

Study on Preparation of Wood Apple Jam Enriched in Aleo Vera and Jaggery

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Abstract: Jam were prepared by using wood apple (*Limoniaacidissima*) and aleo vera with jaggery as sweetner and evaluated for the proximate composition, flavonoids, and alkaloids, microbial load in the developed food. Wood apple and aleo vera are cheaper, highly nutritious. This study planned to make wood apple available through the year by preserving them as jam and aleo vera which is bitter in taste can be also eaten with this jam. Analysis is done of protein, carbohydrate, flavonoids, alkaloids and TSS is taken of jam. Jam were developed stored and quality parameters were assessed for a period of 90 days

Keywords: *Limoniaacidissima*, aleo vera, jaggery, flavonoids, alkaloids, microbial loads

1. Introduction

According to recent reports India ranks second in production of fruits (99.07 million tons) against global production. India with diversified climates is richly endowed with variable kinds of fruits and vegetables. They are amongst the valuable and important gift of nature to mankind. Despite rich in minerals, vitamins and other nutrients and easily accessible, are of great benefit to man. Unfortunately being highly seasonal and perishable, need to be monitored post harvest technologically to justify their utility as industrial raw material. Various value added products can be prepared and commercialized so as to reduce post harvest losses and increase economy. Among these fruit jams are most important value added products.

Fruit jams are semisolid, preserved mixtures of Fruit juice and sugar. Jam making is a good way to preserve fruit flavours for enjoyment throughout the year. Jam is very popular product and commonly consumed as a breakfast food as such or with bread. So, I chose wood apple and aleo vera with jaggery jam. Wood apple extract can be blended with Aloe vera extract and jaggery to get an herbal jam which is having added nutritive and medicinal properties.

1) Wood apple

It is a citrus relative having botanical name *Feronia limonida*. The wood apple (*Limoniaacidissima*) is the only species of its genus, in the family Rutaceae. The wood apple is native and common in dry plains of India and Ceylon. It is also grown throughout Southeast Asia, in northern Malaya and on Penang Island. In India, the fruit was traditionally a "Poor man's food" until processing techniques were developed in the mid - 1950's. It is also called as Elephant apple, monkey fruit, curd fruit, kath bel. Wood apple is summer greener slow growing tree and high up to 10m. The wood apple tree is quite common through all the districts of India and few of them are in the compounds of some institutions and residential bungalows. Wood apple as one of the aliases (elephant apple) suggest, is the favourite of elephants. Naturally the Hindu elephant headed God Lord Vinayaka, is propitiated with an offering this fruit.

Wood Apple forms:

- Large, sweetish fruits.
- Small, acid fruits.

Season:

- In Malaya, the leaves are shed in January, flowering occurs in February and March, and the fruit matures in October and November.
- In India, the fruit ripens from early October through March.

Harvesting:

The fruit is tested for maturity by dropping onto a hard surface from a height of 1 ft (30cm). Immature fruits bounce, while mature fruits do not. After harvest, the fruit is kept in the sun for 2 weeks to fully ripen.

Nature of fruit:

- The rind of wood apple must be cracked with hammer.
- The pulp is brown, mealy, odorous, resinous, astringent, sticky matter and slightly sweet.
- The pulp is lifted out and is eaten raw with or without sugar or honey or it is beverage or frozen as an ice - cream.

The health benefits of wood apple:

- Good for digestion: Wood apple is good for digestion. It helps to destroy worms in the intestine. Wood apple juice is a good remedy for digestive disorders, chronic dysentery and inflammation. The laxative properties of wood apple help to avoid constipation.
- Blood cleanser: 50mg of the juice of fruit mixed with warm water and sugar is recommended for blood purification.
- Prevents scurvy: Deficiency of vitamin c (ascorbic acid) causes scurvy. Since wood apple is rich in vitamin c, it is antiscorbic.
- Good for diabetic patients: The *Feronia* gum contained in the trunk and branches of the tree counteracts diabetes by reducing the severity of the condition.
- Relief in respiratory problems: Leaves of wood apple tree help to avoid repeated colds and related respiratory conditions also help in curing sore throat.
- Cure snakebites: In Ayurveda treatment, all parts of the

wood apple plant is used to cure snake bites.

