

Property of *Psidium guajava* L. leaves in treatment of diarrhea

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Abstract

Jambu batu, Psidium guajava L. in Indonesia and other tropical countries plant has many genus, as a nutritious fruit -the well known Guava- and as a home remedy.

Diarrhea is one of the public health problems in Indonesia. For treatment of diarrhea, most Indonesian tribes use young leaves of Psidium guajava L. as a remedy. They consume it because this medicinal plant is easily found, mainly in the rural area, and because it is also cheaper than western medicine. In the treatment of diarrhea, Psidium guajava L. can be use in several ways, such as infusion or decoction, infusions of young leaves of plant itself or a decoction as a mixture with other parts of the same plant. The mixture can also be combined with other medicinal plants.

Some active constituents that have properties with primary impact on the gut as anti-dirrheic are, tannins, pectin and essential oils. The tannins have properties as astringent or antiseptic. Astringent precipitates proteins in the mucous membrane and reduces intestinal motility. The antiseptic maybe also have some antibacterial effect. Pectin covers the digestive tract by forming a thin coat over the mucous, membrane. Essential oils have properties as an antiseptic and an antispasmodic. Tannins and essential oils are found mostly in young leaves of Psidium guajava L. Therefore, young leaves of Psidium guajava L. are suitable in the treatment of dia"hea, as commonly use by several Indonesian tribes.

Keywords Psidium guajava L, diarrhea, tannins, essential oils, guava

Introduction

Diarrhea is one of the public health problems in Indonesia. For its treatment, most Indonesians and inhabitants of other tropical countries use the leaves of *Psidium guajava* (guava), because the medicinal properties of this plant is already known by the community. Aside from that, guava is easy to be found, mainly in the rural area. This herbal remedy is also cheaper than western medicine. The use of medicinal plants is a means to achieve a "Back to Nature" purpose, and also to preserve these plants.

Sangat, H.M. et al (2000) described the use of medicinal plants in 45 Indonesian tribes, among them, 19 tribes use *Psidium guajava* in the treatment of diarrhea; 16 tribes usually prepare a remedy by making an infusion of young leaves of *Psidium*

guajava ; 2 tribes make a decoction by mixing several parts of the same plant, or by combining with other medicinal plants. Only one tribe makes an infusion using only the root of *Psidium guajava*.

The use of *Psidium guajava* leaves in the treatment of diarrhea as stated above, is possible due to its active constituents, which show anti-diarrheic properties.

Overview

1. Psidium guajava L

Jambu batu or *Psidium guajava* L. (fam. Myrtaceae), probably originated in an area between Mexico and Peru, and a spread to America. At present it is well distributed throughout the tropics and subtropics. It is usually cultivated in an area up to 1200 m above sea level. (Verheij, 1992 ; Rukmana,1996)

Jambu batu is a small evergreen weedy tree, but can reach heights up to 10 m. It has shallow roots, and branches from the base. Its bark is smooth, green to red-brown in colour and it can peel off in thin flakes. The leaves are aromatic and oppositely arranged, and short-petiole. They are oval or oblong-elliptic-shaped, and somewhat irregular in outline. The dull-green, stiff and leathery leaves have pronounced veins. It carries fragrant white flowers, borne singly or in clusters in the leaf axils. The edible 3 fruits may be round, ovoid or pear-shaped, and have 4 or 5 protruding floral remnants at the apex. (Vana Outher,1996)

The many uses of *Psidium guajava* have an impact on community lifestyle. The edible fruits contain high doses of vitamin C (Dalimartha, 2001). The young leaves are usually cooked. The tannin-rich leaves and green fruits are used for dyeing and tanning. The moderately strong and durable trunk makes excellent firewood, charcoal, tool handles and other implements (Verheij,1992)

2. Diarrhea

This digestive disorder is a common problem and affects about 500 million children worldwide every year (Diarrhea, 2000); adults can be attacked as well.

Diarrhea refers to frequent passage of loose or watery stools, more than 4 times a day (Junadi, 1982). It is due to an irritation of the lining of the digestive system which can be precipitated by many causes. Common causes include, absorption disorders, food allergy or other unknown sources, however, also infectious agents, medicines or toxins may cause acute or chronic diarrhea. Usually diarrhea is caused by self-resolving viral infection

(Diarrhea, 2000), or it is ever seen as a benign transient event in some healing strategies ("better out than in"). Any looseness of the bowel involves the loss of the considerable amounts of fluid and electrolytes, it becomes serious if defecation is more frequently, or becomes complicated. Dehydration (excessive loss of water from the body) as a complication of diarrhea is the major problem. In all cases the source of any diarrhea should be ascertained and then should be followed by appropriate treatment (Mills, 2000).

3. Property

a. Phytomedicine

The plant constituents have a unique range of topical effects on the gut. Several herbal remedies reduce bowel looseness, if this is seen as harmful, through the activity of its astringent tannins, digestive aromatic and volatile antispasmodics (Mills, 2000)

The surface of the gastrointestinal tract is extensive, thereby providing quick digestion, which include the process of denaturation and dilution disorder, relatively large doses of remedy need to be taken, which will be un-suitable for maintaining long-term treatment. The effect of the majority of gut treatments is strongest initially and often wears off quite quickly (Mills, 2000).

