to find out more on its capabilities and medicinal properties, which can treat wider range of health problems.

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APPENDICES

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Appendix A

Phytochemical Results



LORMA COLLEGES
Your Pathway to a Brighter Future

COLLEGE OF PHARMACY
City of San Fernando, La Union
Tel. No. (072) 700 - 2500 local 332
Website: <http://lorma.edu>



PHYTOCHEMICAL TESTING RESULTS

Plant Sample: **Gumamela flowers**
Method of Extraction: **Maceration with ethanol**

Physical description of extract:
Color: **Reddish brown**
Odor: **Aromatic**
Transparency: **Slightly turbid**
pH: **Weakly acidic**

Analysis:

Type of Test	Result
Mayer's test	(-)
Hager's test	(-)
Wagner's test	(-)
Dragendorff's test	(-)
Molisch test	(+)
Benedict's test	(++)
Fehling's test	(++)
Lead acetate test	(+)
Alkaline Reagent Test	(+)
Ferric chloride test	(++)
Froth test	(-)
Gelatin test	(-)
Spot test	(+)

Legend: (-) negative; (+) trace amount; (++) positive; (+++) highly positive

Remarks:
The sample contains significant amounts of **reducing sugars, tannins / polyphenols**. The sample also contains trace amounts of **carbohydrates, flavonoids** and **essential oils**. However, the sample does **NOT** contain any amounts of **proteins, saponins** nor **fixed oils**.

- Discrepancies to the documented constituents may be due to extraction process, age of sample, environment, among other factors.

Analyzed by:

Magtangol
Magtangol B. Cruz III
Laboratory Custodian

Date Analyzed:

09/12/2019

Confirmed and certified by:

Ellen Mae P. Abiqui
Ellen Mae P. Abiqui, RPh, MSPharm, CPT®
Acting Dean



PHYTOCHEMICAL TESTING RESULTS

Plant Sample: **Mugwort leaves**

Method of Extraction: **Maceration with Ethanol**

Physical description of extract:

Color: **Green**

Odor: **Pungent**

Analysis:

Type of Test	Result
Mayer's test	(+)
Hager's test	(+)
Wagner's test	(+)
Dragendorff's test	(+)
Molisch test	(-)
Benedict's test	(-)
Fehling's test	(-)
Lead Acetate test	(-)
Alkaline Reagent Test	(-)
Ferric Chloride test	(++)
Froth test	(+)
Gelatin Test	(+)
Filter Paper test	(+)

Legend: (-) negative; (+) trace amount; (++) positive; (+++) highly positive

Remarks:

The sample contains a *significant* presence of **polyphenolic compounds**. It also contains *trace* presence of **alkaloids, saponins, tannins** and **fixed oils**. However, the sample does *not* contain any **carbohydrates, reducing sugars, flavonoids** nor **essential oils**.

- Discrepancies to the documented constituents may be due to extraction process, age of sample, environment, among other factors.

Analyzed by:

Mary Grace D. Cupatan, BSBio
Laboratory Custodian

Confirmed and certified by:


Ellen Mae P. Abiqui, RPh, MSPharm, CPT®
Dean

Appendix B

Communication Letters



La Union Schools Division
REGIONAL SCIENCE HIGH SCHOOL for REGION I
 Bangar, La Union

January 18, 2023

ELLEN MAE P. ABIQUI

Dean

LORMA COLLEGES

College of Pharmacy

City of San Fernando, La Union

Madam/Sir:

Warm greetings from the Regional Science High School for Region I!

We are pleased to inform you that the undersigned, Regional Science High School students are currently conducting **experimentation** in their research study in partial fulfillment of their requirements in Research 10.

In this regard, may we respectfully request from your good office the conduct of **phytochemical analysis** of the **plant** sample to be used in their study knowing fully that your institution is accredited in this endeavor.

Rest assured that data to be gathered will be utilized according to its educational purposes only.

We are looking forward for a positive response regarding this humble request in the name of noble cause of research. Thank you.

Respectfully yours,

JAKE D. MANTILLA
 Research Adviser

IAN CHRIS SEMILLANO

ERICH GLIZ AFODINAR

YEHZKA NAARIAH C. LI
 Researcher/s

Noted:

AURELIA S. GARCIA
 Head Teacher I
 OIC Office of the Principal

Appendix C

MEDICAL EVIDENCES

ETTY V. BAUTISTA, M.D.

Diplomate, American Board of Physical Medicine and Rehabilitation
 Fellow, American Academy of Physical Medicine and Rehabilitation
 Fellow, Philippine Academy of Rehabilitation Medicine
 Fellow, Physiatric Association of Spine, Sport and Occupational Rehabilitation
 Member, American Association of Electrodiagnostic Medicine

Patient: _____ Date: _____
 Address: _____ Age: 63 Sex: F

Rx

① Allopurinol 100mg / tab #60
 1 tablet 2x a day

② Colchicine 500mg / tab #21
 1 tablet 3x a day
 for 7 days

PTR. NO.

TIN:

905-535-032-000

Our Lady of Mount Carmel Physical Medicine and Rehabilitation Center
 OUR LADY OF MOUNT CARMEL MEDICAL CENTER
 Km. 78 Mc Arthur Hiway, City of San Fernando, C-2000, Pampanga

ETTY V. BAUTISTA, M.D.

Diplomate, American Board of Physical Medicine and Rehabilitation
Fellow, American Academy of Physical Medicine and Rehabilitation
Fellow, Philippine Academy of Rehabilitation Medicine
Fellow, Physiatric Association of Spine, Sport and Occupational Rehabilitation
Member, American Association of Electrodiagnostic Medicine

Patient: _____ Date: _____
Address: Farola Taguana Age: 74 Sex: M

Rx

① Febuxostat 40g 1 tab #30
1 tablet once a day

② Celecoxib 200mg 1 tab #30
1 tablet 2x a day
as needed for pain

Our Lady of Mount Carmel Physical Medicine and Rehabilitation Center
OUR LADY OF MOUNT CARMEL MEDICAL CENTER
Km. 78 Mc Arthur Hiway, City of San Fernando, C-2000, Pampanga

ETTY V. BAUTISTA, M.D.

