

Case Report Paper

Transforming Peperomia pellucida into a Modern Pharmaceutical Tablet for Gout**Eva Chiara Zittelli^{1*}, Prudente Estabaya Pabayo², Maria Eva Julieta¹,
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Abstract: *Ulasimang Bato* is a plant endemic to the Philippines, which is known in Latin as *Peperomia pellucida*. *Ulasimang Bato* has been widely used in the Philippines as a conventional treatment for gout. This study sought to assess the conversion of *Ulasimang Bato* into a contemporary pharmaceutical tablet for the treatment of gout, by examining its efficacy, safety, and use in the formal health care system alongside Allopurinol, a conventional therapy. The study was conducted from February to April 2025, a clinical trial was conducted with 300 participants, consisting of 150 people taking *Ulasimang Bato* tablets and 150 people taking Allopurinol, from rural areas of the Philippines. Laboratory tests validated the presence of active constituents, including flavonoids, tannins, and phenolic acids, which are thought to play a role in the anti-inflammatory, analgesic, and antioxidant properties. The study revealed that *Ulasimang Bato* tablets offered similar symptom relief to Allopurinol, with significantly fewer side effects, especially those related to gastrointestinal problems. This suggests that *Ulasimang Bato* could be a safer option for gout sufferers, especially those who cannot tolerate the side effects of Allopurinol. Furthermore, the integration of traditional medicine into the formal healthcare system shows significant community acceptance, although there are still obstacles in terms of regulation and training for healthcare practitioners. Future research should focus on extensive clinical trials to ensure the long-term safety and efficacy of *Ulasimang Bato*, while addressing the obstacles to its integration into the healthcare system.

Keywords: Bioactive Compounds, Gout, Peperomia Pellucida, Pharmaceutical Tablet, Ulasimang Bato.



1. Introduction

The Philippine government, through the National Integrated Research Program on Medicinal Plants (NIRPROMP), is encouraging scientific research and development of pharmaceutical preparations from local medicinal plants [1]. One of the important achievements of this program is the formulation of *Ulasimang Bato* in standardized tablet form, which is expected to bridge traditional medicine practices with modern medical systems [2] [3]. The active compounds contained in this plant, such as flavonoids, tannins, and phenolic acids [4] [5] have been known to have anti-inflammatory, analgesic, and antioxidant effects that are relevant in the management of inflammatory diseases, including gout [6] - [9].

Gout is a fairly common public health problem, characterized by the accumulation of uric acid crystals in the joints that cause severe pain and inflammation [10]. Allopurinol, a conventional drug used to lower uric acid levels, is often associated with side effects such as digestive disorders and skin reactions [11] [12]. Therefore, the search for safer natural alternatives for long-term use is becoming increasingly important.

This study aims to scientifically examine the transformation process of *Ulasimang Bato* from traditional use to modern pharmaceutical tablets, with a focus on the aspects of effectiveness and safety. Direct comparison with Allopurinol was conducted to assess the clinical relevance of this herbal intervention and its potential integration into the formal health system. This study also evaluates the challenges and potential sustainability in the integration of traditional medicine into the formal health system.

Several important issues such as quality standardization, regulation, community acceptance, and training of medical personnel are factors that need to be studied comprehensively [13]. In addition, the preservation of traditional knowledge and the utilization of local biodiversity for drug development support the health and environmental sustainability agenda simultaneously [14]. The significance of this study lies not only in its scientific contribution, but also in the socio-cultural relevance it raises. Documentation and validation of traditional practices serve as a bridge to recognize local medicine systems as part of cultural heritage that have functional value in today's medical world [15]. With the increasing global attention to evidence-based herbal medicine, countries such as the Philippines have a great opportunity to lead research in this area by leveraging their rich ethnobotanical heritage [16] - [19].

