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## Standardization of Kagzi lime RTS Beverage with incorporation of spice extract

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### Abstract

There is a great potential for commercialization of spiced RTS beverages as natural health drinks. Lime Health beverages market is fastest growing in the world, due to its nutritional and health benefits. The present study was carried out to Standardization of kagzi Lime RTS Beverage with incorporation of different proportion of spice. The combined spices extracts such as Cumin+ Cardamom+ Clove+ Ginger+Mint were blended with Kagzi lime (cv. Sai Sharbati) juice and prepared the RTS beverages. The incorporated Lime RTS was standardized based on organoleptic evaluation. The nutrient content such as Total Soluble Solids (TSS), pH, acidity, ascorbic acid, total sugar, reducing sugar, non-reducing sugar were analysed. The sensory evaluation revealed that the all the beverages had good sensory properties except T1 and T6 beverages.

**Keywords:** Kagzi lime, TSS, pH, sugar, spice extract

### 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 (Anony. 2001) <sup>[1]</sup>. Maharashtra state is leading in acid lime cultivation. Kagzi lime is principle citrus fruits grown commercially in vidarbha and marathwada regions. 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) <sup>[2]</sup>. Lime is being acidic generally consumed as fresh but mostly used for flavouring vegetable dishes, fish, meat and salads. It also makes delicious and refreshing cold drinks. The fruits are valued not only for its nutritional qualities but also for medicinal purposes

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  $\beta$ -carotene), limonoids, flavanones (Naringins and rutinoid) and Vitamin-B complex (Ladaniya, 2008) <sup>[3]</sup>. Lime juice is rich in vitamin C, responsible for a series of health benefits. Lime juice reduces the body heat and increases the appetite. Drinking lime juice with salt reduces the stomach pain. It helps in digestion of foods. Fruit juices and fruit juice beverages are becoming popular due to their pleasant flavour and nutritional characteristics. Beverages are consumed by people of all age group to quench the thirst as a social drink and for good health and medicinal values. The medicinal value of the fruit beverages can be enhanced by the incorporation of herbal extracts. Fruits juice could be enriched by addition of herbal extract for preparation of beverages which improves taste, aroma and nutrition and also contributes to medicinal values.

There is always a demand from the consumers all over the world for new food products which are nutritious with delicate flavour. Productions of RTS beverages have been increasingly gaining popularity throughout the country due to their health and nutritional benefits, apart from pleasant flavour and taste. Fruit based RTS beverages are not only rich in essential minerals, vitamins and other nutritive factors but also are delicious and have good appeal. Herbal beverages in the form of RTS, squashes, appetizers, health drinks are important from the nutritional point of view. (Thamilselvi *et al.* 2015) <sup>[5]</sup>.

Ginger and lemon juices have anti-bacterial and anti-fungal properties and impart refreshing taste and flavour. Pepper mint has refreshing, cooling and flavouring properties. Blending of juices is a novel alternative to improve and preserve the phytochemical quality (Waskar 2011) <sup>[6]</sup>.

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To improve the palatability, Nutritional and Health benefits of the beverages the present investigation was undertaken for standardizing Lime RTS beverage with incorporation of spices extract of Cumin, Cardamom, Clove, Ginger and Mint with different proportion.

### Materials and Methods

Raw material like lime fruits cv. "Sai Sharbati" was obtained from the central nursery, VNMKV. Parbhani and other material like ginger, mint, cardamom, clove, cumin, sugar and KMS procured from local market of Parbhani in the year 2017-2018. The lime juice was extracted by using stainless steel squeezer and strained by double fold muslin cloth. The Ginger rhizomes were washed, peeled, cut in o small pieces and grated in grating machine and extract was extracted by squeezing through double fold muslin cloth. The mint leaves were washed and grated in grating machine then squeezing by double fold muslin cloth and kept in centrifuge machine at 5000 rpm for 5 min. to get supernatant. Cardamom, clove, cumin was cleaned and grind by mixer followed by sieved to get fine powder. Then spice powder were mixed in known quantity of distilled water and allowed to sediment for 24 hours. Then filtered it by doubled fold muslin cloth and kept in centrifuge at 5000 rpm for 5 min. to get supernatant.

Spice extract incorporated lime RTS beverage was prepared by using different proportions of spice extract ( $T_1$  =2.5% lime juice without spice extract,  $T_2$  =2.5% lime juice + 0.5% spice extract,  $T_3$  =2.5% lime juice + 0.7% spice extract,  $T_4$  =2.5% lime juice + 0.9% spice extract,  $T_5$  =2.5% lime juice + 1.1% spice extract,  $T_6$  =2.5% lime juice +1.3% spice extract) for this purpose, the syrup was prepared by addition of cane sugar and KMS@750 ppm. After incorporation of spice extract in lime juice TSS were adjusted to 12 °Brix and pasteurized at 60° C for 30 min. and cooled by cold water.

