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To Study the Physico-Chemical Properties of *Bael* and *Aloe Vera Blended Beverages*

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Abstract: ***Bael content high nutritive value which is very beneficial for the health. The presence of tannin in the bael fruit helps in curing diseases like diarrhoea and cholera. The dried powder of the fruit is used to treat chronic diarrhoea. The extract of unripe bael fruit can effectively treat haemorrhoids and vitiligo. It is also used to treat anaemia, ear and eye disorders. The extract of bael leaf can be used to control the cholesterol level in blood which makes the bael leaves highly therapeutic too Adding small amount of black pepper and salt to the pulp and consuming it regularly removes toxins from the intestines. Aloe gel is the clear, jelly-like substance found in the inner part of the aloe plant leaf. Aloe latex comes from just under the plant's skin and is yellow in color. Aloe medications can be taken by mouth or applied to the skin.***

Keywords: Bael and aloe vera juice, Physico-chemical studies PH, TSS.

1. Introduction

Aloe vera is one of the oldest known medicinal plants gifted by nature; Aloe vera, often called miracle plant, known by many names. There are over 200 types of Aloe vera and of these only 4 or 5 are commonly used in medicine. It is perennial, succulent plant with stiff fleshy leaves. Aloe vera is a clear thin gelatinous material that comes from inside the Aloe vera leave. Aloe vera products are available in various forms like capsules, gel and juice were applied directly to the skin. It has cooling effect and is bitter in taste, it contains aloin that is responsible for its purgative action, and well known for its therapeutic properties. **(A.Manoharan et al 2012)** *Aloe vera* leaves have vital ingredients such as vitamins, minerals, amino acids, polysaccharides, enzymes, plant steroids, saponins, lignin, anthraquinones, salicylic acid, which are necessary for the human body. *Aloe vera* works as anti-septic, antibacterial, antiviral, anti-carcinogenic and anti- Inflammatory. It has been reported to cure eczema, diabetes, arthritis and is said to prevent infection. It also improves human immune system and digestive system. The cosmetic and medicinal products are made from the mucilaginous tissue in the centre of the plant called aloe vera gel. Aloe sVera is one of the best example of medicinally important xerophytic plant (Herbs). It is grown largely in South Texas, USA, Mexico, India, South America, Central America, Australia and Northern Africa Akinyele and Odiyi (2007). The Aloe gel or fillet, which is stored in the inner portion of leave, contain almost 99.5% water and 0.5% other ingredients Scientists has discovered over near about 150 nutritional ingredients in aloe vera. **(Himanshu Sharm *et al* 2013)**

2. Medicinal Uses of Aloe Vera

Aloe Vera has been used externally to treat various skin conditions such as cuts, burns and eczema. It is alleged that sap from Aloe Vera eases pain and reduces inflammation. It has antiseptic and antibiotic properties which make it highly valuable in treating cuts and abrasions It has also been commonly used to treat first and second degree burns, as well as sunburns and poison oak, poison ivy, and poison sumac infections and eczema.

Bael belongs with family Rutaceae family. It is moderate sized, slender, aromatic spinous tree distributed in the Indo Malaysian region. Only one species is found in India in the wild form and is often cultivated. It commonly occurs in sub Himalayan tract and in the dry deciduous forests of central and southern India. The tree has branches armed with straight, sharp, axillary spines. Its bark is soft, corky and light grey in color. Leaves are trifoliate, leaflet ovate, acuminate, lateral sessile and have terminal petioles. Flowers are large greenish white and sweet scented, fruit globose and yellowish. The fruits have numerous seeds which are oblong, compressed covered with thick orange sweet pulp**.**

(Harjit Singh Dhillon *et al* 2014*).* Bael (Aegle marmelos L.) is a tropical fruit native to Southeast Asia and is grown throughout India, Sri Lanka, Pakistan, Bangladesh, Burma, Thailand, and most of the Southeast Asian countries. It contains many vitamins like vitamin C, vitamin A, thiamine, riboflavin, niacin, and minerals like calcium, and phosphorusThe bael fruit pulp contains many functional and bioactive compounds such as carotenoids, phenolics, alkaloids, coumarins, flavonoids, and terpenoids and has innumerable traditional medicinal uses**. (Subrata Kumar Bag *et al* 2011)** The beal is the impotant indigenous fruit Asia and different names sach as beal, bel, Bengal quince, bil, bilva, balpatre,shul, shaiphal, vilvum etc. The ripe fruit of beal is the sweet aromatic, nutritious and very palatable, being eaten all the classes of people. The plant is reported to have multiple therapeutic properties such as antiinflammatory, antipyretic and analgesic, anti diabetic and hepatoprotective13activity. (**Pushplata Chougule *et al* 2014).**