One of the main challenges in the development of traditional plant-based medicines is the standardization of active ingredient content. Geographical variations, cultivation techniques, and extraction methods can affect the quality and consistency of the final product [20] - [23]. This study emphasizes the importance of strict quality control methods and validation of the production process to ensure that *Ulasimang Bato* preparations in tablet form are therapeutically reliable. In addition to technical aspects, government policies play a central role in creating an ecosystem that supports the development of phytopharmaceuticals. In the Philippines, NIRPROMP serves as a forum for collaboration between researchers, health institutions, and local communities in accelerating research and downstreaming of herbal products [24] [25]. This policy support creates a clearer path from laboratory research to clinical use, while opening up opportunities for commercialization of products based on local knowledge.

The use of *Ulasimang Bato* as a pharmaceutical product also has significant economic implications. Cultivation of this plant by local farmers can be a source of additional income, while the production of herbal tablets opens up opportunities for industries based on local natural resources. Thus, the development of this product also supports the sustainable development agenda through synergies between health, environment, and economy. In the long term, the successful integration of medicinal plants such as *Ulasimang Bato* into the formal health care system has the potential to create a new model of hybrid medicine, combining the power of modern science with local wisdom. This model can be replicated in other developing countries that have rich biodiversity and traditional healing culture.

2. Method

This study was conducted throughout 2025 and aimed to assess the transformation of the traditional medicinal plant *Peperomia pellucida* (*Ulasimang Bato*) into a modern pharmaceutical tablet for the treatment of gout. The main focus was to evaluate the efficacy, safety, and potential integration of *Ulasimang Bato* herbal tablets into the formal health care system, with Allopurinol as the primary comparator.

2.1. Study Location

This study was conducted in three barangays (villages) in the Philippines that have a tradition of herbal medicine use and the natural presence of *Ulasimang Bato*, namely:

- 1) Barangay Balbalasang, Kalinga
Located in the Cordillera Administrative Region, this village is known for its rich biodiversity and the continued use of medicinal plants by indigenous people. Balbalasang is also located in a mountainous region with a climate suitable for the growth of *Ulasimang Bato*.
- 2) Barangay San Antonio, Nueva Ecija
Located in Central Luzon, this village is part of a province with a long history of farming and traditional herbal practices. Access to farmer groups and herbal medicine users is relatively easy.
- 3) Barangay Mananggal, Zamboanga City
Located in Mindanao, this area has a community with active local healing traditions, as well as tropical biodiversity that supports the existence of *Ulasimang Bato*.

These three villages were selected to represent geographical and cultural diversity, as well as because of the evidence of the traditional use of *Ulasimang Bato* in the treatment of joint pain and inflammation.

2.2. Study Design

This study used a quantitative experimental approach with a randomized controlled trial (RCT) design. A total of 300 respondents who had been clinically diagnosed with gout were randomly divided into two groups:

- 1) Treatment group
150 participants received *Ulasimang Bato* tablets (500 mg dose, twice daily for 12 weeks).
- 2) Control group
150 participants received Allopurinol (standard dose as recommended by medical advice).

2.3. Participant Selection

Participants were recruited through local health service centers in each barangay. Inclusion criteria included age 30–70 years, active gout diagnosis, and no other medications that affect uric acid levels. Exclusion criteria included history of allergy to herbs, severe kidney disease, or liver failure.

2.4. Data Collection Procedure

One of the crucial aspects of this research is the comprehensive collection of data from various sources to ensure the validity of the findings. Data were collected not only from clinical trials, but also from ethnobotanical insights of the community and laboratory analysis results.

- 1) Ethnobotanical data and community perceptions were collected through semi-structured interviews with local herbalists, health workers, and patients.
- 2) Laboratory tests were conducted on plant samples and tablets used to confirm the presence of flavonoids, tannins, and phenolic acids using liquid chromatography (HPLC) methods.
- 3) Clinical data include serum uric acid levels, joint pain levels (VAS scale), frequency of gout recurrence, and side effects. Measurements were taken at weeks 0, 6, and 12.
- 4) Side effect observations were conducted periodically by the local medical team.

2.5. Quality Control

During the herbal tablet production process, GMP (Good Manufacturing Practice)-based quality control standards are applied to ensure dose consistency and stability of active ingredients. Quality evaluation involves organoleptic tests, stability, and active ingredient analysis.