Psidium guajava L. leaves have several effects i.e. antidiarrheic, antispasmodic (Dalimartha, 2001), antibacterial (Dalimartha, 2001, Sudarisman, 1988) and antifungal

b. Phytochemistry

Besides the primary metabolites (carbohydrates, fatty acid, amino acids), many secondary metabolites are found in *Psidium guajava*, i.e. tannins, essential oils or volatile oils (eugenol,

terpenoid, resin), acids, pectin (Dalimartha, 2000; Dharma, 1987), and minerals (Sudarisman, 1988). Tannins, pectin and essential oils are the main substances that have antidiarrheic effects on the gut.

- Tannins have astringent and antiseptic properties. As astringents they precipitate proteins (digestive and other enzymes, fungal and viral proteins) in mucous membranes and other body tissues by forming a thin coagulation layer. Tannins are particularly used for such ailments as diarrhea, bronchitis, slow healing wounds, mouth infections, and hemorrhoids. (Stodola). Tannins as astringents will also gently control diarrhea without risk of aggravating the infection by reducing intestinal motility
- The use of high doses of tannins in the long term should be avoided. (Mills, 2000). This active compound is available in most parts of the *Psidium guajava* i.e. leaves, root, bark and green fruits (Sudarisman, 1988)
- **Essential oils** have several properties, such as antiseptic, analgesic, diaphoretic, broncho-dilating, uterus contraction, positive peristaltic and help to expel gas. The principal constituents are chemically complex mixtures of terpenoid substances (Stodola). Essential oils also have an antispasmodic effect. (Mills, 2000). These compounds can be found in the leaves (Sudarisman, 1988).
- **Pectine** has a coated covering capability while passing through the digestive and respiratory tracts by forming a thin coat over the mucous membrane. In small doses they decrease intestinal peristalsis, and have an anti-diarrheic effect. In large

doses, however, they become laxative. This compound is mainly available in the fruits (range 0.1 - 1.8%). Pectin content increases during ripening and declines in over-ripe fruits (Verheij, 1992).

4 .*The use of Psidium guajava L. leaves*

For the treatment of diarrhea, guava can be used in various ways, e.g. by making infusion from fresh or dried leaves (Dalimartha, 2001), or an infusion from leaves and root bark (Thomas, 1989), infusion or decoction from leaves and bark (Sastroamidjojo, 2001), infusion from crushed young leaves and a little salt (Santoso, 1998), and decoction from young leaves (Wijayakusumah, 2001).

5. *Oral Rehydration Solution (ORS)*

is a solution in the prevention and management of dehydration secondary to a diarrheal illness. The World Health Organization (WHO) has recommended the use of these solutions in the management of diarrhea for the past two decades (Diarrhea, 2000)

Discussion

The human body has the ability to maintain and harmonize its inner equilibrium. In the digestive system, nutritious food materials are absorbed, and the waste products are propelled out as stools. Diarrhea is an effort to clean the digestive system from undesirable substances, with the consequent loss of water and minerals. Usually diarrhea is accompanied by other complaints, such as colic, stomach discomfort or fever. In mild conditions, diarrhea often occurs transiently as a self-resolving disease.

Diarrhea becomes serious if defecation is frequently, more than 4 times a day, or complications develop.

The most serious complication will be, when the patient suffers from dehydration, due to the excessive losses of water and minerals from the body. In some cases, herbal remedies, such as the leaves of guava, can be used because they provide a reduction in bowel looseness if this is seen as harmful. The leaves of *Psidium guajava* L. contain active constituents, tannins, volatile oils or essential oils, (terpenoid, eugenol, resin), acids, mineral etc. Tannins as astringents provide protective coating of the irritated mucous layer lining the gut. Indirectly they help to stop bleeding caused by dysentery. As antiseptic they also show antibacterial properties, which become useful in the treatment of diarrhea caused by food poisoning or contamination. Tannins ability in linking with proteins can be used in treating diarrhea caused by fungal or viral infections. The use of long-term high doses of tannins should be avoided.

The antiseptic property of essential oils or volatile oils in diarrhea can be explained like tannins antiseptic effect. The analgesic or antispasmodic effect is useful against stomach disorders or colics. Diaphoresis is useful if it is accompanied by fever.

The green fruits contain pectins that provide anti-diarrheic effects in small doses.

The minerals that are found in the *Psidium guajava* L. leaves, although in small quantities, are important in replacing the minerals lost during diarrhea. Learning from the discussion above, the leaves of the *Psidium guajava* have several active constituents i.e. tannins and volatile oils, for the treatment of non-specific diarrhea.

The application of guava can be as an infusion or a decoction from its leaves. No matter which form is chosen, it is

important that these substances should be cleaned before making the remedies. Long-term treatment is harmful because of the effect of the tannins. In treating diarrhea, it is very important to make sure that the patients drink enough water to prevent dehydration. ORS (Oral Re-hydration Solution) can be used as prevention or for the treatment of dehydration. The treatment of diarrhea, depending on its causes, consists of antibacterials or antibiotics for bacterial infections, and of symptomatic therapy.

Conclusion

Diarrhea is one of the public health problems in Indonesia. For the treatment of diarrhea, several Indonesian tribes usually prepare a herbal remedy by making infusions or decoctions of a mixture of the young leaves of *Psidium guajava*. The young leaves of *Psidium guajava* contain some active compounds that have a primary impact on the treatment of diarrhea, i.e., tannins and essential oils. Therefore, the utilization of the young leaves of *Psidium guajava* L. by several Indonesian tribes in treatment of diarrhea can be accepted, but further research should be considered.

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