Peperomia Pellucida

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Peperomia pellucida (L.) Kunth Herbs: A Comprehensive Review on Phytochemical, Pharmacological, Extraction Engineering Development, and Economic Promising Perspectives

Abstract

Peperomia pellucida (L.) Kunth belongs to the Piperaceae family and has long been used empirically as traditional medicine by the community of Indonesia, the Philippines, India, Nigeria, Brazil, and other countries. The herb of *P. pellucida* has chemical constituents with potential activity such as analgesic, antipyretic, anti-inflammatory, antidiabetic, gout, antihypertensive (ACE inhibitors), antioxidants, and antibacterial, as well as activities such as a sunscreen. Unfortunately, this plant has not been utilized as a source of raw material for herbal medicines commercially. So far, this plant is still considered a weed by local farmers (mainly oil palm plantations in Indonesia). This narrative review aims to comprehensively overview *P. pellucida* herbs as a potential natural resource for herbal medicine by looking from some perspective. This review article highlights some perspectives on this herb, including plant description and origins, phytochemistry, pharmacology and toxicology, extraction technique development, and its prospect and economical promising as a natural resource of herbal medicines.

Keyword: *Peperomia pellucida* (L.) Kunth., Piperaceae, traditional medicine, extraction technique developments

INTRODUCTION

Peperomia pellucida (L.) Kunth is a herbaceous plant that belongs to the Piperaceae family. In many countries, it has long been used traditionally to treat a wide range of diseases, including diabetes, muscle pain, aches, common cold, conjunctivitis, abscesses, boils and skin wounds, fever, headache, lower blood cholesterol level, proteinuria, diuretic, and convulsions as well as in

Ayurvedic system of medicines. The plant is commonly found in several Asian and South American countries, is easy to find in yards and humid areas, and usually grows wild in sunburns (Bojo et al., 1994; Majumder, 2011; Susilawati et al., 2017).

Many biological activity studies have been successfully conducted to reveal the potential of *P. pellucida* in treating diseases, including antihypertensive, anti-inflammatory, antipyretic, analgesic, antibacterial, antiamoeba, antioxidant, gastroprotective, and other pharmacological activities (Ahmad et al., 2019; Fakayode et al., 2021; Idris et al., 2016; Ng et al., 2021; Rojas-Martínez et al., 2013; Uwaya et al., 2021). The results are also supported by the fact that this plant contains phytochemical compounds responsible for pharmacological activities. For instance, Pellucidin A, isolated from *P. pellucida* inhibits the angiotensin-converting enzyme, and Patuloside A exhibits antibacterial activity. The herbs are also believed to possess polyphenolics, flavonoids, fatty acids, volatile oils, and other bioactive constituents (Ahmad et al., 2019; Heinrich et al., 1998; Khan et al., 2010; Usman and Ismaeel, 2020).

P. pellucida has great potential as it has been used empirically to treat diseases and is scientifically proven to possess biological activities related to its utilization in traditional medicine. However, up to the present time, there are still limited data available about the use of the herbs as raw material for commercial herbal medicinal products. The plant even considers as a weed by some local farmers.

Recently, scientific studies on the *P. pellucida* extraction method development have been done by scientists. These studies generally focus on increasing the yield obtained from the extraction process with a green chemistry approach. The results suggest that applying the suitable extraction method and combined with optimal extraction parameters, it can produce more yields compared to those conventional techniques(Ahmad et al., 2017; Gomes et al., 2022; Hashim et al., 2020;

Mun'im et al., 2017). Thus, it is very possible to be applied to industrial-scale production. This current review aims to provide up-to-date information regarding the progress of research on *P. pellucida* herbs in terms of its phytochemical, pharmacological, and toxicological, as well as developments in the extraction technique. In addition, it also discussed the economic prospects of this plant.

MATERIALS AND METHOD

A literature search was conducted between mid-2021 and mid-2022 to find all published papers related to the *Peperomia pellucida* L Kunth. in electronic databases such as Google Scholar, directory open-access journal (DOAJ), Pubmed, and ScienceDirect. All the data included in the review were articles written in English.

PLANT DESCRIPTION AND ORIGINS

Taxonomy

Kingdom *Plants*, Subkingdom *Tracheobionta – Vascular plants*, Superdivision *Spermatophyta – Seed plants*, Division Class *Magnoliophyta – Flowering plants,* Class *Magnoliopsida – Dicotyledons,* Subclass *Magnoliidae,* Order *Piperales,* Family *Piperaceae*, Genus *peperomia,* Species *Peperomia pellucida* (L.) Kunth (Anonim, 2015; Majumder, 2011).