Diplomate, American Board of Physical Medicine and Rehabilitation
 Fellow, American Academy of Physical Medicine and Rehabilitation
 Fellow, Philippine Academy of Rehabilitation Medicine
 Fellow, Physiatric Association of Spine, Sport and Occupational Rehabilitation
 Member, American Association of Electrodiagnostic Medicine

Patient: _____ Date: _____
 Address: Farola Tagudin Age: 60 Sex: F

Rx

① Allopurinol 300 mg / tab
 1 tablet daily #30

② Arcoxia 120 mg / tab #30
 1 tablet daily
 as needed for severe pain

⑤ Colchicine 500 mg / tab #21
 as needed
 1 tablet 3x

PIN: _____
 TIN: 905-535-032-000

Our Lady of Mount Carmel Physical Medicine and Rehabilitation Center
 OUR LADY OF MOUNT CARMEL MEDICAL CENTER
 Km. 78 Mc Arthur Hiway, City of San Fernando, C-2000, Pampanga

Appendix D

RAW DATA

Raw Data							
Replicate 1							
Effectiveness (Ratings)				Comfortability (Ratings)			
T0	T1	T2	T3	T0	T1	T2	T3
5	4	4	5	5	4	4	5
5	4	5	5	4	4	4	4
4	3	4	5	5	4	4	4
5	3	4	4	4	4	3	4
5	5	3	4	5	5	5	4

Raw Data							
Replicate 2							
Effectiveness (Ratings)				Comfortability (Ratings)			
T0	T1	T2	T3	T0	T1	T2	T3
5	5	4	5	5	4	4	5
4	4	3	5	5	5	4	4
5	4	4	4	5	3	4	4
4	4	5	4	5	4	5	4
5	5	4	4	5	5	5	4

Raw Data							
Replicate 3							
Effectiveness (Ratings)				Comfortability (Ratings)			
T0	T1	T2	T3	T0	T1	T2	T3
5	5	5	5	5	5	5	5
5	5	4	5	5	5	4	5
4	4	4	5	5	4	4	5
5	4	5	4	5	5	5	5
5	5	5	4	5	5	5	5

Acceptability test of the commercial pain reliever ointment and the Gumatela (*Azadirachta indica*) Flowers and Erhaka (*Artemisia vulgaris* L.) Leaves extract as a topical pain reliever

Participant No. _____
 Name _____
 Address _____
 Occupation _____

Purpose: This survey form aimed to determine the acceptability between the commercial muscle pain reliever ointment and the Gumatela (*Azadirachta indica*) Flowers and Erhaka (*Artemisia vulgaris* L.) Leaves extract in terms of effectiveness in relieving muscle pain and comfortability.

Directions: Observe and rate the acceptability of the 4 treatments and encircle the number that corresponds to your rating. Refer to the rating scale below.

A. Effectiveness in relieving muscle pain

5 _____ Relieves the pain completely
 4 _____ Relieves the pain
 3 _____ Relieves the pain but not completely
 2 _____ Does not relieve pain
 1 _____ No effect

B. Comfortability

5 _____ The product is exceedingly comfortable
 4 _____ The product is comfortable
 3 _____ The product gives moderate comfort
 2 _____ The product is not comfortable at all
 1 _____ No effect

CRITERIA	Effectiveness in relieving muscle pain	Comfortability
T0- Commercial Topical Pain Reliever	1 2 3 4 5	1 2 3 4 5
T1- 70% Gumatela Flowers and 30% Erhaka leaves extract ointment	1 2 3 4 5	1 2 3 4 5
T2- 50% Gumatela Flowers and 50% Erhaka leaves extract ointment	1 2 3 4 5	1 2 3 4 5
T3- 30% Gumatela Flowers and 70% Erhaka leaves extract ointment	1 2 3 4 5	1 2 3 4 5

Signature _____

Acceptability test of the commercial pain reliever ointment and the Gumatela (*Azadirachta indica*) Flowers and Erhaka (*Artemisia vulgaris* L.) Leaves extract as a topical pain reliever

Participant No. _____
 Name _____
 Address _____
 Occupation _____

Purpose: This survey form aimed to determine the acceptability between the commercial muscle pain reliever ointment and the Gumatela (*Azadirachta indica*) Flowers and Erhaka (*Artemisia vulgaris* L.) Leaves extract in terms of effectiveness in relieving muscle pain and comfortability.

Directions: Observe and rate the acceptability of the 4 treatments and encircle the number that corresponds to your rating. Refer to the rating scale below.

A. Effectiveness in relieving muscle pain

5 _____ Relieves the pain completely
 4 _____ Relieves the pain
 3 _____ Relieves the pain but not completely
 2 _____ Does not relieve pain
 1 _____ No effect

B. Comfortability

5 _____ The product is exceedingly comfortable
 4 _____ The product is comfortable
 3 _____ The product gives moderate comfort
 2 _____ The product is not comfortable at all
 1 _____ No effect

CRITERIA	Effectiveness in relieving muscle pain	Comfortability
T0- Commercial Topical Pain Reliever	1 2 3 4 5	1 2 3 4 5
T1- 70% Gumatela Flowers and 30% Erhaka leaves extract ointment	1 2 3 4 5	1 2 3 4 5
T2- 50% Gumatela Flowers and 50% Erhaka leaves extract ointment	1 2 3 4 5	1 2 3 4 5
T3- 30% Gumatela Flowers and 70% Erhaka leaves extract ointment	1 2 3 4 5	1 2 3 4 5

Signature _____

Acceptability test of the commercial pain reliever ointment and the Gumatela (*Azadirachta indica*) Flowers and Erhaka (*Artemisia vulgaris* L.) Leaves extract as a topical pain reliever

Participant No. _____
 Name _____
 Address _____
 Occupation _____

Purpose: This survey form aimed to determine the acceptability between the commercial muscle pain reliever ointment and the Gumatela (*Azadirachta indica*) Flowers and Erhaka (*Artemisia vulgaris* L.) Leaves extract in terms of effectiveness in relieving muscle pain and comfortability.

Directions: Observe and rate the acceptability of the 4 treatments and encircle the number that corresponds to your rating. Refer to the rating scale below.

A. Effectiveness in relieving muscle pain

5 _____ Relieves the pain completely
 4 _____ Relieves the pain
 3 _____ Relieves the pain but not completely
 2 _____ Does not relieve pain
 1 _____ No effect

B. Comfortability

5 _____ The product is exceedingly comfortable
 4 _____ The product is comfortable
 3 _____ The product gives moderate comfort
 2 _____ The product is not comfortable at all
 1 _____ No effect

CRITERIA	Effectiveness in relieving muscle pain	Comfortability
T0- Commercial Topical Pain Reliever	1 2 3 4 5	1 2 3 4 5
T1- 70% Gumatela Flowers and 30% Erhaka leaves extract ointment	1 2 3 4 5	1 2 3 4 5
T2- 50% Gumatela Flowers and 50% Erhaka leaves extract ointment	1 2 3 4 5	1 2 3 4 5
T3- 30% Gumatela Flowers and 70% Erhaka leaves extract ointment	1 2 3 4 5	1 2 3 4 5

Signature _____

Acceptability test of the commercial pain reliever statement and the Gamamela (Etiloxo non-steroidal) Flowers and Erhaka (Artemisia vulgaris) J.J. Leaves extract as a topical pain reliever

Participant No. _____
Name _____
Address _____
Occupation _____

Purpose: This survey aims to determine the acceptability between the commercial muscle pain reliever statement and the Gamamela (Etiloxo non-steroidal) Flowers and Erhaka (Artemisia vulgaris) J.J. Leaves extract in terms of effectiveness in relieving muscle pain and comfortability.

Direction: Observe and rate the acceptability of the 4 treatments and encircle the number that corresponds to your rating. Refer to the rating scale below.

