

The Potential of Processing *Chromolaena Odorata* Leaves in Solving Health Issues: A Review

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Abstract. *Chromolaena Odorata L.* locally called kopasanda, is an invasive plant native to Indonesia that belongs to the Asteraceae family. Traditionally, this plant is commonly consumed and processed into several foods used to treat various health problems. This study aims to review the food potential of *Chromolaena Odorata L.* in overcoming health problems. This literature study was obtained from analysis of library sources such as Google Scholar, PubMed, and Science Direct. The results show that *Chromolaena Odorata L.* could be processed into food or drink used to treat health problems such as wound healing, skin infections, stomach problems, and others. The benefit is due to the plant's chemical compounds, which are beneficially used as antibiotic, anti-inflammatory, antipyretic, antioxidant, analgesic, and other properties. The conclusion is that the processed *Chromolaena Odarata L.* plant has the potential to be used as a treatment for several health problems.

1 Introduction

Chromolaena odorata L. has various names in Indonesia, such as kopasanda, botto' - botto', kirinyuh, and other names are invasive plants or weeds. It is a plant native to Indonesia that belongs to the Asteraceae family [1]. The growth of this plant is very fast, forming thick bushes about two meters high and spreading quickly in open areas such as grasslands, roadsides, forests, nature reserves, and wildlife sanctuaries. [2] This plant can be found in various other countries such as Africa, Asia, and sub-Saharan areas where it has been used as a treatment for various disease conditions [3].



Fig 1. *Chromolaena odorata* linn [4].

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Chromolaena odorata (L.) RM King & H. Rob, called Siam weed (Sap suea in Thai), has received much attention due to its various pharmaceutical activities. In Thailand and other tropical countries, fresh leaves of *C. odorata* are a natural product and in *C. odorata* phytochemical studies have traditionally been used to stop bleeding and improve wound healing. Scientific investigations revealed that *C. odorata* extracts exhibit various activities involved in wound healing. Therefore, *C. odorata* extract can be useful as an active ingredient in wound healing and cosmetic products [5].

The classification of the *Chromolaena Odorata* L. plant is by regnum plantae with super division Spermatophyta, division Magnoliophyta, class Magnoliopsida. Class Asteridae, order Asterales family Asteraceae with the genus *Chromolaena*, namely the species *Chromolaena odorata* Linn [6].

This plant is also an herbal plant known as a rich source of phytochemicals that contribute to health management [7]. As time goes by, the demand for plant-based treatments using natural herbal plants has been proven to increase throughout the world [8].

Chromolaena Odorata has been commonly and widely used in traditional medicine because of its properties which can provide therapeutic effects on the body. Leaf extracts from *C. odorata* have been shown to have antioxidant, anti-inflammatory, analgesic, antimicrobial, cytoprotective, and many other medically important properties [9]. Phytochemical components of *C. odorata* include alkaloids, flavonoids, flavanones, essential oils, phenolics, saponins, tannins, and terpenoids. Other important constituents of this plant are chromomoric acid, quercetagenin, and quercetin, all of which contribute to its medicinal properties [10]. For example, it has been reported in several studies that this phytochemical is capable of exhibiting a wide spectrum of pharmacological activities including antioxidant activity, hypoglycemic and hypocholesterolemic effects in animals as well as modulation in the stages of wound healing [11].

Traditionally, this plant is generally used topically or squeezed and then used as a drinking medicine [12]. Of all the benefits obtained from *C. odorata*, no one has ever discussed its potential as a processed product that can be efficacious in overcoming health problems. For this reason, we want to review the potential of processed *C. odorata* in treating various health problems.

2 Method

This review aims to present an overview of the potential of *C. odorata* based on the available evidence regarding the potential of *C. odorata* preparations in various health problems. Published information about *C. odorata* was compiled using various database platforms, including Google Scholar, Science Direct, and PubMed. The selection process includes all articles that cite *C. odorata* with keywords such as benefits, distribution, nutritional content, and phytochemicals in its potential as a processed ingredient that has potential in various health problems.

