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Studies on development and organoleptic evaluation of lime and *Aloe vera* Spread

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Abstract

The study was conducted to develop different formulations of lime and *Aloe vera* spread. Spreads were prepared using lime rind extract pulp, lime pulp with different levels of *Aloe vera* gel. Lime spreads were formulated by mixing Lime pulp and lime peel pulp (60g+40g= 100 gm) with fresh *Aloe vera* juice with various proportions such as (100:20), (100:40) and (100:60) were used as T1, T2, T3 respectively and evaluated with reference to lime spread alone (control). Control and T2 were found to be most preferred variant with respect to sensory quality such as color, flavor, taste, and overall acceptability. Finally it can be concluded that *Aloe vera* juice upto (40%) in preparation of lime spread with good sensory attributes and nutritional value can be prepared.

Keywords: Spread, lime, *Aloe vera*, sensory properties

Introduction

Kagzi lime (*Citrus aurantifolia* L.) belongs to family *Rutaceae*, originated in India. It is commercially grown in tropical and subtropical region of India. Kagzi lime is the third most important fruit after mandarin and sweet orange and India ranks fifth among major lime producing countries (Anonymous, 2001) [2]. One of the most important citrus fruit as a major source of vitamin "C" and acetic acid, grown throughout the world.

In 2015-2016 India produced 2438 MT of lime/lemon from an area of 245 MT ha. Maharashtra produces 11% of total production of lime/lemon in the country and is the fourth largest producer in the country. State produces 0.31 m MT of lime/lemon from an area of 0.045 m ha with productivity of 6.8 MT/ha. Maharashtra state is leading in acid lime cultivation. Kagzi lime is principle citrus fruits grown commercially in Vidarbha and Marathwada regions. The major lime producing belts in the State are Akola, Ahmednagar and Solapur. And also In Maharashtra, lime is grown in various districts such as Pune, Satara, Wardha, Nagpur, Beed and Aurangabad (Anonymous, 2010) [3].

The health benefits of lime include weight loss, skin care, good digestion, relief from constipation, eye care, and treatment of scurvy, piles, peptic ulcer, respiratory disorders, gout, gums, urinary disorders, etc. It is used in curing giddiness, vomiting, nausea, thirst, scurvy and in febrile and inflammatory conditions. (Mohanapriya *et al.*, 2013) [8].

The fruits are extensively used for squashes, pickles, syrups and cordials, manufacture of citric acid and for table purpose in daily life of Indians (Cheema *et al.*, 1954) [4].

Citrus fruits are well known for their refreshing fragrance, thirst quenching ability and providing adequate vitamin C as per recommended dietary allowance. Phytochemicals which play the role of nutraceuticals, such as carotenoids (Lycopene and β -carotene), limonoids, flavanones (naringins and rutinoid) and vitamin-B complex. Mandarins, sweet oranges, pummelos and grape fruits are consumed in fresh form. While Limes, mandarins and oranges are mainly used for making cool drinks, syrup, crush and squash. Orange, lime, lemon and grape fruit juice are bottled and canned in large scale. Orange marmalade, cordial and squashes are very important products (Ladaniya and Shyamsingh, 2001) [6].

Aloe vera is *Aloe barbadensis* miller. It belongs to Asphodelaceae (*Liliaceae*) family, and is a shrubby or arborescent, perennial, xerophytic, succulent, pea- green color plant. It grows mainly in the dry regions of Africa, Asia, Europe and America. In India, it is found in Rajasthan, Andhra Pradesh, Gujarat, Maharashtra and Tamil Nadu. *Aloe vera* is considered the most potent and, thereby, the most popular plant in the research field. *Aloe vera* has been used in folk medicine for over 2000 years, and has remained an important component in the traditional medicine of many contemporary cultures, such as China, India, the West Indies, and Japan.

The raw pulp of *Aloe vera* contains approximately 98.5% water, while the mucilage or gel consists of about 99.5% water.

The remaining 0.5 – 1% solid material consists of a range of compounds including water-soluble and fat-soluble vitamins, minerals, enzymes, polysaccharides, phenolic compounds and organic acids compositional studies on the structural components of the *A. vera* plant leaf portions, the rind was found to be 20-30% and the pulp 70-80% of the whole leaf weight. On a dry weight basis, the percentages of the rind and pulp represented as lipids (2.7% and 4.2%) and that as proteins (6.3% and 7.3%) only accounted for a minor fraction. However, the non-starch polysaccharides and lignin represented the bulk of each leaf fraction and were found to be 62.3% and 57.6% of the dry weight of the rind and pulp, respectively. *Aloe vera* gel polysaccharides consist of linear chains of glucose and mannose molecules, of which mannose is more concentrated than glucose, thereby the molecules are referred to as polymannans (Maharjan and Nampoothiri, 2015) [7].

Aloe vera gel derived from the leaf pulp of the plant has become a big industry worldwide due to its application in the food industry. It is utilized in functional foods especially for the preparation of health drinks with no laxative effects. It is also used in other food products including milk, ice cream, confectionery, etc. *Aloe vera* gel is also used as flavouring component and preservative in some foods (Christaki and Florou-Paneri, 2010) [5].