A. Effectiveness in relieving muscle pain

5 _____ Relieves the pain completely
4 _____ Relieves the pain
3 _____ Relieves the pain but not completely
2 _____ Does not relieve pain
1 _____ No effect

B. Comfortability

5 _____ The product is exceedingly comfortable
4 _____ The product is comfortable
3 _____ The product gives moderate comfort
2 _____ The product is not comfortable at all
1 _____ No effect

CRITERIA	Effectiveness in relieving muscle pain	Comfortability
T0- Commercial Topical Pain Reliever	1 2 3 4 5	1 2 3 4 5
T1- 70% Gamamela Flowers and 30% Erhaka leaves extract ointment	1 2 3 4 5	1 2 3 4 5
T2- 50% Gamamela Flowers and 50% Erhaka leaves extract ointment	1 2 3 4 5	1 2 3 4 5
T3- 30% Gamamela Flowers and 70% Erhaka leaves extract ointment	1 2 3 4 5	1 2 3 4 5

Acceptability test of the commercial pain reliever statement and the Gamamela (Etiloxo non-steroidal) Flowers and Erhaka (Artemisia vulgaris) J.J. Leaves extract as a topical pain reliever

Participant No. _____
Name _____
Address _____
Occupation _____

Purpose: This survey aims to determine the acceptability between the commercial muscle pain reliever statement and the Gamamela (Etiloxo non-steroidal) Flowers and Erhaka (Artemisia vulgaris) J.J. Leaves extract in terms of effectiveness in relieving muscle pain and comfortability.

Direction: Observe and rate the acceptability of the 4 treatments and encircle the number that corresponds to your rating. Refer to the rating scale below.

A. Effectiveness in relieving muscle pain

5 _____ Relieves the pain completely
4 _____ Relieves the pain
3 _____ Relieves the pain but not completely
2 _____ Does not relieve pain
1 _____ No effect

B. Comfortability

5 _____ The product is exceedingly comfortable
4 _____ The product is comfortable
3 _____ The product gives moderate comfort
2 _____ The product is not comfortable at all
1 _____ No effect

CRITERIA	Effectiveness in relieving muscle pain	Comfortability
T0- Commercial Topical Pain Reliever	1 2 3 4 5	1 2 3 4 5
T1- 70% Gamamela Flowers and 30% Erhaka leaves extract ointment	1 2 3 4 5	1 2 3 4 5
T2- 50% Gamamela Flowers and 50% Erhaka leaves extract ointment	1 2 3 4 5	1 2 3 4 5
T3- 30% Gamamela Flowers and 70% Erhaka leaves extract ointment	1 2 3 4 5	1 2 3 4 5

Acceptability test of the commercial pain reliever statement and the Gamamela (Etiloxo non-steroidal) Flowers and Erhaka (Artemisia vulgaris) J.J. Leaves extract as a topical pain reliever

Participant No. _____
Name _____
Address _____
Occupation _____

Purpose: This survey aims to determine the acceptability between the commercial muscle pain reliever statement and the Gamamela (Etiloxo non-steroidal) Flowers and Erhaka (Artemisia vulgaris) J.J. Leaves extract in terms of effectiveness in relieving muscle pain and comfortability.

Direction: Observe and rate the acceptability of the 4 treatments and encircle the number that corresponds to your rating. Refer to the rating scale below.

A. Effectiveness in relieving muscle pain

5 _____ Relieves the pain completely
4 _____ Relieves the pain
3 _____ Relieves the pain but not completely
2 _____ Does not relieve pain
1 _____ No effect

B. Comfortability

5 _____ The product is exceedingly comfortable
4 _____ The product is comfortable
3 _____ The product gives moderate comfort
2 _____ The product is not comfortable at all
1 _____ No effect

CRITERIA	Effectiveness in relieving muscle pain	Comfortability
T0- Commercial Topical Pain Reliever	1 2 3 4 5	1 2 3 4 5
T1- 70% Gamamela Flowers and 30% Erhaka leaves extract ointment	1 2 3 4 5	1 2 3 4 5
T2- 50% Gamamela Flowers and 50% Erhaka leaves extract ointment	1 2 3 4 5	1 2 3 4 5
T3- 30% Gamamela Flowers and 70% Erhaka leaves extract ointment	1 2 3 4 5	1 2 3 4 5

Acceptability test of the commercial pain reliever ointment and the Gannamela (Mikania mosambiensis) Flowers and Erhaka (Crotalaria vulgaris) L.J Leaves extract as a topical pain reliever

Panelist No. _____
Name _____
Address _____
Occupation _____

Purpose: This survey form aimed to determine the acceptability between the commercial muscle pain reliever ointment and the Gannamela (Mikania mosambiensis) Flowers and Erhaka (Crotalaria vulgaris) L.J Leaves extract in terms of effectiveness in relieving muscle pain and comfortability.

Directions: Observe and rate the acceptability of the 4 treatments and encircle the number that corresponds to your rating. Refer to the rating scale below.

A. Effectiveness in relieving muscle pain

5 _____ Relieves the pain completely
4 _____ Relieves the pain
3 _____ Relieves the pain but not completely
2 _____ Does not relieve pain
1 _____ No effect

B. Comfortability

5 _____ The product is exceedingly comfortable
4 _____ The product is comfortable
3 _____ The product gives moderate comfort
2 _____ The product is not comfortable at all
1 _____ No effect

CRITERIA	Effectiveness in relieving muscle pain	Comfortability
T0- Commercial Topical Pain Reliever	1 2 3 4 5	1 2 3 4 5
T1- 70% Gannamela Flowers and 30% Erhaka leaves extract ointment	1 2 3 4 5	1 2 3 4 5
T2- 80% Gannamela Flowers and 20% Erhaka leaves extract ointment	1 2 3 4 5	1 2 3 4 5
T3- 90% Gannamela Flowers and 10% Erhaka leaves extract ointment	1 2 3 4 5	1 2 3 4 5

Acceptability test of the commercial pain reliever ointment and the Gannamela (Mikania mosambiensis) Flowers and Erhaka (Crotalaria vulgaris) L.J Leaves extract as a topical pain reliever

Panelist No. _____
Name _____
Address _____
Occupation _____

Purpose: This survey form aimed to determine the acceptability between the commercial muscle pain reliever ointment and the Gannamela (Mikania mosambiensis) Flowers and Erhaka (Crotalaria vulgaris) L.J Leaves extract in terms of effectiveness in relieving muscle pain and comfortability.

Directions: Observe and rate the acceptability of the 4 treatments and encircle the number that corresponds to your rating. Refer to the rating scale below.

A. Effectiveness in relieving muscle pain

5 _____ Relieves the pain completely
4 _____ Relieves the pain
3 _____ Relieves the pain but not completely
2 _____ Does not relieve pain
1 _____ No effect

B. Comfortability

5 _____ The product is exceedingly comfortable
4 _____ The product is comfortable
3 _____ The product gives moderate comfort
2 _____ The product is not comfortable at all
1 _____ No effect

CRITERIA	Effectiveness in relieving muscle pain	Comfortability
T0- Commercial Topical Pain Reliever	1 2 3 4 5	1 2 3 4 5
T1- 70% Gannamela Flowers and 30% Erhaka leaves extract ointment	1 2 3 4 5	1 2 3 4 5
T2- 80% Gannamela Flowers and 20% Erhaka leaves extract ointment	1 2 3 4 5	1 2 3 4 5
T3- 90% Gannamela Flowers and 10% Erhaka leaves extract ointment	1 2 3 4 5	1 2 3 4 5

Acceptability test of the commercial pain reliever ointment and the Gannamela (Mikania mosambiensis) Flowers and Erhaka (Crotalaria vulgaris) L.J Leaves extract as a topical pain reliever

Panelist No. _____
Name _____
Address _____
Occupation _____

Purpose: This survey form aimed to determine the acceptability between the commercial muscle pain reliever ointment and the Gannamela (Mikania mosambiensis) Flowers and Erhaka (Crotalaria vulgaris) L.J Leaves extract in terms of effectiveness in relieving muscle pain and comfortability.