3 Finding

3.1 Processing of *chromolaena odorata* L.

In recent times, Tisane a general term for teas made from herbs that serve as beverages due to their physical or medicinal effects, has become increasingly popular among health-conscious consumers due to its aroma, antioxidant properties, and therapeutic applications. Tisanes are made from infusions or decoctions of herbs, spices, or other plant materials in hot water and usually do not contain caffeine. Tisanes are categorized based on which part

of the plant they come from: Leaf tisanes (mint, neem, cacao, lemongrass); Flower tisanes (rose, chamomile, hibiscus, and lavender); Bark tisanes (cinnamon, slippery elm, and black cherry bark); Root tisanes (ginger, echinacea and chicory) and fruit tisanes from orange peel, raspberry, blueberry and peach.

In this case, *C. odorata* can be processed into Tisane by washing the collected fresh *Chromolaena odorata* leaves to reduce the microbial load and remove land residues. The leaves are divided into two sets of tisanes. One set of leaves is used for the production of green tisane while the other set is used for the production of black tisane. In the production of black tisane, the leaves are left to wilt and ferment in the shade for 6 hours, while for green tisane the leaves are boiled in steam for 3 minutes; the water is drained from the leaves and allowed to cool at room temperature. Then both are manually rolled with a wooden roller until the leaf is flat enough to break and release leaf components from the interstitial cells. Then proceed with drying the leaves in the oven at 50°C for 6 hours. The dried leaves are ground into very small particles and sieved. The grinding and sieving process is repeated until uniform powder particles are obtained. The powdered leaves are weighed into a tea bag before being sealed. Then it becomes the tisane or the *C. odorata*.

The research results show that there is potential for using *C. odorata* leaves as a tisane. Green and black tisanes were comparable to branded teas in terms of physicochemical properties, phytonutrient content, and antioxidant potential. The concentration of cyanogenic glucosides in tisanes is not high enough to cause toxicity. Green tisanes were preferred over black tisanes and branded green teas in terms of their sensory acceptability. Greater contributions are needed for effective product development which includes profiling of sugars, fatty acids, and amino acids, toxicity testing to allay consumer fears as well as modification and optimization of production processes that will produce high-quality tisanes [13].

Apart from processing *C. odorata* leaves as tisan, traditionally *C. odorata* leaves are often used and consumed in boiled form. A decoction of the plant is used to treat coughs and colds, as well as skin disorders when bathing. It is a hepatotropic agent, diuretic, and astringent [12].

Chromolaena odorata is used in skin care stress, antidiabetic, infections, burns, and wounds. Traditionally, *C. odorata* leaves are needed to prevent leech attacks, liver disease, soft tissue injuries, and fire injuries in tropical countries. This preparation is used by traditional health workers in the treatment of many diseases, especially dysentery, headaches, and toothache [14].

3.2 Nutritional Content

The nutritional content of *C. odorata* consists of carbohydrates, protein, and amino acids such as lysine, histidine, threonine, valine, methionine, isoleucine, leucine, phenylalanine, and phytochemical compounds in the form of alkaloids, cyanogenic glycosides, flavonoids, tannins, terpenoids and saponins (10%). As well as the composition of *C. odorata*, namely moisture (59.50%), amount of ash (2.50%), crude protein (6.56%), crude lipids (0.10%), carbohydrates (20.58%), crude fiber (10.76%) with total energy that can be metabolized is 109.46 kcal/100g [10].

C. odorata as a source of fatty acids was investigated through Gas-mass spectrometry and Fourier Transformation Infra-Red analysis. Functional groups in the extracted oil were analyzed. The research results show that the oil contains several chemical compounds. In addition, the analysis results show the presence of hydroxyl groups, cellulose fatty acids, methyl carboxylic acids, nucleic acids, and carbohydrates in the extracted oil. Thus, *C. odorata* leaf oil extract has the potential to be a source of fatty acids. It is therefore recommended that the biological activity of the oils be examined in future studies to ascertain

the full potential of the oils from these three plants for food, nutraceutical, and pharmaceutical purposes [15].