Morphology

P. pellucida herb (as seen in Figure 1) is a plant that usually grows wild in damp and clusters. This plant is easy to find in gardens, yards, roadsides, on the edges of ditches, and other watery places. This herb flowers throughout the year and is an annular herb, the leaves are bare and light green on the upper surface and green and white on the lower surface, thinly fleshy, ovoid or oval, with an area of + 1.5 – 4 (-5) cm, wide 1-3,3 cm. Fibrous roots, pale green translucent stems, erect or ascending, with a height of + 15 – 45 cm (Abere and Okpalaonyagu, 2015; Majumder, 2012; Rahman et al., 2014).

Figure 1. *Peperomia pellucida* (L) Kunth in natural habitat

Habitat

This plant is widespread in South America and many Asian countries, grows at about 400 m asl (above sea level) as a weed along roadsides, in moist soil and in shady places around houses that are usually in clusters, and in plantations (mainly oil palm plantations in Indonesia). Most of these plants are found in the tropics (Majumder, 2011; Rahman et al., 2014). The herb of *P. pellcuda* is widely distributed in many American and South Asian countries (Arrigoni-Blank et al., 2004; Ho et al., 2022).

Empirical uses

Ethnobotanical studies on the *P. pellucida* herb show that every part of this plant has long been used as a medicinal plant. Empirically, the *P. pellucida* herb is used by Indonesians to treat headaches accompanied by fever, and the leaves extract used to treat stomach pain, gout, and hypertension (Heyne, 1988). In Bolivia, all parts of this plant are used to stop bleeding. The herbaceous root of *P. pellucida* is used to treat fever and wounds. In northeastern Brazil, this herb is used for blood pressure and lowering cholesterol levels, and this plant is used in religious activities (de Albuquerque et al., 2007). In Guyana and the Amazon, it acts as a cough medicine, emollient, and diuretic and can be used to treat proteinuria (Nwokocha et al., 2012). In the Philippines, the decoction of this plant is used to reduce uric acid levels and kidney disorders. In various areas of Bangladesh, the leaves of this plant are used by local people as a treatment for mental illness. In South America, the fresh juice of the stems and leaves of this plant can be used as a treatment for inflammation of the eyes (Majumder, 2011).

PHYTOCHEMISTRY

P. pellucida plants have been known to have various types of chemical constituents, including amino acids, protein carbohydrates, minerals consisting of sodium, calcium, and iron (Ooi et al., 2012), tannins, saponins, phenols, steroids, terpenoids, amino acids, alkaloids(Abere et al., 2012; Abere and Okpalaonyagu, 2015; de Albuquerque et al., 2007; Awe et al., 2013; Gini and Jothi, 2013; Gomes et al., 2022; Majumder and Majumder, 2013; Mengome et al., 2010; Pappachen and Chacko, 2013), essential oils(Manalo et al., 1983; Usman and Ismaeel, 2020; Verma et al., 2015), and fatty acid (linoleic acid and α-linoleic acid) (Heinrich et al., 1998). Some studies have succeeded in isolating and identifying the chemical compounds contained in the *P. pellucida* herb, and these studies have been carried out since 1983, as presented in Table 1.

PHARMACOLOGY ACTIVITY

A comprehensive study of pharmacological activities of *P. pellucida* has been discussed by Kartika et al. (2016). The review describes *P. pellucida* herbs (both in the form of pure compound isolates, fractions, or extracts) about its pharmacological activities such as cytotoxic, lipase inhibitory, fibrinolytic, and thrombolytic, hypotensive, gastroprotective, depressant effect, burn healing, analgesic, antioxidant, antipyretic, anti-inflammatory, antiosteoporotic, antidiarrhoeal, antisickling, antimicrobial, antihyperuricemia, and antihyperglycemic. However, in this subsection, we discuss some of the updated potential activities in detail.