Directions: Observe and rate the acceptability of the 4 treatments and encircle the number that corresponds to your rating. Refer to the rating scale below.

A. Effectiveness in relieving muscle pain

5 _____ Relieves the pain completely
4 _____ Relieves the pain
3 _____ Relieves the pain but not completely
2 _____ Does not relieve pain
1 _____ No effect

B. Comfortability

5 _____ The product is exceedingly comfortable
4 _____ The product is comfortable
3 _____ The product gives moderate comfort
2 _____ The product is not comfortable at all
1 _____ No effect

CRITERIA	Effectiveness in relieving muscle pain	Comfortability
T0- Commercial Topical Pain Reliever	1 2 3 4 5	1 2 3 4 5
T1- 70% Gannamela Flowers and 30% Erhaka leaves extract ointment	1 2 3 4 5	1 2 3 4 5
T2- 80% Gannamela Flowers and 20% Erhaka leaves extract ointment	1 2 3 4 5	1 2 3 4 5
T3- 90% Gannamela Flowers and 10% Erhaka leaves extract ointment	1 2 3 4 5	1 2 3 4 5

Acceptability test of the commercial pain reliever ointment and the Gamamela (Olibanum rose-sinensis) Flowers and Erhaka (Artemisia vulgaris) L.f Leaves extract as a topical pain reliever

Participant No. _____
 Name _____
 Address _____
 Occupation _____

Purpose: This survey form aimed to determine the acceptability between the commercial muscle pain reliever ointment and the Gamamela (Olibanum rose-sinensis) Flowers and Erhaka (Artemisia vulgaris) L.f Leaves extract in terms of effectiveness in relieving muscle pain and comfortability.

Directions: Observe and rate the acceptability of the 4 treatments and encircle the number that corresponds to your rating. Refer to the rating scale below.

A. Effectiveness in relieving muscle pain

5 _____ Relieves the pain completely
 4 _____ Relieves the pain
 3 _____ Relieves the pain but not completely
 2 _____ Does not relieve pain
 1 _____ No effect

B. Comfortability

5 _____ The product is exceedingly comfortable
 4 _____ The product is comfortable
 3 _____ The product gives moderate comfort
 2 _____ The product is not comfortable at all
 1 _____ No effect

CRITERIA	Effectiveness in relieving muscle pain	Comfortability
T0- Commercial Topical Pain Reliever	1 2 3 4 5	1 2 3 4 5
T1- 70% Gamamela Flowers and 30% Erhaka leaves extract ointment	1 2 3 4 5	1 2 3 4 5
T2- 50% Gamamela Flowers and 50% Erhaka leaves extract ointment	1 2 3 4 5	1 2 3 4 5
T3- 30% Gamamela Flowers and 70% Erhaka leaves extract ointment	1 2 3 4 5	1 2 3 4 5

Signature _____

Acceptability test of the commercial pain reliever ointment and the Gamamela (Olibanum rose-sinensis) Flowers and Erhaka (Artemisia vulgaris) L.f Leaves extract as a topical pain reliever

Participant No. _____
 Name _____
 Address _____
 Occupation _____

Purpose: This survey form aimed to determine the acceptability between the commercial muscle pain reliever ointment and the Gamamela (Olibanum rose-sinensis) Flowers and Erhaka (Artemisia vulgaris) L.f Leaves extract in terms of effectiveness in relieving muscle pain and comfortability.

Directions: Observe and rate the acceptability of the 4 treatments and encircle the number that corresponds to your rating. Refer to the rating scale below.

A. Effectiveness in relieving muscle pain

5 _____ Relieves the pain completely
 4 _____ Relieves the pain
 3 _____ Relieves the pain but not completely
 2 _____ Does not relieve pain
 1 _____ No effect

B. Comfortability

5 _____ The product is exceedingly comfortable
 4 _____ The product is comfortable
 3 _____ The product gives moderate comfort
 2 _____ The product is not comfortable at all
 1 _____ No effect

CRITERIA	Effectiveness in relieving muscle pain	Comfortability
T0- Commercial Topical Pain Reliever	1 2 3 4 5	1 2 3 4 5
T1- 70% Gamamela Flowers and 30% Erhaka leaves extract ointment	1 2 3 4 5	1 2 3 4 5
T2- 50% Gamamela Flowers and 50% Erhaka leaves extract ointment	1 2 3 4 5	1 2 3 4 5
T3- 30% Gamamela Flowers and 70% Erhaka leaves extract ointment	1 2 3 4 5	1 2 3 4 5

Acceptability test of the commercial pain reliever ointment and the Gamamela (Olibanum rose-sinensis) Flowers and Erhaka (Artemisia vulgaris) L.f Leaves extract as a topical pain reliever

Participant No. _____
 Name _____
 Address _____
 Occupation _____

Purpose: This survey form aimed to determine the acceptability between the commercial muscle pain reliever ointment and the Gamamela (Olibanum rose-sinensis) Flowers and Erhaka (Artemisia vulgaris) L.f Leaves extract in terms of effectiveness in relieving muscle pain and comfortability.

Directions: Observe and rate the acceptability of the 4 treatments and encircle the number that corresponds to your rating. Refer to the rating scale below.

A. Effectiveness in relieving muscle pain

5 _____ Relieves the pain completely
 4 _____ Relieves the pain
 3 _____ Relieves the pain but not completely
 2 _____ Does not relieve pain
 1 _____ No effect

B. Comfortability

5 _____ The product is exceedingly comfortable
 4 _____ The product is comfortable
 3 _____ The product gives moderate comfort
 2 _____ The product is not comfortable at all
 1 _____ No effect

CRITERIA	Effectiveness in relieving muscle pain	Comfortability
T0- Commercial Topical Pain Reliever	1 2 3 4 5	1 2 3 4 5
T1- 70% Gamamela Flowers and 30% Erhaka leaves extract ointment	1 2 3 4 5	1 2 3 4 5
T2- 50% Gamamela Flowers and 50% Erhaka leaves extract ointment	1 2 3 4 5	1 2 3 4 5
T3- 30% Gamamela Flowers and 70% Erhaka leaves extract ointment	1 2 3 4 5	1 2 3 4 5

Signature _____

Acceptability test of the commercial pain reliever ointment and the Gamamela (African rose-scented) Flowers and Erhaka (Aromatica vulgaris L.) Leaves extract as a topical pain reliever

Product No. _____
Name: _____
Address: _____
City: _____

Purpose: The survey form aimed to determine the acceptability between the commercial muscle pain reliever ointment and the Gamamela (African rose-scented) Flowers and Erhaka (Aromatica vulgaris L.) Leaves extract in terms of effectiveness in relieving muscle pain and comfortability.

