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Preparation and Evaluation of Herbal Syrup

Ranjit Tukaram Mali, Komal Kapratwar, Prof. Bhagyashali Pawar
Student, Gajanan Maharaj College of Pharmacy, Chh. Smabhajinagar, Maharashtra, India.
Principal, Gajanan Maharaj College of Pharmacy, Chh. Smabhajinagar, Maharashtra, India

Abstract: *The blend beverages of fruits, medicinal plants and spices are rich source of nutrients, medicinal properties and flavors to meet the consumers demand in National and International markets The TSS, acidity, reducing sugars and total sugars increased whereas, vitamin-A, vitamin-C, non-reducing sugar and organoleptic score decreased continuously up to the end of the storage period under ambient temperature (20.1-29.40C). Moreover, it had been found that syrup organoleptically acceptable up to 5 months of storage in case of both glass and polypet bottles. This study indicates that mango, kagzi lime, Aloe vera and ginger can be utilized for palatable syrup making beneficial for the consumers in terms of taste, color, flavor, medicinal and therapeutic properties.*

Keywords: blend beverages

I. INTRODUCTION

A beverage is a liquid intended for human consumption, in addition to their basic function of satisfying thirst, beverages play an important role in human culture .

Beverages are of two types- unfermented (non-alcoholic) and fermented (alcoholic). Blended beverages with using different fruits, vegetables, spices extract and plants of medicinal values as new food products definitely attract the consumers in the interpretation of sensory and nutritional characteristics.

Mango is the king among tropical fruits which is botanically known as Mangifera indica L. and belongs to the family Anacardiaceae . It is also known as Aam , National fruit of India, Bathroom fruit and Symbol of love. It is originated in South-East-Asia, particularly in Indo-Burma region.

On the basis of analysis of different varieties of mango, it is reported that mango fruit contains moisture 73.0 – 86.7%, carbohydrate 11.6 – 24.3%, protein 0.3 – 1.0%, fat 0.1 – 0.8%, fibers 0.8%, minerals 0.3 – 0.7%, Vitamin A 650 – 25940 I.U., Vitamin C 3 – 83 mg/100g, calcium 0.01%, phosphorous 0.02% and iron 4.5 mg/100 g .

Young and unripe mango fruits are utilized for culinary purposes as well as for preparing pickles, chutney and amchur , because of their acidic taste. Ripe mango fruits are utilized in preparation of pulp, juice, syrup, squash, jam, jelly, preserve, nectar, canned slices, dried powder, RTS, baby food, mango leather , toffee, candy and many other products. These conventional type of mango products have been developed to a considerable level and a significant demand has been built up by the processing industry, both for domestic and export market .

Citrus (Citrus spp.) is a genus of flowering trees and shrubs, belonging to the family Rutaceae. Citrus fruits are used extensively in food processing industry to prepare a wide varieties of products such as RTS, juice, squash, syrup, chutney, slices, pickles and cordial. Kagzi lime (Citrus aurantifolia Swingle) is said to be originated in India.

Vitamin C content is the maximum in acid lime (15-65 mg/100 g).

The fruit is very sour because of high quantity of acid; hence fresh fruits are not consumed whereas, fresh juice mixed with water and sugar makes a delicious drink during summer season. Lime fruits are also consumed as pickles in India. 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. They are refreshing and delicious to eat.

Aloe vera (Aloe barbadensis Miller) is perennial, drought resistant succulent plant commonly known as ‘Ghrit-kumari’ and ‘Gheegwar’ belongs to the Asphodelaceae or Liliaceae family, which historically has been used for a variety of medicinal purpose.

There are 275 species of aloe vera grown all over the world. The most widely used species of aloe vera are Aloe barbadensis Miller and Aloe aborescens . Aloe vera gel is colorless, transparent and slippery mucilage containing water

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and bioactive polysaccharides mainly acemannan and glucomannan. Aloe vera gel is used to treat constipation, coughs, ulcers, diabetes, headaches, arthritis, and immune-system deficiencies .