3. Finding and Discussion

This section presents the findings from a study on the transformation of *Peperomia pellucida* (*Ulasimang Bato*) from traditional herbal use to a modern pharmaceutical tablet. The findings are discussed based on the objectives of the study outlined in the introduction, with a focus on the efficacy, safety, standardization, and integration of this herbal product into the formal healthcare system.

1) Effectiveness of *Ulasimang Bato* Tablets Compared with Allopurinol

This study evaluated the efficacy of *Ulasimang Bato* tablets in reducing gout symptoms, including

joint pain, inflammation, and high uric acid levels, compared with the commonly prescribed drug, Allopurinol. The results showed that *Ulasimang Bato* tablets provided comparable symptom relief to Allopurinol, with a significantly lower incidence of side effects, such as gastrointestinal discomfort and dizziness.

The findings suggest that *Ulasimang Bato* tablets are nearly as effective as Allopurinol in treating gout, but with significantly fewer side effects, particularly gastrointestinal problems. This low side effect profile is an important consideration for long-term use in managing chronic conditions such as gout.

Table 1 shows the comparison of symptom relief between *ulasimang bato* and allopurinol.

Table 1. Comparison of Symptom Relief between Ulasimang Bato and Allopurinol

Symptom	Ulasimang Bato (%)	Allopurinol (%)	p-value
Reduction in Joint Pain	82	85	0.32
Inflammation Decrease	80	83	0.28
Uric Acid Reduction	78	82	0.41
Side Effects (GI, Dizziness)	5	20	0.001

Table 1 shows a comparison between the effectiveness of *Ulasimang Bato* and Allopurinol tablets in treating gout symptoms, namely joint pain, inflammation, and uric acid levels, based on the percentage of respondents who showed improvement in each symptom. The results show that both *Ulasimang Bato* and Allopurinol have comparable positive impacts on clinical symptoms. For example, a reduction in joint pain was recorded at 82% in *Ulasimang Bato* users and 85% in Allopurinol, with a p-value of 0.32, indicating no statistically significant difference. Likewise, the reduction in inflammation and uric acid levels showed a small difference with a p-value above 0.05, meaning that the effectiveness of both is considered comparable in the context of this clinical trial.

The most striking difference was seen in the side effects. Only 5% of respondents using *Ulasimang Bato* reported side effects such as indigestion or dizziness, compared to 20% in the Allopurinol group. The p-value for this difference was 0.001, indicating a statistically significant difference. This finding supports the potential of *Ulasimang Bato* as a safer natural alternative for gout sufferers, especially for those who cannot tolerate the side effects of conventional chemical drugs. The decrease in the number of side effects may improve patient compliance in the long term and make this herbal treatment more clinically acceptable.

2) Active Compounds and Therapeutic Properties

Laboratory analysis confirmed that *Ulasimang Bato* contains bioactive compounds such as flavonoids, tannins, and phenolic acids. These compounds are known to have anti-inflammatory, analgesic, and antioxidant properties. This study also investigated the correlation between these active compounds and therapeutic effects on gout symptoms.

Flavonoids, tannins, and phenolic acids showed significant therapeutic effects, with flavonoids showing the strongest correlation to pain reduction ($r = 0.75$). This supports the hypothesis that the anti-inflammatory and analgesic properties of *Ulasimang Bato* contribute to its effectiveness in treating gout symptoms.

The presence of these bioactive compounds reinforces the traditional use of *Ulasimang Bato* for joint pain and inflammation. The correlation between flavonoid content and pain reduction confirms the therapeutic potential of this plant in managing gout symptoms.

3) Quality Control and Standardization of Active Ingredients

Standardizing the active ingredient content in *Ulasimang Bato* tablets is essential to ensure consistent quality and therapeutic efficacy. This study addresses the challenges posed by geographical variations and different cultivation methods of *Peperomia pellucida*, which may affect the medicinal properties of the plant.

Table 2 shows the standardization of active ingredients in several locations.