Directions: Observe and rate the acceptability of the 4 treatments and encircle the number that corresponds to your rating. Refer to the rating scale below.

A. Effectiveness in relieving muscle pain

5 _____ Relieves the pain completely
4 _____ Relieves the pain
3 _____ Relieves the pain but not completely
2 _____ Does not relieve pain
1 _____ No effect

B. Comfortability

5 _____ The product is exceedingly comfortable
4 _____ The product is comfortable
3 _____ The product gives moderate comfort
2 _____ The product is not comfortable at all
1 _____ No effect

CRITERIA	Effectiveness in relieving muscle pain	Comfortability
T0- Commercial Topical Pain Reliever	1 2 3 4 5	1 2 3 4 5
T1- 70% Gamamela Flowers and 30% Erhaka leaves extract ointment	1 2 3 4 5	1 2 3 4 5
T2- 50% Gamamela Flowers and 50% Erhaka leaves extract ointment	1 2 3 4 5	1 2 3 4 5
T3- 30% Gamamela Flowers and 70% Erhaka leaves extract ointment	1 2 3 4 5	1 2 3 4 5

Acceptability test of the commercial pain reliever ointment and the Gamamela (African rose-scented) Flowers and Erhaka (Aromatica vulgaris L.) Leaves extract as a topical pain reliever

Product No. _____
Name: _____
Address: _____
City: _____

Purpose: The survey form aimed to determine the acceptability between the commercial muscle pain reliever ointment and the Gamamela (African rose-scented) Flowers and Erhaka (Aromatica vulgaris L.) Leaves extract in terms of effectiveness in relieving muscle pain and comfortability.

Directions: Observe and rate the acceptability of the 4 treatments and encircle the number that corresponds to your rating. Refer to the rating scale below.

A. Effectiveness in relieving muscle pain

5 _____ Relieves the pain completely
4 _____ Relieves the pain
3 _____ Relieves the pain but not completely
2 _____ Does not relieve pain
1 _____ No effect

B. Comfortability

5 _____ The product is exceedingly comfortable
4 _____ The product is comfortable
3 _____ The product gives moderate comfort
2 _____ The product is not comfortable at all
1 _____ No effect

CRITERIA	Effectiveness in relieving muscle pain	Comfortability
T0- Commercial Topical Pain Reliever	1 2 3 4 5	1 2 3 4 5
T1- 70% Gamamela Flowers and 30% Erhaka leaves extract ointment	1 2 3 4 5	1 2 3 4 5
T2- 50% Gamamela Flowers and 50% Erhaka leaves extract ointment	1 2 3 4 5	1 2 3 4 5
T3- 30% Gamamela Flowers and 70% Erhaka leaves extract ointment	1 2 3 4 5	1 2 3 4 5

Acceptability test of the commercial pain reliever ointment and the Gamamela (African rose-scented) Flowers and Erhaka (Aromatica vulgaris L.) Leaves extract as a topical pain reliever

Product No. _____
Name: _____
Address: _____
City: _____

Purpose: The survey form aimed to determine the acceptability between the commercial muscle pain reliever ointment and the Gamamela (African rose-scented) Flowers and Erhaka (Aromatica vulgaris L.) Leaves extract in terms of effectiveness in relieving muscle pain and comfortability.

Directions: Observe and rate the acceptability of the 4 treatments and encircle the number that corresponds to your rating. Refer to the rating scale below.

A. Effectiveness in relieving muscle pain

5 _____ Relieves the pain completely
4 _____ Relieves the pain
3 _____ Relieves the pain but not completely
2 _____ Does not relieve pain
1 _____ No effect

B. Comfortability

5 _____ The product is exceedingly comfortable
4 _____ The product is comfortable
3 _____ The product gives moderate comfort
2 _____ The product is not comfortable at all
1 _____ No effect

CRITERIA	Effectiveness in relieving muscle pain	Comfortability
T0- Commercial Topical Pain Reliever	1 2 3 4 5	1 2 3 4 5
T1- 70% Gamamela Flowers and 30% Erhaka leaves extract ointment	1 2 3 4 5	1 2 3 4 5
T2- 50% Gamamela Flowers and 50% Erhaka leaves extract ointment	1 2 3 4 5	1 2 3 4 5
T3- 30% Gamamela Flowers and 70% Erhaka leaves extract ointment	1 2 3 4 5	1 2 3 4 5

Appendix E

Statistical Test among the Treatments

H₀ – There is no significant difference between the commercialized product and varying concentrations of Gumamela (*Hibiscus rosa-sinensis L.*) flowers and Erbaka (*Artemisia vulgaris L.*) leaves extract as topical pain reliever in terms of:

- i) Effectiveness and;
- ii) Comfortability

H_a - There is a significant difference between the commercialized product and varying concentrations of Gumamela (*Hibiscus rosa-sinensis L.*) flowers and Erbaka (*Artemisia vulgaris L.*) leaves extract as topical pain reliever in terms of:

- i) Effectiveness and;
- ii) Comfortability

Appendix Table 3. Mean Result of the Effectiveness Rating of the Muscle Pain Reliever Ointment

Treatments	Replicates			Mean or average per treatment
	R1	R2	R3	
Treatment 0	4.80	4.60	4.80	4.73
Treatment 1	3.80	4.40	4.80	4.33
Treatment 2	4.00	4.00	4.60	4.20
Treatment 3	4.60	4.40	5.00	4.67

Legend: The higher the mean, the more effective the product is in relieving muscle pain

Interpretation:

Table 3 shows the mean result of the effectiveness rating of the topical pain reliever. As gleaned from the table, treatment 0 which is the commercial product yielded the best result for having a mean of 4.73 during the three replication survey procedures. It was then followed by treatment 3 which comprises of 30% Gumamela (*Hibiscus rosa-sinensis L.*)

flowers and 70% Erbaka leaves (*Artemisia vulgaris L.*) extracts for 4.67 mean while treatment 1, 70% Gumamela (*Hibiscus rosa-sinensis L.*) flowers and 30% Erbaka leaves (*Artemisia vulgaris L.*) extracts garnered 4.33 mean. On the other hand, treatment 2 which is 50% Gumamela (*Hibiscus rosa-sinensis L.*) flowers and 50% Erbaka leaves (*Artemisia vulgaris L.*) extracts got the least mean of 4.20 in this acceptability test. In conclusion, treatment 3 garnered the best result, thus it yielded the best results in terms of various concentrations, therefore high amount of Erbaka Leaf extracts increases its potential.