In food industry, it has been used as an ingredient for preparation of functional foods and production of gel-containing health drinks, energy drinks and different type of beverages like RTS, squash, syrup, tea, milk, ice-cream and confectionary.

Ginger is an ancient medicinal as well as spicy plant belonging to Zingiberaceae family and botanically known as Zingiber officinale Rosc. It is indigenous to South-EasternAsia. Since a very long time ginger is known for its medicinal values as a digestive aid, spiritual beverage, aphrodisiac, antiemetic, anticancer, anti-oxidant, antiinflammatory and immune stimulating properties

. The fresh ginger is widely used in pickles and candies making whereas fresh ginger juice is used in RTS, squash, syrup and nectar beverages preparation while ginger powder, oleoresin, essence, soft drink, non- alcoholic beverages and ginger oil are manufactured from dry ginger. Ginger ale and the ginger beer are two most popular ginger drinks which are carbonated ginger, flavored with soft drinks.

II. LITERATURE SURVEY

1. Gul, R., Jan, S. U., & Shah, S. U. (2017).

The preparation of herbal syrups offers a practical, palatable, and effective route for delivering phytotherapeutic agents. Advances in extraction techniques, phytochemical analysis, and formulation science continue to improve their quality and therapeutic potential. However, standardization and clinical validation remain key challenges in aligning traditional formulations with modern healthcare standards.

2. Kumar, M. et al. (2020)

Several studies have investigated the phytochemical profile of herbal syrups. For example, syrups prepared from Adhatoda vasica have been shown to contain alkaloids like vasicine and vasicinone, which have bronchodilatory and expectorant properties (Patel et al., 2016). Tulsi syrup, rich in eugenol and flavonoids, exhibits antioxidant and immunomodulatory activity.

Additionally, clinical and in-vivo trials have demonstrated the efficacy of certain herbal syrups in managing upper respiratory tract infections and improving immunity (Rao et al., 2019). However, standardized clinical trials are still limited, necessitating more research into dosage, efficacy, and safety.

3. Sharma, R. et al. (2018)

Modern herbal syrup preparation involves several key steps: selection of plant material, extraction (commonly by decoction, infusion, or percolation), filtration, concentration, and addition of preservatives and sweetening agents. The extraction method significantly influences the concentration and stability of bioactive compounds. Studies have shown that ethanol-water extracts often yield higher concentrations of phenolic compounds compared to aqueous decoctions (Gul et al., 2017).

4. Rao, M. et al. (2019).

Traditional medicine systems have long utilized syrups made from medicinal herbs such as Glycyrrhiza glabra (licorice), Zingiber officinale (ginger), and Ocimum sanctum (tulsi) for treating conditions like cough, sore throat, and digestive issues. These formulations were typically prepared by decocting the herbs and combining the filtrate with sugar or jaggery to increase shelf life and mask bitterness. The extraction method significantly influences the concentration and stability of bioactive compounds.

Studies have shown that ethanol-water extracts often yield higher concentrations of phenolic compounds compared to aqueous decoctions (Gul et al., 2017).

Preservatives such as sodium benzoate and citric acid are commonly added to improve shelf life and microbial stability. Natural alternatives like honey or lemon juice are being explored in eco-friendly formulations (Kumar et al., 2020).

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5. Patel, A. et al. (2016).

Ensuring the consistency and safety of herbal syrups requires stringent quality control measures. Parameters such as pH, viscosity, microbial load, and phytochemical content are essential for assessing product quality. Standardization using HPLC, TLC, and spectrophotometric methods is recommended for quantitative estimation of bioactive compounds (Sharma et al., 2018).

Regulatory frameworks for herbal syrups vary globally. In India, the Ministry of AYUSH provides guidelines for manufacturing Ayurvedic formulations, while in other countries such as the USA and Europe, herbal products are often categorized as dietary supplements or traditional herbal medicinal products, requiring proof of safety and efficacy.