Anti-hypertension

P. pellucida herb has activity as antihypertensive, mainly as an angiotensin-converting enzyme (ACE) inhibitor, based on several studies that have been reported (Ahmad et al., 2019; Kurniawan et al., 2016; Saputri et al., 2021, 2015). Antihypertensive activity assay has been reported by Saputri et al. (2015), where the ethyl acetate fraction of *P. pellucida* herb extract has activity as an ACE inhibitor (*in vitro* method) with IC_{50} value of 7.17 μg/ml and *In vivo* assay method has also been carried out which show that at the dose of 50 mg/KgBW it has an ACE inhibitory effect similar to that of captopril. These results align with the research conducted by Nwokocha et al. (2012). The extract of *P. pellucida* herb exhibited dose-dependent antihypertensive, vasodilating, and bradycardic effects by targeting nitric oxide-dependent signaling pathways in mice. ACE inhibitory compounds from the P. pellucida herb have been isolated and identified, including quercetin (Kurniawan et al., 2016), pellucidin A, and 2,3,5-trimethoxy-9-(12,14,15-trimethoxybenzyl)-1H-indene (Ahmad et al., 2019). In addition, an in silico molecular docking study has also been carried out on several other phenylpropanoid compounds against the ACE receptor, showing that most of these compounds have strong binding energy interactions with the receptor(Ahmad et al., 2019).

Anti-inflammatory, Antipyretic, and Analgesic

The aqueous extract of the *P. pellcuida* herb was tested as an anti-inflammatory (carrageenan and arachidonic acid induction method) and analgesic (acetic acid induction and heat induction using hot plates) in rats and mice orally, with anti-inflammatory activity at doses of 200 and 400 mg/kg respectively. Based on the effect of prostaglandin synthesis (Arrigoni-Blank et al., 2004). In addition, anti-inflammatory activity has also been demonstrated by Ng et al. (2021), which showed that the fermentation and drying processes affected the effectiveness of the anti-inflammatory activity of *P. pellucida* herb extracts, where the anti-inflammatory potential of *P. pellucida* increased significantly with the drying process compared to the results of the fermentation process. Furthermore, the fresh and dried leaf extracts of *P. pellucida* exhibited various antioxidant and anti-inflammatory potentials comparable to those obtained in the standard (Fakayode et al., 2021). The methanol extract of the *P. pellucida* herb was administered orally with a dose range of 70 – 210 mg/kg and showed significant analgesic activity in mice induced with acetic acid(Aziba et al., 2001; Sheikh et al., 2013). While the analgesic activity dose with the highest activity at a dose of 400 mg/kg is induced with acetic acid, and a dose of 100 mg/kg is the best dose in the heat induction method using a hot plate (Arrigoni-Blank et al., 2004).

Antibacterial and Antiamoeba

The n-butanol fraction of *P. pellucida* herb extract has antibacterial activity (Khan and Omoloso, 2002) and also reported antibacterial tests on four gram-positive bacteria (*Bacillus subtilis, Bacillus megaterium, Staphylococcus aureus, Streptococcus β-haemolyticus*) and six gram-negative bacteria (*Escherichia coli, Shigella dysenteriae, Shigella sonnei, Shigella flexneri,* *Pseudomonas aeruginosa, Salmonella typhi*), with MIC values against all these bacteria in the concentration range from 8 to 64 g/mL and antifungal at *Aspergillus flavus* and *Candida albicans* (Khan et al., 2010). *P. pellucida* has broad-spectrum antimicrobial activity on *Penicillium notatum*, *Aspergillus niger*, *Rhizopus stolon*, *Candida albicans*, *Salmonella thypi*, *Klebsiella pneumonae*, *Pseudomonas aeruginosa*, *Bacillus subtilis*, *Staphylococcus aureus*, *Escherichia coli* (Oloyede et al., 2011), *Vibrio sp*, *Flavobacterium sp*, and *Edwardsiella tadra* (Wei et al., 2011). Idris et al. (2016) have also proved the antibacterial activity of the *n*-hexane extract of *P. pellucida* herb with a MIC value of 25 μg/mL. Khan et al. (2010), have succeeded in isolating and identifying the compound Patuloside A which has antibacterial activity from this herb. Another study revealed that *P.pellucida* has antiamoebic activity where the methanol fraction can damage the morphology and change the structure of *Acanthamoeba* cysts (IC_{50}= 29.28±3.64 %) detected using toluidine dye and observed using a light microscope(Sangsuwon et al., 2015).

Antidiabetes and Antioxidant

The antidiabetic activity of *P.pellucida* extract was observed in diabetic rats where doses of 10% and 20% w/w given for six days can reduce blood glucose levels(Hamzah et al., 2012). Sheikh et al. (2013) have also proven the hypoglycemic effect of ethyl acetate extract of the herbs at a dose of 300 mg/Kg in vivo. Then, Susilawati et al. (2017) isolated a new active compound (8,9-dimethoxy ellagic acid) from the plant, which exhibited antidiabetic properties in experimental animals.