The prepared RTS filled in PET bottle and label it then RTS were analysed for TSS, acidity, pH, ascorbic acid, total sugar, reducing sugar and non-reducing sugar contents as per the methods of given by Ranganna (1986). Evaluated organoleptically for color, flavour, taste, appearance and overall acceptability by panel of 10 judges who scored on 9-point hedonic scale.

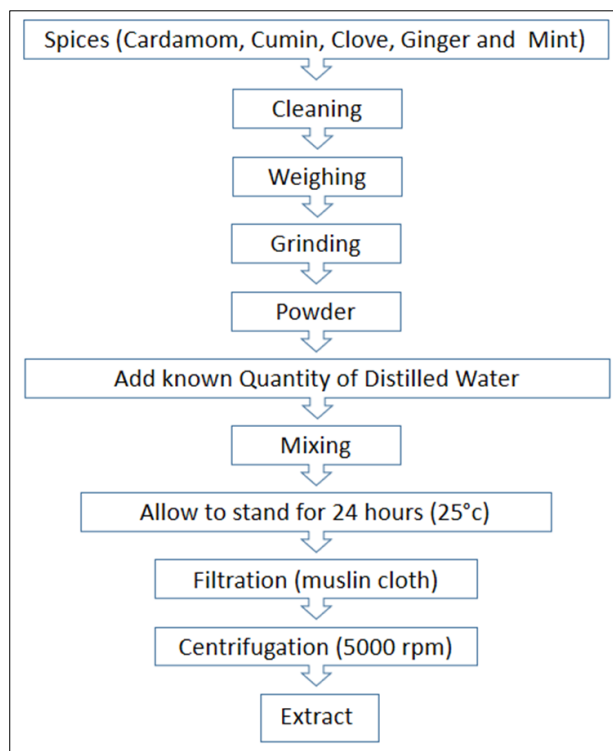
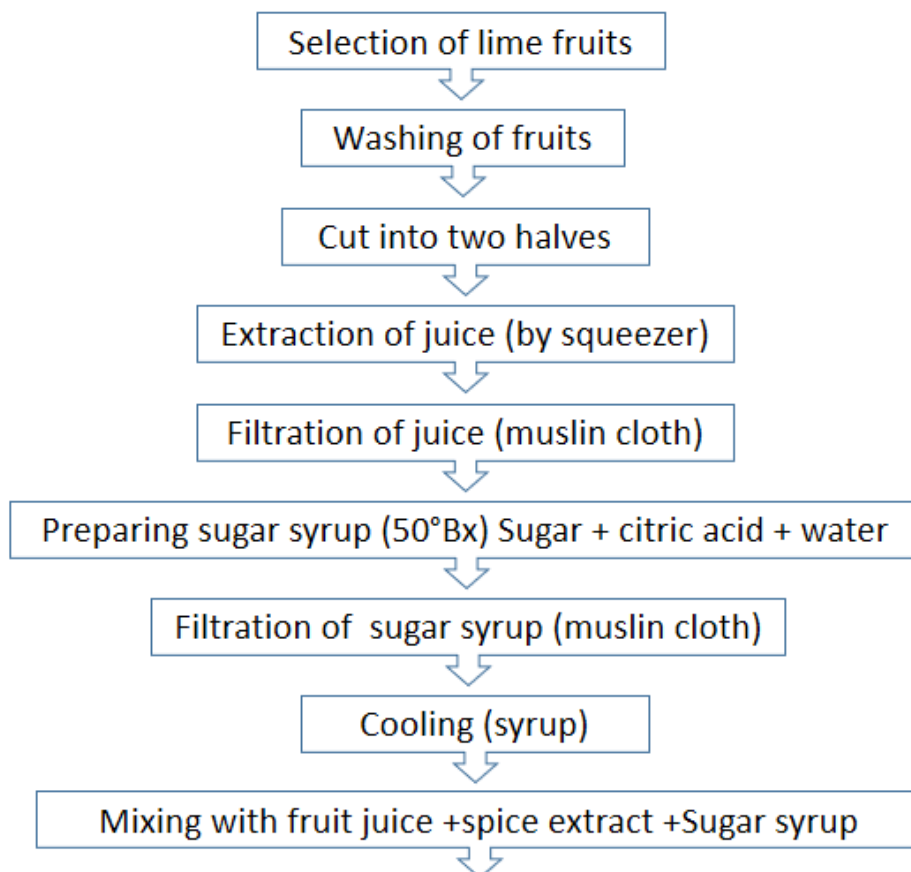
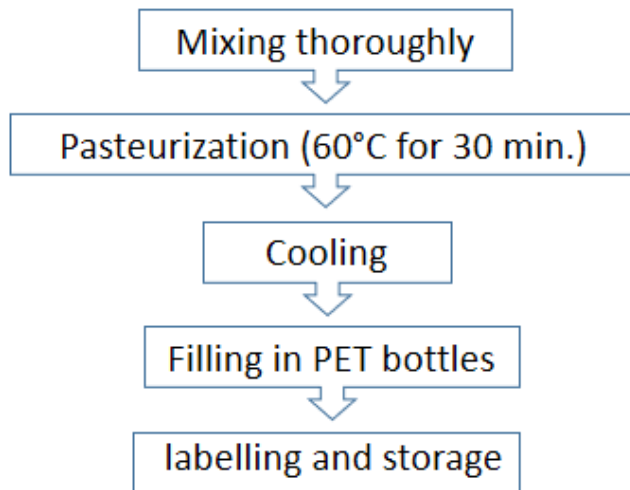