OBJECTIVES

The objectives of a syrup made from ginger, mango and aloe vera can vary depending on its intended use .

1. Digestive Health :- Ginger is known for its digestive properties , while aloe vera may contribute to soothing the digestive system

2. Immune support :- ginger and aloe vera are believed to have immune – boosting properties that could support overall immune health.

3. Anti–Inflammatory Effects :- Ginger and aloe vera are known for their potential anti- inflammatory benefits, which may help with conditions related to inflammation

4. Hydration and Nutrient Boost :- Mango can provide natural sweetness and essential nutrients , enhancing the flavour and nutritional profile of the syrup

5. Throat Soothing:-

Aloe vera , with its soothing properties , could be beneficial for the throat , while ginger may offer relief for respiratory issues .

6. Anti-Oxidant Properties :- mango and aloe vera are rich in anti oxidants , which can help combat oxidative stress and support overall health

HISTORY

1. History of Mango :-

Mango is believed to have originated in South Asia over 4000 years ago Cultivation of Mangoes spread to East Asia , the Middle East , and later to other tropical and subtropical regions.The fruit holds cultural significance in many societies featuring in folklore , religious rituals , traditional medicine Mangoes were introduced to the Americans by Portuguese explores in the 16thcentury.

2. History of kagzi lime:-

Kagzi lime , also known as key lime or Persian lime has a rich history in southeast Asia and the middle east Limes in general , have been cultivated for thousands of years, with records indicating their use in ancient Egyptian , greek , and roman civilizations Kagzi lime juice is popular fot its distinct flavour and is widely used in culinary dishes , beverages and traditional medicine

3. History of aloe vera :-

aloe vera has a long history dating back to ancient civilizations like Egypt where it was known as the “plant of immortality ” .It has been used for its medicinal properties for centuries in various cultures , including Chinese , Indian , and Greek.The gel extracted from the aloe vera plant is known for its soothing and healing properties , making it a common ingredients in skincare and heath products.

4. History of ginger :-

ginger has a history of over 5000 years of cultivation in southest Asia It has been used in traditional medicine in china and india and was later traded along the silk road , spreading its popularity .Ginger juice syrup is a modern adaptation ,

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often used as a flavourful addition to beverages and culinary dishes .Ginger itself has been praised for its potential health benefits , including anti- inflammatory and digestive properties

Method of Preparation:-

FORMULATION TABLE :(50)

SR	INGREDEANT	QUANTITY
1	MANGO	4 ML
2	LIME	1 ML
3	GINGER	1 ML
4	ALEOVERA	1 ML
5	CITRIC ACID	0.5 GM
6	SIMPLE SYRUP	Q.S

INGREDIENT:

1. Mango:

Common name :- aam.

chemical constituent:- carbohydrates , vitamins , minerals , antioxidants .

Family :- mangifera indica l.

Colour :- Vibrant orange / yellow hues.

LIME :-

Common name:- key lime.

Chemical constituent:- citric acid , ascorbic acid , flavonoids.

Family:- citrus aurantifolia swingle.

Colour :- clear and bright .

Aroma :- strong citrous fragrance.

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ALOE VERA :-
Common name :- aloe vera
Chemical constituent:- polysaccharides , aloin , enzymes , saponins .
Family:- aloe barbadensis miller. Colour :- clear or slightly yellowish. Aroma:- mild .