On the other hand, the antioxidant properties of *P.pellucida* herbs have been widely studied(Adhitia et al., 2017; Mun'im et al., 2017; Oloyede et al., 2011; Uwaya et al., 2021; Wei et al., 2011; Yunarto et al., 2018). The methanol extract of the herbs possesses higher free radical scavenging activity than petroleum ether and chloroform extract (Uwaya et al., 2021; Wei et al., 2011). The high antioxidant activity of the plant at low concentrations indicates that it could be beneficial for treating ailments resulting from oxidative stress (Oloyede et al., 2011). Meanwhile, the ethanol extract has antioxidant activity with an IC_{50} value of 32.94 μg/mL (Yunarto et al., 2018). This result is relatively weaker than the methanol extract. However, there was an increase in the activity of the ethanol extract combined with the microwave-assisted extraction method (Mun'im et al., 2017) and the effect of gamma irradiation (Yusuf et al., 2017).

Other Pharmacology Activity

Scientists also successfully revealed the potency of *P. pellucida* herbs in other pharmacological activities, including gastroprotection, antimalaria, UV filter, anti-hyperuricemia, and others. Dillapiole, a chemical compound isolated from these herbs, showed gastroprotective activity in gastric ulcer experiment rats (Rojas-Martínez et al., 2013). The study of antimalaria properties on *P. pellucida* fractions (n-hexane, ethyl acetate, and methanol) suggested that all tested fractions were active against malaria culture with IC_{50} 12.80, 2.90, and 10.74 μg/mL, respectively (Bialangi et al., 2016). Besides that, this plant also possesses UV protection activity (Ahmad, 2015). The ethanolic extract of P. pellucida demonstrated antihyperuricemia in rats and mice (Tarigan et al., 2012). In addition to the pharmacological activity of *P. pellucida* herbs, it has also been reported that the extracts are rich in carbohydrates, proteins, and total ash content (31.22%), whose composition consists of main elements including sodium, calcium, and iron. This indicates that the plant can benefit humans in terms of protein and energy supplements(Ooi et al., 2012). Moreover, the administration of *P. pellucida* ethanol extract at a certain dose (200mg/Kg) can stimulate bone regeneration in the fractured part (Ngueguim et al., 2013).

TOXICITY ACTIVITY

In some countries, *Peperomia pellucida* has been eaten as salads, cooked as greens, and brewed as a tea by the local communities (Wakhidah et al., 2020). Moreover, the plant has historical data about its utilization as herbs to treat some diseases. This implies that this plant is safe to be consumed as food for human. Several toxicological studies of this herb have been carried out to evaluate the safety of the extracts. An acute toxicity test on mice (*Mus musculus*) reported that the LD_{50} of the herb extract was 5000 mg/kg BW, which suggested that the extract was relatively safe or exhibited low toxicity (Abere et al., 2012; Arrigoni-Blank et al., 2004). Similarly, acute toxicity tests performed by Waty et al. (2017) found that LD_{50} of the methanol extract of the plant was more significant than 4000 mg/kgBW in DDY mice and there was no sign of toxicity on the skin and hair, respiration system, defecation, feed intake and behavior. In addition, the highest tested dose (4000 mg/kgBW) did not cause mortality. The safety of *P.pellucida* herbs is also supported by the findings of histoptological study on white rats which statistically declared that the tested extract was non-toxic in the biological system tested (Beltran-Be et al., 2013). Citotoxicity effects on human embryonic kidney 293 cells (HEK 293) have also been observed by Pappachen and Chacko (2013). The results showed that there was no sign of toxicity at the lowest (6.25 µg/ml) to the highest tested dose (100 µg/ml). Further research was done by Hsuuw and Chan (2015) to distinguish the apoptotic effects of dillapiole isolated from *P. pellucida* on rats oocyte maturation, in vitro fertilization (IVF), as well as the development before and after implantation. Dillapiole significantly impaired rats oocyte maturation, lowered the IVF rate, and inhibited the development of embryo on tested animals. The findings implied that *P. pellucida* based products is not suggested for the pregnant woman and need further research. In vitro toxicity tests have been carried out on monkey kidney cells with an LC_{50} of 70 μg/ml (Mengome et al., 2010).