Appendix Table 4. Mean Result of the Comfortability Rating of the Muscle Pain

Reliever Ointment

Treatments	Replicates			Mean or average per treatment
	R1	R2	R3	
Treatment 0	4.60	5.00	5.00	4.87
Treatment 1	4.20	4.20	4.80	4.40
Treatment 2	4.00	4.40	4.60	4.33
Treatment 3	4.20	4.20	5.00	4.47

Legend: The higher the mean, the more comfortable the product is

Interpretation:

Table 4 shows the mean result of comfortability rating of the topical pain reliever. As gleaned from the table, treatment 0 which is the commercial product yielded the best result for having a mean of 4.87 during the three replication survey procedures. It was then followed by treatment 3 which comprises of 30% Gumamela (*Hibiscus rosa-sinensis L.*) flowers and 70% Erbaka leaves (*Artemisia vulgaris L.*) extracts for 4.47 mean while treatment 1, 70% Gumamela (*Hibiscus rosa-sinensis L.*) flowers and 30% Erbaka leaves (*Artemisia vulgaris L.*) extracts garnered 4.40 mean. On the other hand, treatment 1 which is 50% Gumamela (*Hibiscus rosa-sinensis L.*) flowers and 50% Erbaka leaves (*Artemisia vulgaris L.*) extracts got the least mean of 4.33 in this acceptability test.

Appendix Table 5. Ranking According to Effectiveness

REPLICATE	Evaluator	Different Topical Pain Reliever				RANK			
		T0	T1	T2	T3	A	B	C	D
Replicate 1	1	5	4	4	5	1.5	3.5	3.5	1.5
	2	5	4	5	5	2	4	2	2
	3	4	3	4	5	2.5	4	2.5	1
	4	5	3	4	4	1	4	2.5	2.5
	5	5	5	3	4	1.5	1.5	4	3
Replicate 2	6	5	5	4	5	2	2	4	2
	7	4	4	3	5	2.5	2.5	4	1
	8	5	4	4	4	1	3	3	3
	9	4	4	5	4	3	3	1	3
	10	5	5	4	4	1.5	1.5	3.5	3.5
Replicate 3	11	5	5	5	5	2.5	2.5	2.5	2.5
	12	5	5	4	5	2	2	4	2
	13	4	4	4	5	3	3	3	1
	14	5	4	5	4	1.5	3.5	1.5	3.5
	15	5	5	5	4	2	2	2	4
	ΣRank					29.5	42	43	35.5

n=15 k=4 α=0.01 df=3 P Value = 0.19

Crit Value = 10.92

$$\text{FM Cal} = (12/(nk(k+1))) * (\sum R^2) - 3n(k+1)$$

$$\text{FM Cal} = 0.04 * 5743.5 - 225$$

$$\text{FM Cal} = 4.74$$

Decision Rule: The FM Calculated (4.74) is less than the FM Critical Value (10.92).
Therefore, accept the null hypothesis.

Appendix Table 6. Ranking According to Comfortability

Replicates	Evaluator	Different Topical Pain Reliever				RANK			
		T0	T1	T2	T3	A	B	C	D
Replicate 1	1	5	4	4	5	1.5	3.5	3.5	1.5
	2	4	4	4	4	2.5	2.5	2.5	2.5
	3	5	4	4	4	1	3	3	3
	4	4	4	3	4	2	2	4	2
	5	5	5	5	4	2	2	2	4
Replicate 2	6	5	4	4	5	1.5	3.5	3.5	1.5
	7	5	5	4	4	1.5	1.5	3.5	3.5
	8	5	3	4	4	1	4	2.5	2.5
	9	5	4	5	4	1.5	3.5	1.5	3.5
	10	5	5	5	4	2	2	2	4
Replicate 3	11	5	5	5	5	2.5	2.5	2.5	2.5
	12	5	5	4	5	2	2	4	2
	13	5	4	4	5	1.5	3.5	3.5	1.5
	14	5	5	5	5	2.5	2.5	2.5	2.5
	15	5	5	5	5	2.5	2.5	2.5	2.5
	Σ Rank					27.5	40.5	43	39

n=15 k=4 $\alpha=0.01$ df=3 P Value = 0.13

Crit Value = 10.92

$$\text{FM Cal} = (12/(nk(k+1))) * (\Sigma R^2) - 3n(k+1)$$

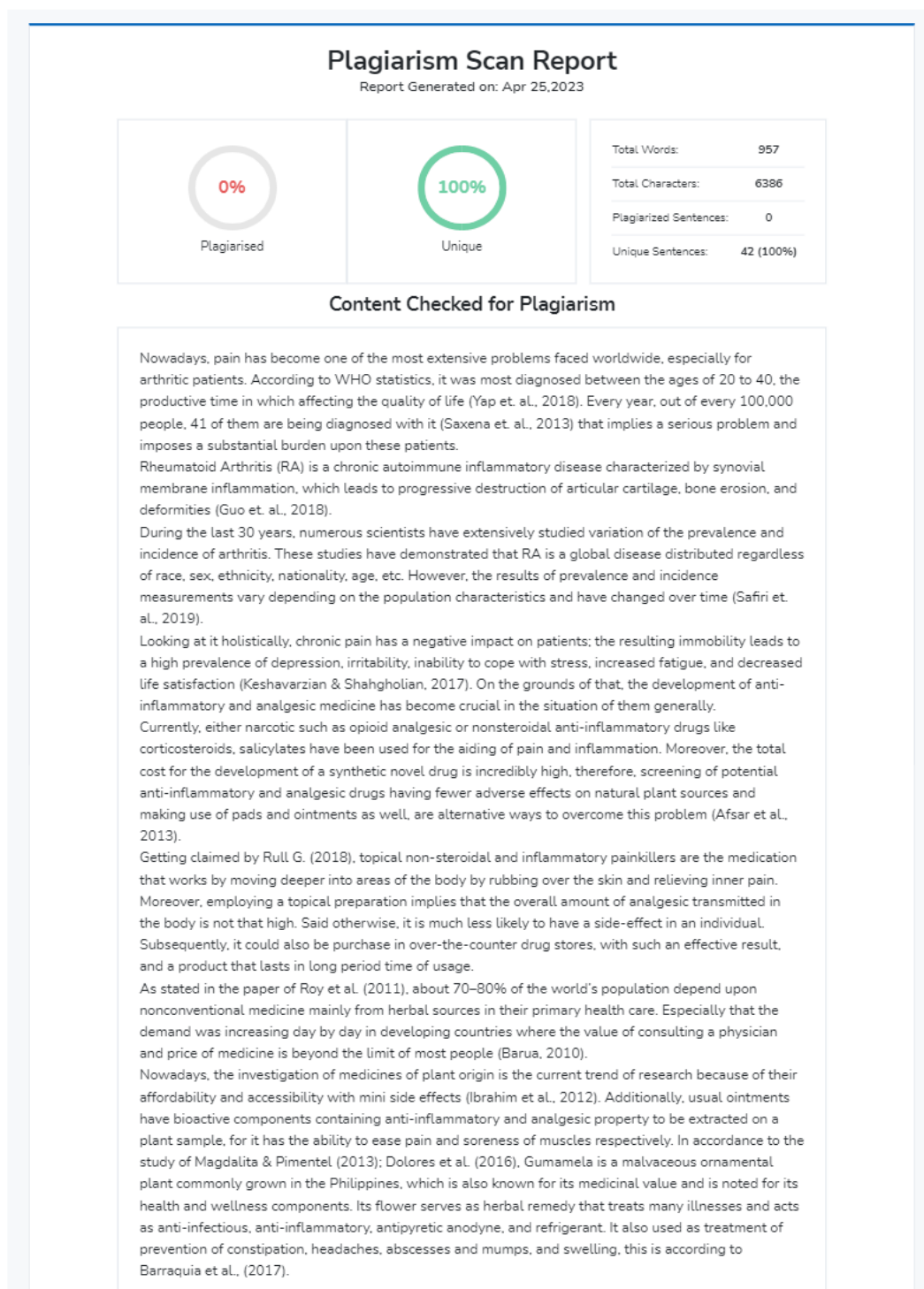
$$\text{FM Cal} = 0.04 * 5766.5 - 225$$

$$\text{FM Cal} = 5.66$$

Decision Rule: The FM Calculated (5.66) is less than the FM Critical Value (10.92).
Therefore, accept the null hypothesis.