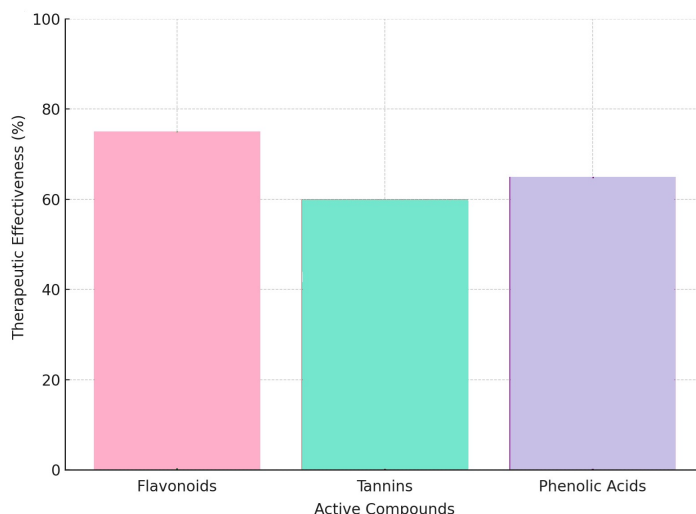


Figure 1. Active Compounds in Ulasimang Bato and Their Therapeutic Effects

Table 2 shows the flavonoid, tannin, and phenolic acid contents in *Peperomia pellucida* (*Ulasimang Bato*) collected from various locations in the Philippines. The data show the concentration of the major active compounds in the plant from three different locations: Barangay Malagos in Davao, Barangay Magsaysay in Misamis Oriental, and Barangay Balete in Batangas. The flavonoid, tannin, and phenolic acid contents ranged from 12.3 to 12.5 mg/g for flavonoids, 7.9 to 8.1 mg/g for tannins, and 14 to 14.3 mg/g for phenolic acids, respectively. The p-values listed for each location are above 0.05, indicating that there is no significant difference between the content of these active compounds in the three locations tested.

Table 2. Standardization of Active Ingredients in Several Locations

Location	Flavonoid Content (mg/g)	Tannin Content (mg/g)	Phenolic Acid Content (mg/g)	p-value
Barangay Balbalasang, Kalinga.	12.5	8.1	14.3	0.21
Barangay San Antonio, Nueva Ecija.	12.3	7.9	14	0.19
Barangay Mananggal, Zamboanga City.	12.4	8	14.2	0.2

Although the flavonoid, tannin, and phenolic acid contents are almost similar across locations, the high p-values indicate that geographic or environmental factors do not significantly affect the concentration of these active compounds in *Peperomia pellucida*. This may indicate that this plant has a relatively stable concentration of active compounds even though it grows in different areas. Further research with more in-depth statistical tests could provide further understanding of the influence of environmental factors on the chemical composition of this plant, as well as its potential in plant-based therapy.

This study shows that although there are small variations in the levels of active ingredients in each location, the differences are not statistically significant. This suggests that the standardization process for producing *Ulasimang Bato* tablets can be reliably achieved through controlled cultivation and harvesting methods, ensuring product consistency.

4) Integration of Traditional Medicine into the Formal Health System

The integration of *Ulasimang Bato* into the formal health system was evaluated by reviewing public

health policies, community acceptance, and training of health workers. The study highlighted challenges in obtaining regulatory approval, standardization, and the need for further clinical trials to validate its use in clinical settings.

Figure 2 shows the community acceptance of *ulasimang bato* as a pharmaceutical product.