GINGER
Common name:- ginger.
Chemical constituent:- gingerol , shogaol , zingerone , gingerdiol.
Family :- zingiber officinale rosc.'
Colour :- deep golden – brown or amber.
Taste :- spicy , warming

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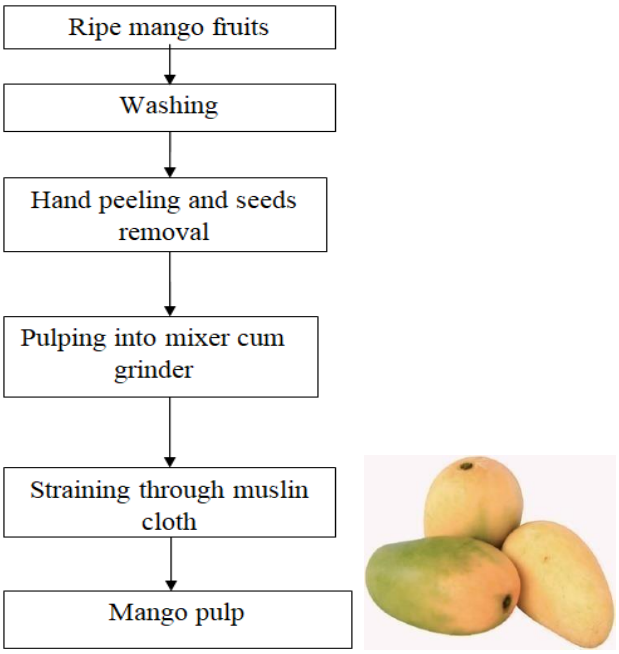

Fig. 1. Flow chart for extraction of pulp from mango fruits

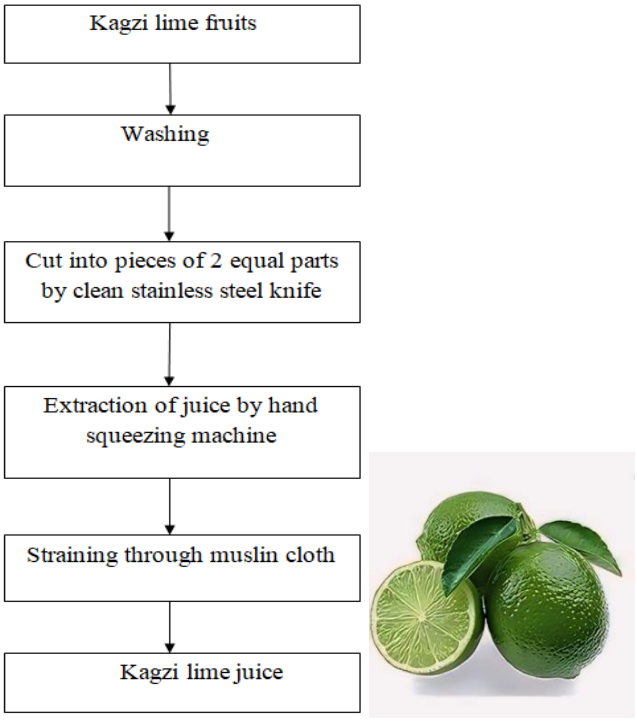

Fig. 2. Flow chart for extraction of juice from kagzi lime fruits

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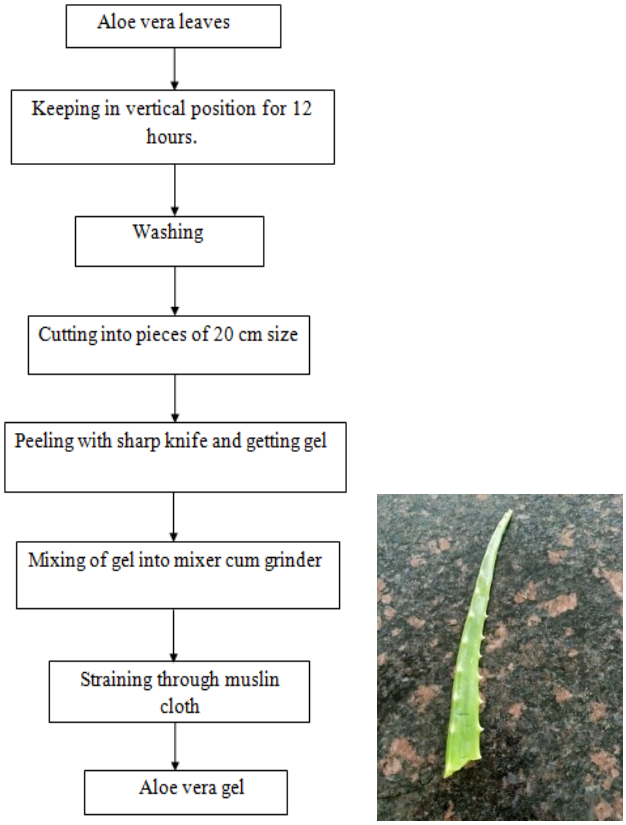