- f) Energy booster: 100grams of wood apple provides 140 calories and is therefore, a good energy booster.
- g) Good for kidney patients: Regular consumption of wood apple is recommended for people with kidney complaints.
- h) Effective for ear - aches: The root of the wood apple tree is used to check different kinds of ear problem. A good source of beta carotene, also cure liver problems. They also contain thymine and riboflavin. This fruit is an ingredient in cardiac tonic also.
- i) Healing and curative properties: The pulp of the raw fruit is useful in arresting secretion or bleeding. The ripe fruit is refreshing, aromatic, digestive and a tonic. It is useful in preventing and curing scurvy and in relieving flatulence. Its leaves are not only aromatic but also possess some astringent and carminative properties. The gum that the stem exudes has a soothing effect on the skin and mucous membrane. Mashed seedless pulp of the raw fruit is beneficial in the treatment of dysentery, diarrhea and piles. The pulp of the ripe fruit, mixed with cardamom, honey and cumin seeds, is effective for indigestion, diarrhea and piles. The gum is also useful in diarrhea and dysentery. The transparent gummy substance oozing from the stem when cut or broken can be beneficially used in bowel affections. It also relieves tenesmus, that is, powerful straining to relieve the bowels.
- j) Women's disorders: A mixture of the ripe pulp of the fruit, cardamom, honey and cumin seeds, taken regularly in the morning tones up sagging breasts. It is also useful in preventing cancer of the breast and uterus and helps cure sterility due to a deficiency of the hormone progesterone.
- k) Children's diseases: Juice of the tender leaves, given with milk and sugar, is very useful in bowel complaints of children. A powder of the leaves can also be taken in 2 to 4 gram doses for the same complaint. The pulp of the ripe fruit can also be used beneficially in the treatment of stomach disorders of children. It should be given in 30 to 60 grams doses.

2) Aloe vera

Belongs to kingdom: Plantae, order: Asparagales, family: Asphodelaceae and genus: Aloe. Aloe vera is also known as medical aloe, is a species of succulent plant that probably originated in Northern Africa. Aloe vera grows in arid climates and is widely distributed in Africa and other arid areas. The species is frequently cited as being used in herbal medicine. Many scientific studies of Aloe vera have been undertaken. There is some preliminary evidence that (Aloe vera extract may be useful in the treatment of wound and burn healing, diabetes and elevated blood lipids in human. The positive effects are thought to be due to compounds like polysaccharides, mannans, anthraquinones and lecithins). . In India, the plant is known as Ghritkumarr. Aloevera can be grown as an ornamental plant.

The species is popular with modern gardeners as a putatively medicinal plant and due to its interesting flowers, form and succulence. This succulence enables the species to survive in areas of low natural rainfall, making it ideal for rockeries and other low - water use gardens.

Aloe vera leaf form: -

- a) It is stem less succulent plant growing 60 100 cm tall, spreading by offsets.
- b) The leaves are thick and fleshy green to grey green with some variegations showing white flecks on upper and lower surfaces.
- c) Aloevera forms arbuscular mycorrhiza, a symbiosis that allows the plant better access to mineral nutrients to soil.
 - Season: - The species is hardy in zones 8 - 11, although it is intolerant of very heavy frost or snow conditions.
 - Health benefits of Aloe vera: -
- d) Aloe vera juice is used for consumption and relief of digestive issues such as heartburn and irritable bowel syndrome.
- e) Aloe vera is non - toxic, with no known side effects, provided the aloin has been removed by processing (Aloe vera is alleged to be effective in treatment of wounds.)
- f) Aloe vera has been linked with improved blood glucose levels in diabetics, and with lower blood lipids in hyperlipidaemic patients, but also with acute hepatitis (liver disease) In other diseases, preliminary studies have suggested oral Aloe vera gel may reduce symptoms and inflammation in patients with ulcerative colitis) Compounds extracted from Aloevera have been used as an immunostimulant that aids in fighting cancers in cats and dogs; however, this treatment has not been scientifically tested in humans. The injection of Aloe vera extracts to treat cancer has resulted in the deaths of several patients.
- g) Aloe vera extracts have antibacterial and antifungal activities. Aloe vera extracts have been shown to inhibit the growth of fungi that cause tinea; however, evidence for control beneath human skin remains to be established. Aloe vera was shown to inhibit growth of Streptococcus and Shigella species in vitro. Aloe vera is now widely used on face tissues, where it is promoted as a moisturizer and/or anti - irritant to reduce chafing of the nose of users who suffer high - fever or cold. It has also been suggested that biofuels could be obtained from Aloe vera seeds.