Appendix F

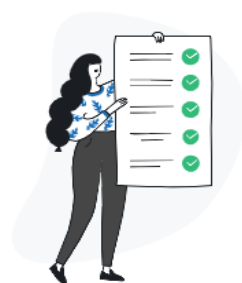
Plagiarism Check Results



It has been reported by Magalong and Lopez (2007) that alkaloids, cardenolides and guaianolides, tannins, protein, and carbohydrates were discovered in all floral extracts from different gumamela cultivars, however anthraquinones and oils were found to be absent. The red and pink gumamela flower was found to contain polyphenol, resin, and flavonoids that has analgesic and anti-inflammatory properties.

On the other hand, *Artemisia vulgaris* L., also known as mugwort, is a perennial long-stemmed shrub belonging to the family Compositae. It is native to temperate Europe, Asia, and northern Africa (Ashok and Upadhyaya, 2013). This species has a long history in medicine and was formerly referred to as the mother of herbs in the Middle Ages for its biological activities. In addition, it was used in traditional Chinese, Hindu, and European medicine to cure a variety of disorders involving pain (Ekier, et al 2020). According also to a previous report of Ashok & Upadhyaya (2013), diverse classes of bioactive compounds such as flavonoids, sesquiterpenoids, essential oils, tannins, phenols, and saponins were present in *A. vulgaris* that may produce a response by inhibiting the activity. Taken also into account, its easy availability and significant potency of with minimum side effects can make this plant an appropriate candidate for the development of novel anti-inflammatory and analgesic medicine (Pandey et al., 2021). Ultimately, the proportion of bioactive compounds extracted by ethanol was comparatively high as compared to other solvents, due to higher polarity of ethanol which be the possible reason for higher anti-inflammatory and analgesic effect of the plant samples in ethanolic extraction (Rajabian et al., 2017). This guarantees the effectiveness of ethanol as polar solvent in separating the bioactive constituents needed. To sum up, medicinal plants with pharmacological evidence supporting their usage in folk medicine agents could be useful as natural medical therapy for inflammatory and pain-related illnesses (Dara & Belamkar, 2014).

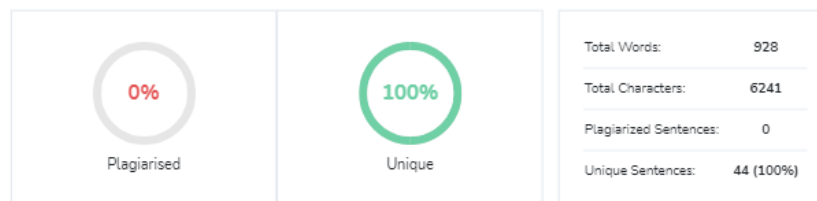
Founded by related literatures mentioned, this study can benefit all people in a community, especially arthritic patients to ease their discomfort with less side-effects. Moreover, to improve one's daily functioning and contribute on increased rate of productivity. In which, herbal constituents utilized were accessible, yet effective and efficient to use.



No Plagiarism Found

Plagiarism Scan Report

Report Generated on: Apr 25, 2023



Content Checked for Plagiarism

This study was conducted in School Year 2022-2023 at the Regional Science High School for Region I. The experiment was conducted on a nearby residence of the researcher. The study was delimited to two (4) treatments, in which only arthritic patients are the respondents. Further, the phytochemical constituents present in plant samples were not tested for anti-inflammatory and analgesic activity. However, results taken were based in previous related literatures.

This study aimed to determine the synergistic effect of Mugwort (*Artemisia vulgaris* L.) leaf and Gumamela (*Hibiscus rosa-sinensis* L.) flowers extracts as topical pain reliever.

- 1) What are the bioactive compounds present in Mugwort (*Artemisia vulgaris* L.) leaf and Gumamela (*Hibiscus rosa-sinensis* L.) flower extracts which could aid pain?
- 2) Which among the treatments will yield the best result in terms of:
 - 2.1) Effectiveness and;
 - 2.2) Comfortability?
- a) T0 - Commercial pain reliever ointment
- b) T1 - 70% *Hibiscus rosa sinensis* flowers and 30% *Artemisia vulgaris* L. leaves extracts
- c) T2 - 50% *Hibiscus rosa sinensis* flowers and 50% *Artemisia vulgaris* L. leaves extracts
- d) T3 - 30% *Hibiscus rosa sinensis* flowers and 70% *Artemisia vulgaris* L. leaves extracts
- 3) Is there a significant difference between the commercialized product and the treatments in terms of:
 - 3.1) Effectiveness and;
 - 3.2) Comfortability?

Definition of Terms

For clarification and understanding, the following terms, with their operational meaning are given.

Analgesic activity is a medicinal property that can reduce pain

Anti-inflammatory is the ability of something to aid inflammation

Arthritis is a condition that adversely affects people

Ethanol is a polar solvent that was used in the extraction of *A. vulgaris* leaves and *H. rosa-sinensis* flowers

Extraction is a procedure in which the bioactive compounds needed are being extracted by the means of using a solvent

Flower is the part of Gumamela (*H. rosa-sinensis*) to be investigated

Leaf is the part of Mugwort (*A. vulgaris*) to be assessed

Phytochemical Analysis is a process that examines what are the constituents present or absent in the plant samples.

Phytochemicals are various bioactive compound that are present in the *A. vulgaris* leaf and *H. rosa-sinensis* flower

Synergistic is used to describe things that produce, result from, or otherwise involve interaction and combination

Topical is a material that are prepared for external use and is intended for application to the skin

This chapter shows the research design that is most appropriate for accomplishing the study. The materials were presented how they were used on the experiment and in the data gathering process.

These materials were also utilized for the formulation of the treatments. Moreover, the data gathering procedures were elaborated thoroughly on how they were executed in order to avoid errors and

incidents throughout the research process. Likewise, the management of data was presented and ethical standards were observed to preserve the integrity of the research paper and the researcher as well.

Research Design

The researchers applied the post-test only control group design to evaluate the synergistic effect of Erbaka (*Artemisia vulgaris* L.) leaves and Gumamela (*Hibiscus rosa-sinensis* L.) extracts as topical pain reliever. According to Frey (2018), posttest-only control group design is a type of true-experimental design in which there is a minimum of two groups, where one of which is controlled. Afterwards, data were accumulated on the assessment after the procedure.