Fig. 3. Flow chart for extraction of Aloe vera gel

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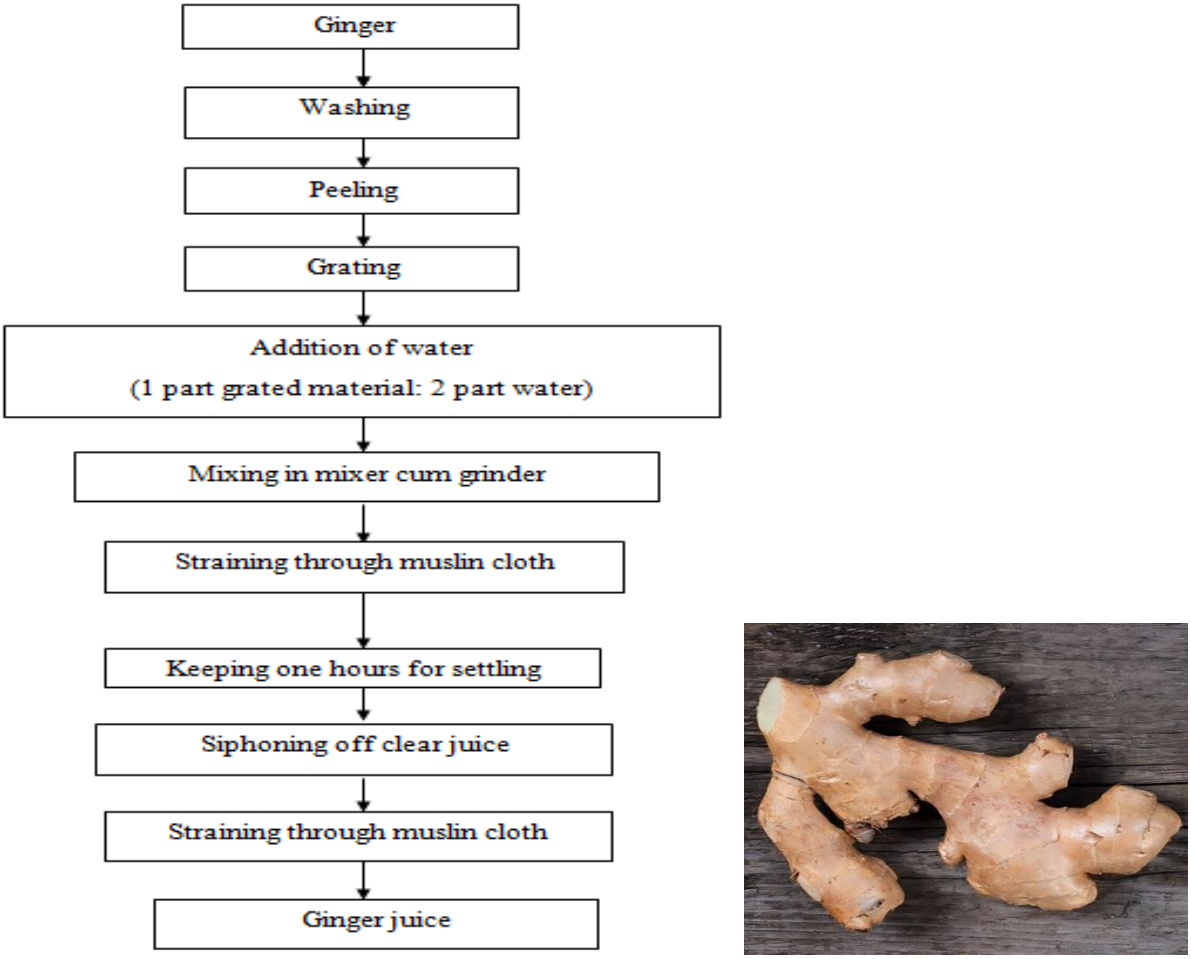