Fig 1: Flow diagram for preparation of Spice Extract





**Fig 2:** Flow diagram for preparation of Spice Extract incorporated Lime RTS Beverage

## Results and Discussion

**Table 1:** Chemical composition of Spice extract incorporated Lime RTS Beverage

Treatment	Chemical composition of prepared spice extract incorporated lime RTS beverage						
	TSS (%)	Acidity (%)	pH	Total sugar (%)	Reducing sugar (%)	Non-reducing sugar (%)	Ascorbic Acid (mg/100 ml of juice)
T1	12	0.30	2.73	10.11	1.96	8.15	1.83
T2	12	0.30	2.73	10.11	1.96	8.15	1.83
T3	12	0.31	2.67	10.11	1.99	8.12	1.85
T4	12	0.31	2.61	10.12	2.01	8.11	2.90
T5	12	0.32	2.57	10.13	2.02	8.11	2.97
T6	12	0.32	2.57	10.14	2.07	8.07	3.70
SE±	0.295	0.003	0.028	0.006	0.016	0.012	0.302
CD at 5%	0.876	0.009	0.084	0.017	0.048	0.035	0.896

The data presented in table 1 clearly indicated that spice incorporated lime beverage without spice extract and 0.5% spice extract were found to have lower acidity (0.30 %) while the beverage with 1.1% spice extract and 1.3% spice extract contained comparatively higher acidity (0.32%). However, pH values were found to be higher in treatment T1 and T2 (2.73) whereas pH lower value was observed in T5 and T6 (2.57).

The total sugar was observed lowest and same in T1, T2 and

T3 (10.11%) whereas highest sugar percentage was observed in T6 (10.14 %).

The reducing sugar percentage was observed lowest in T1 and T2 (1.96) whereas highest in T6 (2.07). The Non-reducing sugar percentage was observed lowest in T6 (8.07) whereas highest Non-reducing sugar percentage was observed in T1 and T2 (8.15) The ascorbic acids was observe lowest in T1 and T2 (1.83mg/100 ml of juice) whereas highest value was received in T6 (3.70mg/100 ml of juice).

**Table 2:** Organoleptic Evaluation of Spice extract incorporated Lime RTS Beverage

Treatments	Organoleptic Evaluation of Spice extract incorporated Lime RTS Beverage (Organoleptic Score 9 Hedonic scale)				
	Color	Flavour	Taste	Appearance	Overall acceptability
T1	9.00	6.00	6.00	9.00	7.50
T2	9.00	6.50	7.00	8.50	7.70
T3	8.50	8.00	7.50	8.00	8.00
T4	8.00	9.00	9.00	8.00	8.50
T5	7.50	9.00	8.50	7.50	8.12
T6	6.00	7.50	6.50	6.50	6.60
SE±	0.458	0.491	0.461	0.354	0.271
CD at 5%	1.362	1.460	1.370	1.053	0.806

The Spice extract incorporated Lime RTS Beverage were evaluated organoleptically for color, flavour, taste, appearance and overall acceptability and were found to be acceptable at the time of preparation (Table 2). The treatment T<sub>1</sub> and T<sub>2</sub> secured the highest score for color (9.00 score). Whereas lowest score was received by Treatment T<sub>6</sub> (6.00). The highest score for flavour was received by T<sub>4</sub> and T<sub>5</sub> (9.00) whereas lowest score was observed in Treatment T<sub>1</sub> and T<sub>2</sub> (6.00 to 6.50). The treatment T<sub>4</sub> was secure first position for taste score (9.00) whereas T<sub>1</sub> received lowest score (6.00). The treatment T<sub>1</sub> was received highest score (9.00) for

Appearance and lowest by T<sub>6</sub> (6.50). The overall acceptability score was received highest by treatment T<sub>4</sub> (8.50) whereas lowest score was obtained by T<sub>6</sub> (6.60)

## Conclusion

From the Present study, it is concluded that spice extract incorporated lime RTS beverage with 2.5% lime juice + 0.9 % spice extract having TSS 12°Brix and acidity 0.31% level was found to be the best among all the treatments. However, the antioxidant and nutraceuticals potential was increase by addition of spice extract.

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