EXTRACTION TECHNIQUE DEVELOPMENT

Designing environmentally friendly and sustainable natural product extraction processes is a research topic currently attracting attention in the interdisciplinary fields of applied pharmaceutical sciences, chemistry, biology, and technology(Ahmad et al., 2017b; Mediani et al., 2022; Mun'im et al., 2017). Three main approaches have been identified to design and demonstrate green extraction on a laboratory and industrial scale to reach an optimal consumption of raw materials, solvents, and energy: (1) improving and optimizing existing processes; (2) using non-dedicated equipment; and (3) innovation in processes and procedures as well as the discovery of alternative solvents (Chemat et al., 2012).

The application of "green extraction" on *P. pellucida* herb has been reported in a few studies. Gomes et al. (2022) extracted *P. pellucida* herb with 99.8% ethanol using indirect ultrasounds assisted technique for 40 minutes to obtain crude extract. The extraction time was relatively low compared to the conventional methods that usually need longer time (Ahmad et al., 2017). Moreover, ultrasound-assisted extraction does not involve high temperatures that can cause degradation of desired bioactive compounds in the extracts, decreasing the bioactivity (Kumar et al., 2021). Therefore, using ultrasounds to extract thermo-labil compounds in *P.pellucida* could be an alternative method for the chemical, cosmetics, and pharmaceutical industries to obtain the compounds of interest from *P.pellucida* herbs.

Another technique studied for extracting *P.pellucida* herbs was microwave-assisted extraction (MAE). Extraction of phenolic constituents from *P.pellucida* (L) Kunth Herbs using MAE with solvent 95% ethanol was carried out to determine the impact of extraction duration (5–25 min) and temperature (65–145 C) on the extraction yield and the total phenolic content (TPC). The optimum condition reached 15 minutes at 145^{0}C (Hashim et al., 2020). A similar study was conducted by

Mun'im et al. (2017). They investigated the efficiency of some parameters, including ethanol concentration, sample ratio, extraction time, and microwave power for extracting phenolic and flavonoid compounds. The ideal MAE parameters for total phenolic content (49.78 mg GAE/g extract) were 80% ethanol as solvent, 1:12 solid to solvent ratio, extraction time of 2 min, microwave power of 30% Watt, while for total flavonoid content (TFC) were 80% ethanol as solvent,1:12 solid to solvent ratio, time of 2 min, and microwave power 70% Watt.

In terms of solvent optimization, ionic liquid-based microwave-assisted methods (IL-MAE) were studied to extract *P. pellucida* herbs. The use of 1-ethyl-3-methylimidazolium bromide (EMIMBr) as a solvent for attracting optimum polyphenolic compounds has been demonstrated by Ahmad et al. (2017). The study showed that using EMIMBr – MAE on the following parameters: a microwave power of 30% Watt, 10 minutes of extraction time, 14:1 (mL/g) liquid to solid ratio, EMIMBr concentration of 0.7 mol/L yielded the highest TPC (13.750 μg GAE/g) compared to conventional organic solvent *n*-hexane and ethyl acetate (3.408 and 7.823 μg GAE/g, respectively). The application of ionic liquids, including 1-butyl-3-methyl imidazolium bromide ([BMIM]Br) and 1-butyl-3-methyl imidazolium chloride ([BMIM]Cl) on polyphenolic compounds extraction from *P.pellucida* herbs was also demonstrated. The yield of TPC obtained using [BMIM]Cl as solvent was 18.287 μg GAE/g with parameter concentration of solvent 0.7 mol/L, 14 mL/L liquid-solid ratio, 270 Watts microwave power for 10 minutes. For [BMIM]Br solvent, the highest TPC measurement was 15.734 μg GAE/g obtained from parameter concentration of solvent 0.7 mol/L, 14 mL/L liquid-solid ratio, 270 Watts microwave power for 15 minutes(Ahmad et al., 2017b).

Metabolite profiling analysis of *P. pellucida* herbs was conducted by comparing the metabolite profile of extracts obtained from IL-MAE and maceration with 1-butyl-3-methylimidazolium tetrafluoroborate ([BMIM]BF_4]) and ethyl acetate as a solvent, respectively. The total ion chromatogram (TIC) from UPLC-QToF-MS/MS suggested that there were differences between organic and ionic liquid solvents [BMIM]BF_4 in their metabolite profiles (Ahmad et al., 2018). This may imply that using ionic liquids such as [BMIM]BF_4 can be opted to attract a class of compounds like polyphenols or to get some kinds of enriched *P. pellucida* extract.