Benefits of Bael The fruit is of considerably medicinal value when it just begins to ripen. The ripe fruit is aromatic, astringent which helps construction of skin, coolant and laxative. The unripe or half-ripe fruit is astringent, digestive

stomachic which improves appetite and antiscorbutic, i.e. which helps to fight scurvy caused due to vitamin C deficiency. Consumption of unripe or half-ripe bael fruits is excellent for curing chronic stages of dysentery and cholera, where there is no fever. The use of dried bael, in normal or powdered form, is also good for this purpose. The fruit is also beneficial for the chronic dysentery that is characterized by alternate constipation and diarrhea. Bael is a high source of tannin and its rind contains about 20% of the compound, with around 9% in the pulp of the fruit. Hence, the fruit is considered to be thetreatment of choice for curing cholera. The fruit is considered highly beneficial for the digestive system and can also be used as a mild laxative. An infusion made from the bael leaves is regarded to be an effective cure for peptic ulcer. The concoction is prepared by soaking the leaves in water overnight and then drinking the water in the morning, after straining it.

3. Materials And Methods

To extract the Aloe Vera juice

This phase involved Fresh *Aloe vera* leaves used to obtain two components, firstly bitter yellow latex from peripheral budle sheeth of aloe, called *Aloe vera* sap and a mucilaginous gel from parenchymatous tissue. The interest and use of gel has increased dramatically in the field of health care and cosmetics. *Aloe vera* has a bitter taste which can be unpleasant in raw state and its palatability could be enhanced with addition of some other fruit juices

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Procedure

Extracted using cold extraction method Fresh *aloe vera* leaves were dipped into 500 ppm of KMS solution and washed thoroughly with tap water and kept for cooling to 5°C for gel stabilization This phase involved extraction of Aloe Vera juice from Aloe Vera leaves, The aloe vera gel. Further leaves were cut vertically into two half and gel was separated using stainless steel knife, it was allowed to resolve for 12hrs and then homogenized using mixer grinder Then it was filtered and adding citric acid to control browning while high heat treatment Further it was dearated, pasteurized, flash cooled and stored. The obtained juice was stored refrigerated temperature until further use.

To extract the Bael juice

This phase involved Aegle Marmelos is commonly called as bael, or bel or Bengal quince or wood apple. The trees are of great importance to the environment as they act as climatic purifier that is they release greater percentage of oxygen in comparison to other trees.

Procedure

The freshly ripe bael fruits were collected (1000g) and washed thoroughly in running tap water. Fruits were peeled with the help of stainless steel knife, cut into two half pieces, then remove the hard shell of bael fruit which was of 240g.Pulp with seeds and fibre which was of 760g mixed with water (in 1:1 ratio).After that sieved and remove the seed and fibre which was of 60g.I had 1460g of pulp after removing seeds and fibre. The pulp filled in bottle and capped then kept the bottle filled with pulp at room temperature.

To developed the bael and aloe vera blended beverages

This phase involved to whole idea of development of bael and aloe Vera blended beverages. 12% TSS, 0.3% acidity and 10% blended juices of different blending ratio of 95% Bael juice + 5% Aloe vera juice (A), 90% Bael juice + 10% *Aloe vera* juice (B), 85% Bael juice + 15% *Aloe vera* juice (C) and controlled RTS containing 100% Bael juice without Aloe vera (Control). Best blended RTS was selected by organoleptic test which was conducted on 9 Point Hedonic Scale for appearance, colour, taste, flavour and overall acceptability by a panel of 25 semi-trained judges having prior experience of sensory evaluation of fruits and vegetable product.

Procedure

Mixed the bael juice and aloe vera juice then added sugar,citric acid and water for preparing strained syrup then added the preservative that is sodium benzoate at the rate of 100ppm.Syrup with sodium benzoate (preservative) pasteurized in water bath at 60°c for 5 minutes. After that cold the pasteurized syrup at room temperature and took the bottle of 200ml capacity filled with pasteurized syrup.Then done storage.

Physico-chemical evaluation

The next phase involved Physico-Chemical evaluation of the prepared bael and aloe vera blended beverage involving different parameters like.

- Estimation of moisture percentage
- Estimation of PH
- Estimation of TSS

Estimation of Moisture Content

Weigh accurately about 5 gm of the sample in a previous dried and weighed Petri dish

Place the sample in an electric oven maintained at temperature 105 degree Celsius for 3 hrs. Take out the sample after 3 hrs and keep it in dessicator for 20 min to cool it down. Now again weigh the sample.

Estimation of pH

For determining the pH of fruit and their products, a buffer of pH 4 would suffice. Standardize the pH meter using this buffer and check the pH of the samples. M/20 sodium borate solution (pH 9.18) at 20^0C.Temperature of 0, 10, 20, 30, are 9.25, 9.18, 9.10, 9.03 respectively Dissolve 19.071 gm of sodium borate $Na_2B_4O_7.10H_2O$ AR grade, in distilled water in a standard 1-liter graduated flask. Make up the volume with CO_2 free distilled water to 1 litre. Add a drop of toluene and shake well. For the preparation of buffer solution of intermediate pH value, make use of critic acid-phosphate buffer.