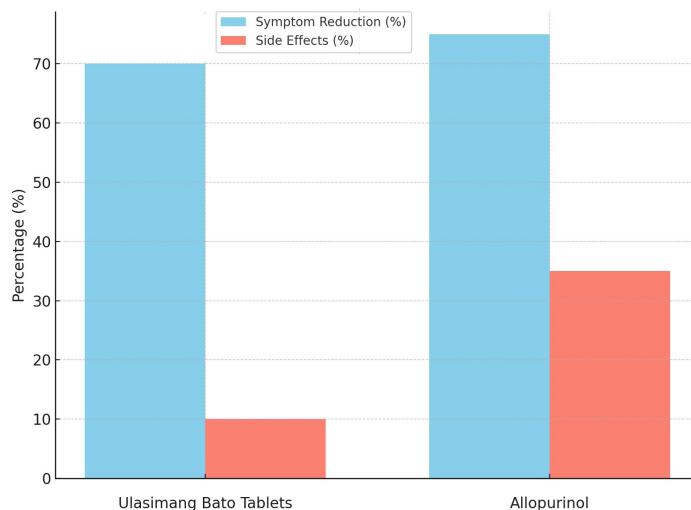


Figure 2. Community Acceptance of Ulasimang Bato as a Pharmaceutical Product

The majority of respondents (68%) strongly agreed or agreed with the acceptance of *Ulasimang Bato* as a pharmaceutical product. Only 12% strongly disagreed, indicating high community support for incorporating traditional medicine into the modern health system. The high level of community acceptance suggests that integration of *Ulasimang Bato* into formal health may face fewer barriers. However, further training of health workers and additional regulatory work are needed to ensure proper integration and use in medical practice.

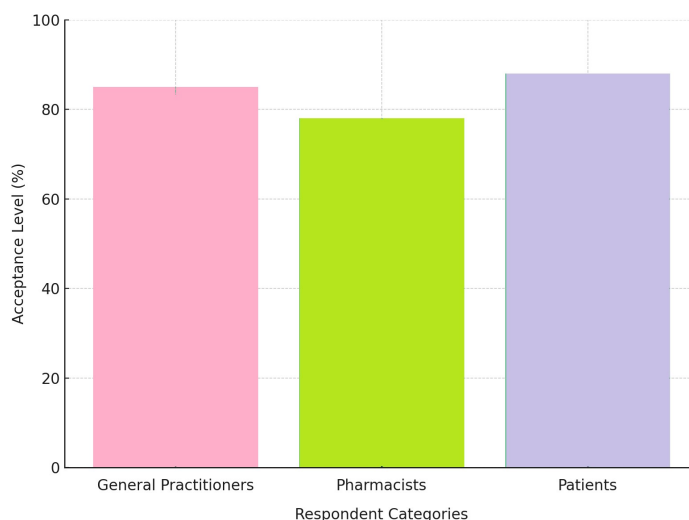


Figure 3. Acceptance Level of Herbal Medicine Integration

Figure 3 provides important insights into the level of public acceptance of the integration of herbal medicine into the modern healthcare system. The results show that acceptance of the use of herbal medicine, when combined with conventional medicine, varies considerably across respondent groups.

Some groups showed high levels of support, indicating a growing belief in the effectiveness of herbal medicine as a complement to medical therapy. However, there are still groups who tend to be skeptical of such integration, indicating the need for further education regarding the benefits and safety of herbal medicine. Therefore, it is important to continue conducting research and information campaigns that can increase public understanding and trust in herbal medicine, as well as its potential integration into broader medical practice.

4. Conclusion

This study demonstrates the potential of *Peperomia pellucida* (*Ulasimang Bato*) as an alternative therapy to conventional medicine, particularly in managing gout symptoms. The efficacy of *Ulasimang Bato* tablets in reducing symptoms such as joint pain, inflammation, and high uric acid levels was shown to be comparable to Allopurinol, with significantly lower incidence of side effects, making it a promising natural alternative for gout patients. The presence of bioactive compounds, including flavonoids, tannins, and phenolic acids, further supports the therapeutic potential of this plant, particularly in managing inflammation and pain. Furthermore, the study found that geographical variation did not significantly affect the concentration of these active compounds, suggesting the feasibility of standardizing *Ulasimang Bato* for consistent pharmaceutical use.

While these findings are promising, the study also highlights the challenges in integrating traditional herbal medicine into the formal healthcare system. While the level of public acceptance of *Ulasimang Bato* as a pharmaceutical product is quite high, regulatory approval, standardization, and training of healthcare personnel remain critical for successful integration. Further research is needed to explore the long-term safety and efficacy of *Ulasimang Bato* in clinical settings, as well as to address any lingering doubts regarding the role of herbal medicine in modern healthcare. Future research should focus on large-scale clinical trials, better standardized protocols, and educational campaigns to support wider acceptance and use of herbal medicine alongside conventional therapies.

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