Aloevera extract can be blended with wood apple extract to some extent while preparation of jam. Aloevera extract is transparent and has great nutritive and medicinal properties hence jelly prepared from blending both the extracts shows excellent property with medicinal value.

3) Jaggery

It is an unrefined sugar product made in Asia and Africa. It's sometimes referred to as a "non - centrifugal sugar, " because it's not spun during processing to remove the nutritious molasses. Similar non - centrifugal sugar products exist all over Asia, Latin America and the Caribbean, although they all have different names.

- Gur: India.
- Tapa dulce: Costa Rica.
- Namtantanode: Thailand.
- Gula Melaka: Malaysia.
- Kokuto: Japan.

About 70% of the world’s jaggery production takes place in India, where it is commonly called “gur.” It’s most often made with sugar cane. However, jaggery made from date palm is also common in several countries.

Jaggery contains more nutrients than refined sugar because of its molasses content. Molasses is a nutritious by-product of the sugar making process, which is usually removed when making refined sugar. Including the molasses adds a small amount of micronutrients to the final product. The exact nutrition profile of this sweetener can vary, depending on the type of plant used to make it (cane or palm).

According to one source, 100 grams (half a cup) of jaggery may contain:

- Calories: 383.
- Sucrose: 65–85 grams.
- Fructose and glucose: 10–15 grams.
- Protein: 0.4 grams.

- Fat: 0.1 grams.
- Iron: 11 mg, or 61% of the RDI.
- Magnesium: 70 - 90 mg, or about 20% of the RDI.
- Potassium: 1050 mg, or 30% of the RDI.
- Manganese: 0.2–0.5 mg, or 10–20% of the RDI.

Jaggery may also contain small amounts of B vitamins and minerals, including calcium, zinc, phosphorus and copper. One commercially available product, SugaVida, is a granulated palm jaggery that is claimed to be a good source of naturally occurring B vitamins.

Health benefits:

- Improved Digestive Health
- Liver Detoxification Improved Immune Function

2. Materials and Methodology



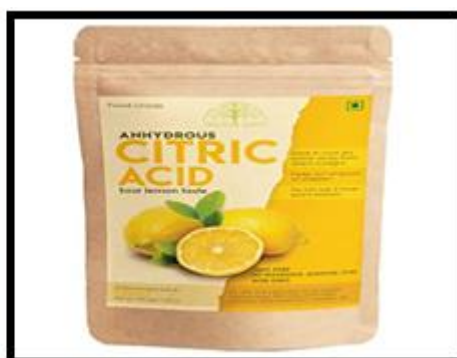
Woodapple



Aleo Vera

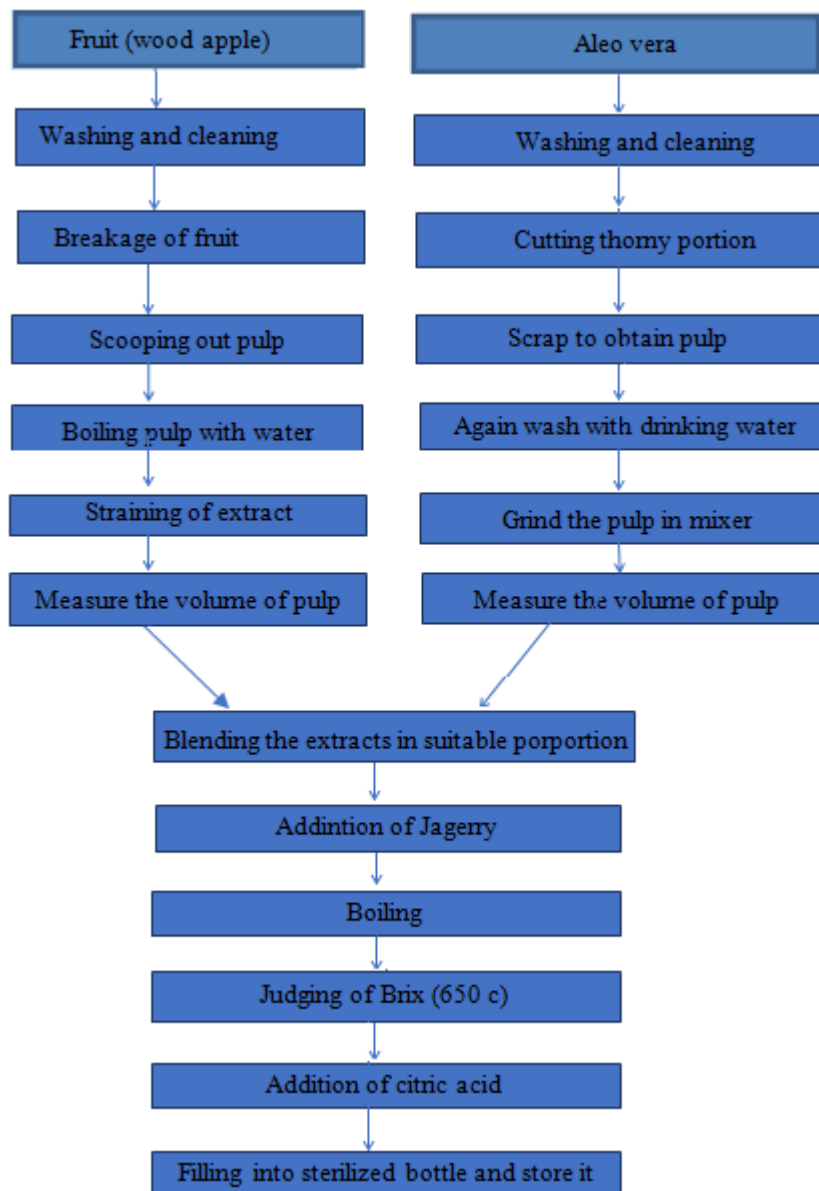


Jaggery



Citric Acid

Processing of wood apple jam enriched with aleo vera and jaggery.



3. Results



Wood apple jam

	Initial Readings	After 90 days
Moisture	25%	24%
Ash	0.175%	0.172%
Reducing sugar	20.3gm in one tbsp (20g)	26.2gm in one tbsp (20g)
Protein	0.68gm in one tbsp. (20g)	0.72gm in one tbsp. (20g)
Flavonoids	Positive	Positive
Alkaloids	Positive	Positive
pH	3.56	3.79
Microbial load	Negative	Negative
TSS	65.63%	66.8%
Taste	Sweet	Sweet

4. Discussion

The study on Preparation of Wood apple jelly enriched with Aleo vera was conducted. The wood apple was procured from local market and Aleo vera was procured from my house and studied for it's physical and physiological parameters. Wood apple and Aleo vera are generally not used for table purpose due to high acidity and as stringency in wood apple and bitterness in aloe vera so an attempt was

made to prepare a good quality jam from it so as to increase its consumption at home and to bring it at commercial level. Jam was prepared by blending both the extracts. Since wood apple is rich source of pectin no need of adding external pectin hence cost of adding external commercial pectin was saved what happen and aloe vera and having great nutritive properties but still not used for products manufacturing on commercial level this product can be commercialised successfully.

The recipe formulation and technology were standardised for jam according to requires desired specification and the final product was evaluated.

The result obtained on various aspects is summarised as follows:

- Wood Apple was found to contain about 45 to 48% Pulp while aloe vera contains 65 to 70% pulp.
- The moisture content of the jam is 25% which is taken out with the help of hot air oven at 100°C. Percentage of TSS of jam is 65%. Ph of jam is 3.5.

Microbial load had been done by pour plate technique and there were no microbial colonies observed at initial days and at the end of the storage period.

5. Conclusion

The mixing of wood apple with aloe vera and jaggery was best under storage for 90 days. Hence it is clear this combination are suitable for the preparation of mixed jam with good quality and high nutritive value. The cost involved was also low. So, this recipe can be recommended for making of quality wood apple and aloe vera jam.

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