Fig. 4. Flow chart for extraction of ginger juice.

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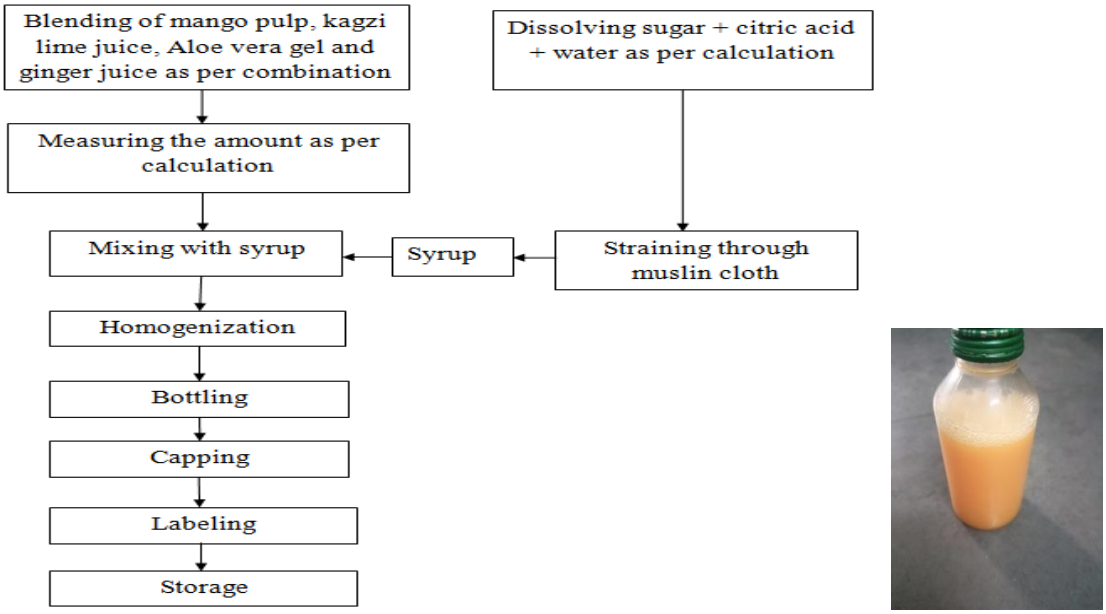

Fig. Flow sheet for preparation of mango + kagzi lime + Aloe vera + ginger blended syrup

Preparation of Syrup

Syrup comprising 25% blend, 70% TSS (Total Suspended Solids) and 1.20% acidity were prepared from different treatments. The prepared syrup was organoleptically evaluated on 9-point Hedonic scale to find out the best combination of blend for large scale preparation.

The technique used for syrup making is shown in Fig

EVALUATION PARAMETERS

1. Formulation studies:

Colour : The colour of formulation was found to be yellowish for the optimized batch.

Odour: The odour of formulation was aromatic

Taste: The test of formulation was shightly pungent

2. PH: The pH determination of syrup by using to techniques.

A) Glass electrode. B) pH paper.

Procedure for glass electrode:

1. Prepare 30ml buffer of each pH. The volume of the stock solution to be taken. Prepare the buffer by mixing appropriate volume.
2. Allow the solution for 15minutes to establish equilibrium.
3. Measure the pH of solution using a pH meter.

