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Development of *Pinnatum* squash

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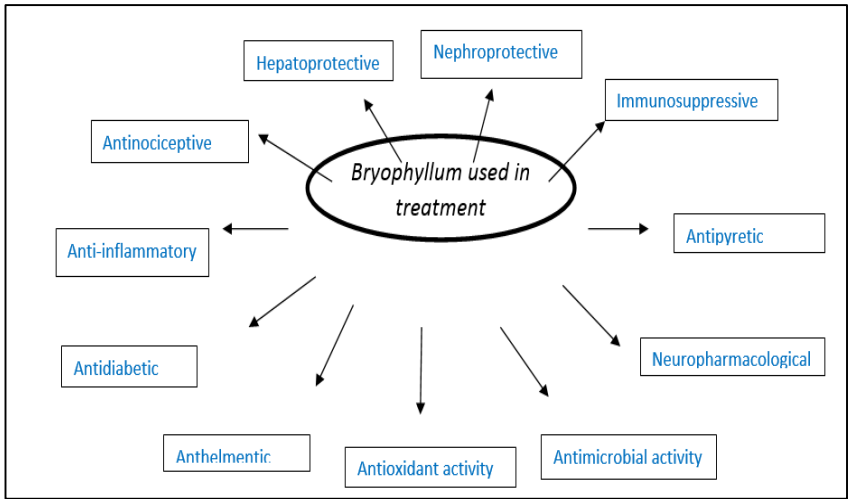
Abstract
Bryophyllum pinnatum, commonly known as *Pattharchaṭṭa*, is used traditionally in ethno medicinal practices for the treatment of kidney stones and urinary insufficiency. It is used in folk medicine in tropical Africa, tropical America, India, China, and Australia. This research paper deals with the development of a therapeutic product by bringing out the potentialof leaf because of its unique properties. This research is aimed to develop the *Bryophyllum pinnatum* squash accounting its efficiency for its ability to reduce the size of the stone in human body. Kidney stone affect 10-12% of the population in industrialized countries. The average life time risk of stone formation has been reported in the range of 5-10%. This disorder is multi factorial and is strongly related to dietary lifestyle habits or practices. Increased rates of hypertension, diabetes and obesity which are linked to nephrolithiasis, also contribute to an increase in stone formation. Looking at various factors that could cause Nephrolithiasis and its available costly and painful treatment and keeping in mind the properties of *Bryophyllum pinnatum* various trials were done to make its squash out of which few were finalised that could have the potential of breaking stone that too without causing any pain/renal colic (deadliest pain in the world).

Keywords: *Bryophyllum pinnatum* Development, *Pinnatum* squash

Introduction
Bryophyllum pinnatum(synonym): Bryophyllum calycinum, Kalanchoe pinnatum) [1] also known as the air plant, cathedral bells, life plant, miracle leaf, and Goethe plant are a succulent plant native to Madagascar, which is a popular houseplant and has become naturalized in tropical and subtropical areas. *Bryophyllum pinnatum* family is Crassulaceae and is smooth skinned more or less erect fleshy herb [2] and it is used in traditional medicine.In *B. pinnatum* alkaloids, phenols, flavonoids, saponins, tannins, carotenoids, glycoside, sitoisterol, anthocyanins, malic acid, quinines, tocopherol are present [3]. The leaves are also known tocontain bryophyllin, potassium, malate, ascorbic, malic, and citric acids [4]. The aqueous extract of the leaves havefound to have a potent nephroprotective activity in gentamycin-induced nephrotoxicity in rats [1]. The importance of traditional medicine has gained support from the World Health Organization and other international body that have been actively promoting it on a global level. This made such an impact that the herbal medicine market has been revitalized and seems to be a new option rather than an afterthought for the treatment of various ailments and diseases [6].

One of the most common neurological problems that is kidney stones has become an area of intensive clinical and epidemiological research. These stones are hard &solid aggregation crystalline mineral material. Kidney stones may vary in size and shape. Stones may be small as a grain of sand or as large as a pearl. Some stones are even as big as golf balls. Stones may be smooth or jagged and are usually yellow or brown. Sometimes, the stones that are forms in kidney or urinary tract are very small and can easily pass out of the body [5].

Properties of Leaf



2. Materials and Methods

In the present chapter, the materials and the methodology adopted for preparation of *Bryophyllumpinnatum*squash are discussed.

2.1 Procurement of raw material

The raw materials used in the preparation of *Bryophyllumpinnatum* squash are as follows-fresh, well graded, highly coloured, of good commercial quality *Bryophyllum pinnatum* Leaves were collected from Jiwaji University, Gwalior for experimental purpose. White crystalline sugar was procured from the local market of Gwalior for the preparation of sugar syrup to be used for adjusting the brix *Bryophyllumpinnatum*squash. water was used for the preparation of sugar syrup. Citric acid, sodium benzoate was used as a preservative for preserving the *Bryophyllum pinnatum* squash.