Modern extraction techniques like microwave-assisted extraction can efficiently extract valuable phytochemicals. MAE is thought to be more environmentally friendly and consumes less time and solvent since there is minimal to no CO_2 emission. This method has successfully demonstrated the extraction of flavonoid and phenolic compounds from *P.pellucida* herbs and other plants (Ahmad et al., 2018; Chemat et al., 2019; Zhang et al., 2018). Dipole rotation (reversal of dipoles) and ionic conduction (movement of charged ions present in the solute and solvent) are the two methods by which microwave-assisted extraction transfers energy(Kubrakova and Toropchenova, 2008). In terms of microwave extraction, polar solvents are thought to be more efficient in absorbing electrical energy. However, the effectiveness of a solvent in a microwave environment depends on the dielectric constant and the dissipation factor, both of which are expected to be high for solvents used to effectively influence microwaves. The efficiency of the process is further increased by the careful selection of an appropriate solvent to interact with the metabolite components to be extracted. The absorption of microwave energy by biological materials causes the build-up of pressure within the cellular material, eventually leading to the splitting of the cellular structure with release of its chemical constituents(Kratchanova et al., 2004; Routray and Orsat, 2012).

PROSPECT AND ECONOMICAL PROMISING

Peperomia pellucida based medicines have been used empirically by the communities in Indonesia, Bolivia, Brazil, Guyana, Amazon, Philippines, Bangladesh, and South America to treat many kinds of diseases(de Albuquerque et al., 2007; Heyne, 1988; Majumder, 2011; Nwokocha et al., 2012). Even though it has great economic potential, there is very limited data available about this plant's commercial products, at least until now. The previous section of this review has described the current development of extraction methods to increase the yield of polyphenolic content and flavonoid content of *Peperomia pellucida* herbs using IL-MAE. Such a technique has a high possibility of being transferred to an industrial scale. It is because the time, energy use, high extraction yield, small amount of solvent, low economical costs as well as eco-friendly meet the criteria of the green extraction concept.

From the pharmaceutical industry perspective, *Peperomia pellucida* has a high potential to be developed into herbal medicines with indications related to its pharmacological activities, as discussed in the previous section of this review. Whereas the most likely product to be produced with the currently available data (effective extraction method, pharmacological activity, and toxicity data) is health supplements. The health supplements could be used as a complementary therapy for hypertension, diabetes, or inflammation patients. Health supplements are regulated as food by the FDA, making it more feasible to be manufactured since the regulation for food is not as strict as the regulation for drugs(Commissioner, 2022). However, future development of *P.pellucida* as herbal medicine should probe deeply into the formulation and clinical data trial so that the herbal medicine could be used as primary health care.

Regarding raw material supply, *P.pellucida* is abundant in nature and even considered a weed by local farmers. Utilizing this plant as a basic material in herbal medicine has several advantages.

Firstly, concerning its nature that can grow easily, it will not be challenging to cultivate them so the reproducibility of the products can be maintained. Secondly, it can be cultivated with several modification methods, from hydroponic techniques, which can overcome the limited land issue, to biotechnology techniques to increase the yield of compounds of interest. For instance, the polyphenolic content and the volatile oils are the compounds responsible for biological activities in the extract that can be improved by inoculating the *P.pellucida* with *Enterobacter asburiae* and *Klebsiella variicola* (Alves et al., 2022). Nevertheless, the post-harvest management for this plant would be challenging since the herb contains a lot of water so it is easy to rot if not handled properly.

Interestingly, the Philippine Patent has been granted to National Integrated Research Program on Medicinal Plants, Institute of Herbal Medicine, University of the Philippines Manila for the Ulasimang bato, local name for the *P. pellucida*, as antihyperurisemic agent. The use of this plant as antihyperurisemic agent has successfully passed clinical trials phase 1-3 and it is now available for commercial production and ready for public consumption as medicine (Sanchez, 2020). This initial information rationalizes that the use of *P. pellucida* as therapy agents in the treatment of hyperurisemic and the treatment of other various diseases is very possible.

CONCLUSION

Taking everything into consideration, the herbs of *Peperomia pellucida* is highly likely to be developed into herbal medicines. Utilizing this weed plant as herbal medicine, apart from increasing self-reliance in terms of drug supply, can also improve the economy of the farmers in the future as well as increase the value of the plant.

Peperomia Pellucida

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