3. Viscosity: Thoroughly clean the Ostwald viscometer with warm chromic acid and if necessary used

1. An organic solvent such as acetone.
2. Mount viscometer in vertical position on a suitable stand.3
3. Fill water in dry viscometer up to mark G.
4. Count time required, in second for water to flow from mark A to mark B.
5. Repeat step 3 at least 3 times to obtained accurate reading.

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6. Rinse viscometer with test liquid and then fill it up to mark A, find out the time required for liquid to flow to mark B.
7. Determination of densities of liquid as mentioned in density determination experiment.

Formula for viscosity: Density of test liquid × Time required to flow test liquid Viscosity = × Viscosity of water × Density of water × Time required to flow water

II. RESULTS AND DISCUSSION

1. Chemical Attributes of Fresh Mango Pulp, Kagzi Lime Juice, Aloe Vera Gel and Ginger Juice

The data pertaining to chemical attributes of fresh mango pulp, kagzi lime juice, Aloe vera gel and ginger juice is presented in Table 2. which revealed that the mango pulp used in syrup making contained 19.00 percent TSS, 1.36 per cent acidity, 2650.17 I.U. vitamin-A, 17.33 mg/100g vitamin-C, 4.24 per cent reducing sugars, 12.66 per cent non-reducing sugar and 16.90 percent total sugars.

Similarly , reported 23.10 percent total soluble solids, 0.31 per cent acidity,

16.00 mg/100 g vitamin-C, 7.08 per cent reducing sugars, 12.24 per cent non- reducing sugar, 19.32 per cent total sugars and 14.30236 mg/100 g total carotene in mango pulp.

Kagzi lime juice contained 5.00 per cent TSS, 7.68 percent acidity, 2.78 I.U. vitamin-A, 59.80 mg/100ml vitamin-C, 1.43 per cent reducing sugars, 1.08 per cent non-reducing sugar and 2.51 per cent total sugars. Aloe vera gel contained 1.88 per cent TSS, 0.24 per cent acidity, 0.00 I.U. vitamin-A, 2.53 mg/100g vitamin-C, 0.53 per cent reducing sugars, 1.18 per cent non-reducing sugar and 1.71 per cent total sugars .

Ginger contained 2.20 per cent TSS, 0.26 per cent acidity, 0.00 I.U. vitamin-A,

1.90 mg/100 g vitamin-C, 0.63 per cent reducing sugars, 1.12 per cent non- reducing sugar and 1.75 per cent total sugars. The subtle difference in chemical attributes of raw materials might be due to variety, agroclimatic and cultural practices

Standardization of Blends for Syrup

A quality blended syrup with 25 per cent blend comprising 55 per cent mango pulp, 25 per cent kagzi lime juice, 10 per cent Aloe vera gel and 10 per cent ginger juice with 70 per cent TSS and 1.20 per cent acidity was organoleptically found best for preparation of blend syrup in Table 3. Similarly Tiwari and Deen

[20] observed that syrup containing 50% bael pulp and 50% Aloe vera gel has secured highest organoleptic score. Chaudhary et al. [16] reported that the syrup containing 75 per cent mango pulp and 25 per cent aloe vera gel has secured maximum organoleptic score which indicates that component of raw materials influenced the acceptability of the blend beverages

III. CONCLUSION

It may be concluded from above findings that syrup prepared from 25 per cent blend comprising 55% mango pulp, 25% kagzi lime juice, 10% Aloe vera gel and 10% ginger juice containing 70% TSS and 1.20% acidity was best during organoleptic evaluation. The TSS, acidity, reducing sugars, total sugars was increased, whereas vitamin-A, vitamin-C, non-reducing and organoleptic quality was decreased during storage into both glass and polypet bottles.

The syrup can be stored up to 5 months at ambient storage temperature (20.1-29.40C)

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