The researcher administered this experimental design by using control and experimental groups to assess the cause-and-effect relationship between variables, where one is the commercialized product. The independent variable of the study is the kind of ointment to be used, while the dependent variable is the rating of respondents in terms of pain severity improvement and comfortability of the products.

In data gathering, survey form was constructed by the researchers. Treatments were applied and survey was carried out into the control and experimental groups.

Materials and Equipment

The experimentation process includes plant samples. About 500g of *Hibiscus rosa-sinensis* L. and 500g of *Artemisia vulgaris* L. leaves were collected from the backyards of few houses in Bangar, La Union, and Tagudin, Ilocos Sur. The plant samples were thoroughly washed to remove any unwanted dirt that could contaminate the sample. The required amount of *Hibiscus rosa-sinensis* L. flowers and *Artemisia vulgaris* L. leaves were calculated using a weighting scale. Researchers provided other ingredients for the making process; while the Shea butter, Beeswax, Menthol Crystals, and Camphor were purchased online by using Shopee as platform. Finally, apparatuses were from the laboratory of Regional Science High School for Region 1.

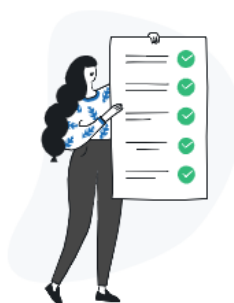
Data Gathering Process

Gathering of Materials

The experimentation process includes plant samples. About 500g of *Hibiscus rosa-sinensis* L. and 500g of *Artemisia vulgaris* L. leaves were collected from the backyards of few houses in Bangar, La Union, and Tagudin, Ilocos Sur. The plant samples were thoroughly washed to remove any unwanted dirt that could contaminate the sample. The required amount of *Hibiscus rosa-sinensis* L. flowers and *Artemisia vulgaris* L. leaves were calculated using a weighting scale. Researchers provided other ingredients for the making process; while the Shea butter, Beeswax, Menthol Crystals, and Camphor were purchased online by using Shopee as platform. Finally, apparatuses were from the laboratory of Regional Science High School for Region 1.

Extraction and Phytochemical Screening

Dried *Hibiscus rosa-sinensis* L. flowers and *Artemisia vulgaris* L. leaves were submitted at Lorma Colleges San Fernando, La Union for ethanolic extraction by means of maceration, and for phytochemical screening to be also done. Phytochemical analysis is a process where the plant sample extracts are analyzed for the presence of secondary metabolites like alkaloids, terpenes, and flavonoids, while extraction is being conducted to insituate those constituents (Srivastava et al., 2020).



No Plagiarism Found

APPENDIX G

Documentation



Plate 1: Picture of *Artemisia vulgaris* L. leaves



Plate 2: Picture of *Hibiscus rosa-sinensis* L. flowers



Plate 3: Washing of *Artemisia vulgaris* L. leaves and *Hibiscus rosa-sinensis* L. flowers

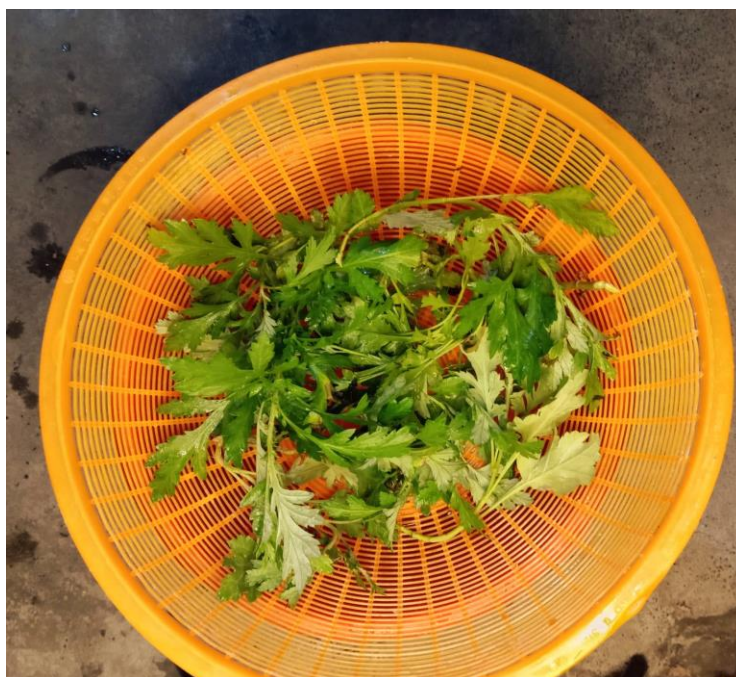


Plate 4: Drying of *Artemisia vulgaris* L. leaves and *Hibiscus rosa-sinensis* L. flowers



Plate 5: Mechanical Extraction



Plate 6: The Treatments



Plate 7: Treatment Testing

Appendix F

Data Book

Activities	Date Started	Date Finished	Details
Choosing a topic and formulation of problem	Aug 29, 2022	Aug 31, 2022	The researchers are tasked to choose a study to venture
Collecting background information	Sept 2, 2022	Sept 9, 2022	Important information that is needed in the study were collected
Title defense	Sept 15, 2022	Sept 15, 2022	The study entitled: The Synergistic effect of Gumamela (<i>Rosa sinensis L.</i>) flowers and Erbaka (<i>Artemesia vulgaris L.</i>) leaves extract as topical pain reliever was defended
Making Chapter I	Sept 25, 2022	Oct 17, 2022	The researchers worked on the Chapter I after gathering all the information
Making of Chapter II	Nov 3, 2022	Nov 20, 2022	Chapter II was formulated which served as the researchers' guide in the conduct of the experiment
Gathering all the materials	Jan 9, 2023	Feb 10, 2023	Materials that are needed in the study were procured and gathered by the researchers.
Formulation of Communication Letters	Jan 18, 2023	Jan 18, 2023	Communication Letters were formulated by the researchers and signed by the research adviser, indicating that the researchers can start the experimentation

Phytochemical analysis	Jan 18, 2023	March 27, 2023	The qualitative phytochemical screening of the plant samples was conducted at Lorma Colleges of Pharmacy, San Fernando La Union
Preparing of treatments	Feb 11, 2023	Feb 15, 2023	Treatments were prepared by the researchers ready for acceptability testing
Conduct of Acceptability Test	February 20, 2023	March 25, 2023	Acceptability Test was conducted to test and compare the treatments by a survey rated by the respondents
Collecting RRL	March 25, 2023	March 28, 2023	Several reviews of related literature were collected in order to support the results that were gathered by the researchers
Finishing of Chapter III and IV	March 25, 2023	March 30, 2023	Chapters III and IV were formulated to discuss the findings.
Pre-Oral Defense	April 26, 2023	April 27, 2023	Researchers will defend their studies to the panelists.
Incorporation of Suggestions	April 28, 2023	May 9, 2023	The researchers incorporated the suggestions of panelists.
Final Oral Defense	May 25, 2023	May 25, 2023	Researchers will defend their studies to the panelists.
Incorporation of Suggestions	May 26, 2023	May 29, 2023	Recommendations were incorporated by the researchers.

CURRICULUM VITAE



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