Materials and Methods

Materials

The fresh limes were obtained from central nursery of

VNMKV, Parbhani. *Aloe vera* was obtained from local village market of Parbhani. Sugar, chilli powder, ginger powder and black pepper powder used were procured from local market of Parbhani. The present investigation was carried out in Department of Food Engineering, College of food technology, VNMKV, Parbhani

Methods

Spread Preparation

The lime and *Aloe vera* spreads were prepared according to method described by (Ofosu *et al.*, 2011) skipping pectin. Freshly harvested lime and *Aloe vera* were washed, cleaned to remove impurities. Lime were peeled, cut to remove seeds and lime pulp was extracted using mixer grinder, similarly lime peel pulp was prepared in mixer grinder by adding little amount of water as needed. Fresh *Aloe vera* juice was prepared using mature *Aloe vera*, cutting it with knife and then extracted gel was grinded in mixer grinder. Lime pulp, lime peel pulp and *Aloe vera* juice were filtered through plastic mesh sieve to obtain clear liquid. The mixture of lime pulp, lime peel pulp, *Aloe vera* juice were taken in required ratio in open pan and heated continuously with sugar, chilli powder, ginger powder. Heating was stopped when the T.S.S reached 68° Brix, and filled in clean sterilized and dried glass bottles of 200 ml capacity and sealed air tight. The bottles were then stored in ambient conditions for storage study.

Table 1: Composition of various trials

Sample	Wt. of lime pulp (gm)	Wt. of lime peel pulp(gm)	Wt. of sugar (gm)	Wt. of <i>Aloe vera</i> (ml)	Wt. of ginger powder (gm)	Wt. of black pepper powder (gm)	Wt. of chilli powder (gm)
Control (100)	60	40	80	-	1	1	1
T1 (100:20)	60	40	80	20	1	1	1
T2 (100:40)	60	40	80	40	1	1	1
T3 (100:60)	60	40	80	60	1	1	1

Control -100% lime and lime peel pulp, T1- 100% lime and lime peel pulp and 20 ml *Aloe vera* juice, T2- 100% lime and lime peel pulp and 40 ml *Aloe vera* juice, T3- 100% lime and lime peel pulp and 60 ml *Aloe vera* juice.

Organoleptic evaluation of lime and *Aloe vera* spread

Organoleptic evaluation of *Aloe vera* and lime spread for colour and appearance, flavour, after taste and overall acceptability was carried out by using standard method of (Amerine *et al.*, 1965) [1]. For these 10 semi-trained judges

were used and 1 to 9-point hedonic scale was used for rating the quality of the lime and *Aloe vera* spread. The mean of ten judges was considered for evaluating the quality.

Results and Discussions

Table 2: Organoleptic evaluation of lime and *Aloe vera* spread

Samples	Color	Appearance	Flavor	Taste	Texture	Overall Acceptability
Control (100)	8.7	9	8.5	9	9	8.8
T1 (100:20)	7.5	8.0	8.0	8.5	8.5	8.1
T2 (100:40)	8.5	8.7	8.5	9	8.5	8.6
T3 (100:60)	7.0	7.0	7.5	7.5	8.0	7.4

Sensory/ Organoleptic evaluation of lime and *Aloe vera* spread

Data pertaining to sensory evaluation of lime and *Aloe vera* spread with respect to appearance, colour, flavour, taste and overall acceptability were carried out. Accordingly, results obtained are depicted in table. 2.

Data indicated in table 2. Showed that the sample Control and T2 are the most acceptable product.

The average sensory attributes scores of prepared lime spread (Control) were analyzed for variance among the spread prepared by different samples containing different levels of *Aloe vera* gel. Control sample got the highest score (8.8) and sample T3 the lowest score (7.4).

In case of appearance spread prepared from sample control is the best than other samples. Sample Control got the highest score (9) and sample T3 got the lowest score (7.0).

In case of flavor and taste spread prepared from control and T2 got the highest score (8.5 and 9) respectively. Sample T3 got the lowest score (7.5).

In terms of texture control sample got the highest score (9). Sample T1 and T2 got the same score (8.5) and sample T3 got the lowest score (8.0).

In terms of overall acceptability Control sample and T2 sample had high score (8.8 and 8.6) respectively. And T1

sample and T3 sample got the least score (8.1 and 7.4) respectively.

From the above discussion we can conclude that sample T2 showed near about same score of sample Control. Therefore, sample Control and T2 were selected for further studies.

Conclusion

Lime fruit has recognized its utility as a base ingredient in various value added products like jam, jelly, beverages, various products and so on. Therefore the present investigation was undertaken to standardize a process for formulation and quality up gradation of lime spread. It was shown that sample T2 with 40 ml of *Aloe vera* juice was found to be most acceptable with reference to Control sample. So the sample Control and sample T2 were selected for further investigation.

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