3.3 The Potential of Health Issues Solving

Humans have used plants for centuries as a source of food, medicine, and raw materials for various industries. Throughout history, various parts of plants, such as fruit, seeds, bark, roots, and flowers, have been utilized for their medicinal properties in treating various diseases in humans and animals. "Traditional medicine, which often uses plant extracts, is very common in countries such as China and India, where it has been integrated into primary health care systems." Nigeria is one of the countries where herbal medicines are commonly used to treat diseases such as asthma, tuberculosis, ulcers, diarrhea, and dysentery, especially in communities located in the South, South East, and South West geopolitical zones [16].

The studies reported as shown above show that *C. odorata* has bioactive compounds in both fresh and dried powder form, therefore the biological effects attributed to Siam weed can be ascribed to the presence of reasonable amounts of bioactive compounds such as alkaloids, flavonoids, phenolics, saponins, steroids, and tannins can be factors causing various biological and health benefits derived from *C. odorata* [17].

The wide ethnopharmacological uses of this plant are probably due to the presence of flavonoids, essential oils, phenolics, tannins, and saponins. This plant is reported to have antibacterial, anti-inflammatory, antioxidant, anthelmintic, antifungal, cytotoxic, anti-convulsant, antiprotozoal, antispasmodic, antipyretic, and analgesic properties. Additionally, in some villages, especially in the northern region of Ghana, wild grass is used to treat various febrile conditions such as malaria [18].

C. moderate leaf extract can be used effectively in wound treatment because it inhibits the growth of *Pseudomonas aeruginosa* isolated from infected wounds. *C. moderate* leaf extract, if used properly, can be a source of active antimicrobial agents for the development of drugs against infections caused by *Pseudomonas aeruginosa*. This can also help reduce the emergence of antibiotic-resistant strains [19].

Other studies also show the antidiabetic activity of *C. odorata* leaf extract. Administration of this extract for five weeks showed improvement in diabetes-related conditions: increased body weight, reduced blood glucose levels, restoration of blood insulin levels, and increased insulin expression in pancreatic beta cells. These results provide basic information for further research to isolate and characterize the active compound and evaluate its mechanism of action [11].

C. odorata exhibits wound-healing properties due to its many antioxidants that form compounds and promote healing. By suppressing inflammatory mediators, *C. Odorata* can also be protected from cell damage. It has antibacterial properties against Gram-positive and Gram-negative bacteria, so it can reduce wound infections. It may also reduce the absorption of certain nutrients, such as glucose and cholesterol, in the intestine through intra-luminal physicochemical interactions, and has been reported to have hypocholesterolemic properties [12]. Although *C. odorata* exhibits a broad spectrum of pharmacological activity, the field of wound healing is fraught with challenges, including understanding the wound itself and investigating the known and unknown constituents of its natural products [20].

Other findings reveal that the phenolic extract of *C. odorata* can inhibit protein fibrillation and oxidation based on its diverse phenolic, flavonoid, and terpenoid compounds. The phenolics and terpenoids present in *C. odorata* can bind and prevent protein oxidation and structural changes that cause amyloid fibrils. Additionally, *C. odorata* is a powerful natural antioxidant with a good biosafety profile. Thus, *C. odorata* holds promise as a potential pharmacological resource to combat abnormal conditions associated with fibrillogenic and oxidative protein damage such as Alzheimer's disease, Parkinson's disease, and type 2

diabetes, among others. The extensive phytochemical profile highlights the potential role of *C. odorata* ingredients in the identification of new compounds with pharmacotherapeutic value [21].

4 Conclusion

Based on the review that has been carried out, it can be concluded that processed *C. odorata* leaves can be beneficial for several health problems such as wound healing, fever, malaria, antibiotics, antimicrobials, coughs, and several other health problems. *C. odorata* can be processed into tisanes, tea, and infusion and it is possible that it can be processed as other food preparations.

Our review shows that there are so many activities of *C. odorata* in overcoming various health problems that it requires a lot of innovation in its processing other than into tisan or tea. So it is important to use it as a research subject in the future by paying attention to a systematic and comprehensive review of *Chromolaena odorata* in its use with permission for health medicine.

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