2.2 Process of juice extraction

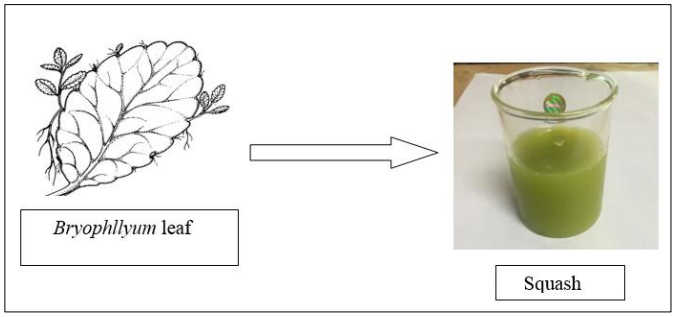
Bryophyllum pinnatum leaves were washed and then shade dried. The leaves were the blanched at 60º-80 ºC for 3-5 minutes. The main motive to blanch the leaves is to inactivate the deteriorative enzymes, microbes and also to enhance the colour of the leaves which will give good colour to the squash. After blanching the leaves were blended with hand blender to extract the juice and then by using muslin cloth the juice was strained.

2.3 Preparation of Syrup

Sugar syrup of 70º brix was prepared by mixing sugar and water in the ratio of 1:1 and citric acid at the rate of 17.78 gm/lit was added then the mixture was heated at temperature of 90 ºC to dissolve the solutes and content was filtered through muslin cloth. The syrup was then cooled prior to mixing with juice.

Flow Chart for preparing *Bryophyllum pinnatum* squash:

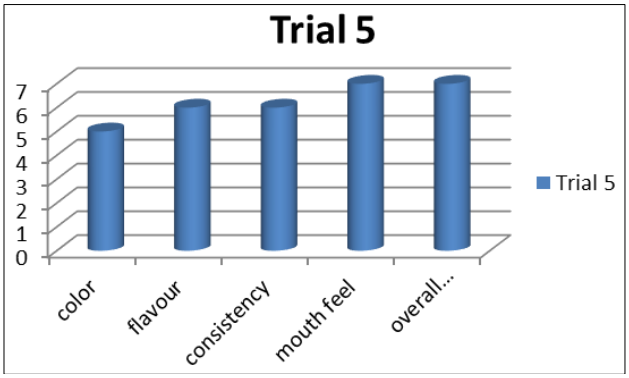
Bryophyllum pinnatum leaves
↓
Washing
↓
Blanching
(60º-80 ºC for 3-5 min)
↓
Juice extraction
↓
Straining
↓
Juice measuring
↓
(Sugar+water+acid Syrup preparation ← heating just to dissolve)
↓
Straining
↓
Mixing Juice with Syrup
↓
Addition of preservatives
(17.78 gm citric acid/1lit squash)
↓
Bottling
↓
Capping
↓
Storage

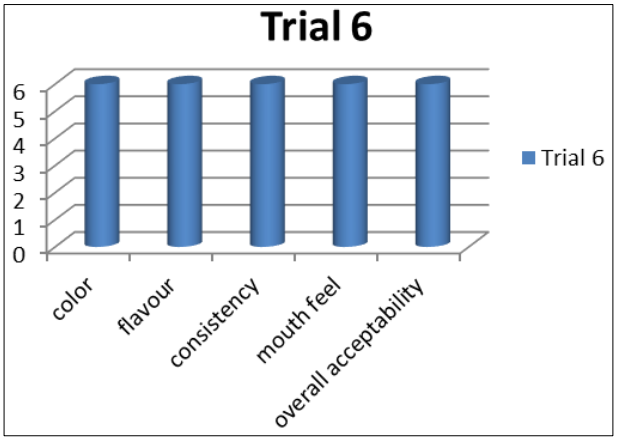


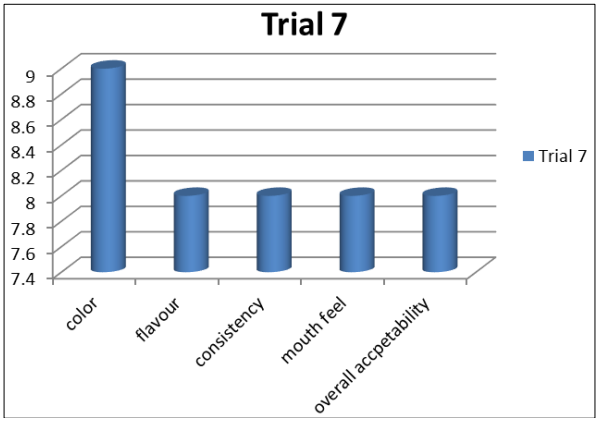
2.4 Sensory evaluation

Sensory evaluation of *Bryophyllum pinnatum* squash is done by semi-trained panellists of department of centre for food technology, Jiwaji University. Hedonic scale (nine points) was used for Sensory evaluation of product which have different sensory attribute like colour, consistency, flavour, aroma, appearance, aftertaste, overall acceptability.

Seven trials were formulated, out of which T5, T6, & T7 were finalised.







Trials	Sensory evaluation of *Bryllophyam pinnatum* squash				
	colour	flavour	consistency	Mouth feel	Overall acceptability
Trail 5	5	6	6	7	7
Trial 6	6	6	6	6	6
Trial 7	9	8	8	8	8

Result and Discussion

Keeping in mind the available options for the management of nephrolithiasis a squash was prepared by using *Bryophyllum pinnatum* leaf extract. Different trials were made using different ratio of leaf extract. The sensory evaluation was done by semi-trained panellist of Centre for Food Technology, Jiwaji University Gwalior. Many trials were formulated (T1, T2, T3, T4, T5, T6, & T7), out of which three trials fulfilled the sensory attributes. T7was found to have more acceptability rather than other two trials i.e., T5 & T6, and could fulfil the consumer demand. Thus, in future it could prove to be a better alternative in the management of kidney stones rather than any other medicine/painful surgical treatment.

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