Estimation of Total Soluble Solids (TSS)

Determine the Refractometer reading by placing a drop of syrup on the prism and reading the corresponding percentage of dry substance from either direct reading. For sample containing invert sugar in the sample. The test should be done at 20^0C. The Refractometer should be checked for accuracy before reading. Allow the water to circulate through the instrument or a few minute note the temperature

and refractive index of distilled water. Then compare the reading.

4. Results

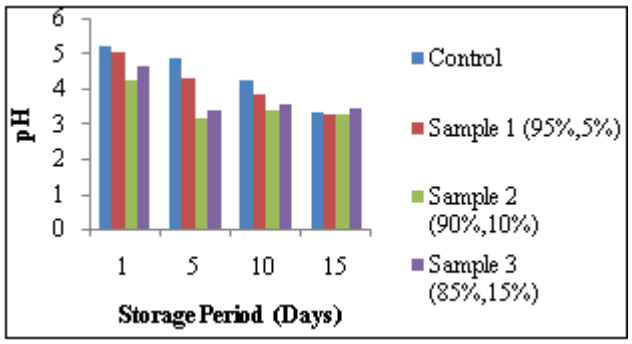
Physicochemical Analysis

Effect of storage condition on pH

The pH values of the sample were observed to be lying in the acidic range. The value of pH for the control sample was found out to be 5.25on day 1, whereas 3.70 on day 15.The value of experimental sample was recorded to be 3.28 in sample 2 on day 15, whereas the value of pH was recorded to be 4.25 in sample 3 on day 1.

Table 4.6: pH of control and Experimental Bael and aloe vera juice

Storage Period (day)	*Control*	*Sample 1 (95%,5%)*	*Sample 2 (90%,10)*	*Sample 3 (85%,15%)*
1	5.25	5.10	4.27	4.65
5	4.90	4.34	3.16	3.40
10	4.25	3.86	3.38	3.58
15	3.36	3.31	3.28	3.45



Graphical Figure 4.6: pH of Control and experimental Bael and Aloe Vera juice

Effect of storage condition on TSS

The content of Total soluble solid (in Brix) of control sample was recorded to be maximum 14.10 on 1 day and 14.15 on the 15 day, Even the experimental sample showed very slight variation in TSS value throughout the testing. The maximum value of TSS was recorded to be 14.35 on day 1 in sample 2.on the other hand, the minimum value of TSS was found out to be 13.85 on day 15,in sample 2.

Table 4.7: Total soluble solid (percentage) of control and Experimental bael and aloe vera juice

Storage period (day)	Control	Sample1 (95%,5%)	Sample 2 (90%,10%)	Sample 3 (85%,15%)
1	14.10	14.25	14.15	14.20
5	14.5	14.25	14.30	14.30
10	14.5	14.20	14.21	14.26
15	14.2	14.10	13.85	14.26

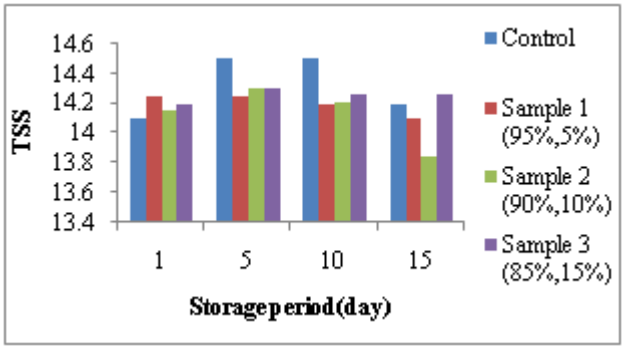


Figure 4.7: Total Soluble Solid (percentage) of control and Experimental Bael and aloe vera juice

5. Conclusion

Aegle marmelos, commonly known as bael, Bengal quince, golden apple, stone apple, wood apple, bili, Bael is the amazing health benefits, medicinal benefits, ritual use and home remedy. It is a best home remedy which helps to combat with various daily life health problems like constipation, peptic ulcer, indigestion, respiratory problems, diarrhoea, dysentery, piles, diabetes, sexual dysfunctions and so many. Wood apple provides immunity to fight with various infections like bacterial, viral, funga daily consumption of the bael helps in treating common digestive problems such as diarrhoea, constipation, cholera, haemorrhoids (piles), and many more due to its availability of tannin. Bael content high nutritive value which is very use full for the health point view. Bael content high level of nutritive value like carbohydrate, protein, vitamin, and mineral which is found high amount in bael juice which is beneficial for the all age group. Some aloe products are made from the whole crushed leaf, so they contain both gel and latex. Aloe seems to be able to speed wound healing by improving blood circulation through the area and preventing cell death around a wound. It also appears that aloe gel has properties that are harmful to certain types of bacteria and fungi.Aloe vera also content high amount of nutritive value. when bael incorporated with aloe vera juice It's nutritive value is increase which is very use full for the health point of view. When aloe vera incorporated juice of ripe bael fruit. Include this mixture in your daily diet to prevent heart related diseases like heart strokes and attacks.

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