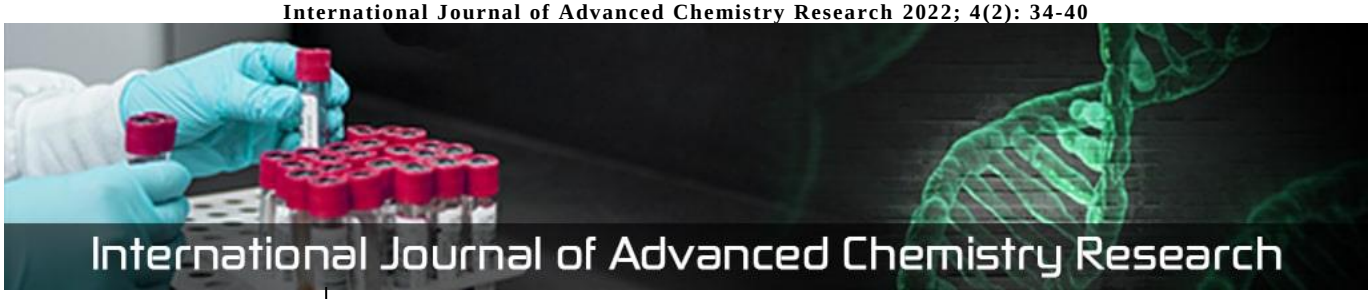

ISSN Print: 2664-6781
ISSN Online: 2664-679X
Impact Factor: RJIF 5.32
IJACR 2022; 4(2): 34-40
www.chemistryjournals.net
Received: 01-07-2022
Accepted: 13-08-2022

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Studies on syrup preparation from mango (*Mangifera indica* L.), citrus (*Citrus aurantifolia* Swingle.), Aloe vera (*Aloe barbadensis* Miller.) and ginger *(Zingiber officinale* Rosc.) Blends

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DOI: https://doi.org/10.33545/26646781.2022.v4.i2a.74

Abstract
The present investigation was carried out at Post Graduate Laboratory of Department of Fruit Science, College of Horticulture and Forestry, A.N.D. University of Agriculture & Technology, Kumarganj, Ayodhya (U.P.) during the year 2019-2020. Mango, citrus (kagzi lime), Aloe vera and ginger have nutritional, spicy, medicinal and therapeutic values. 25 per cent of 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 was found best on 9- point hedonic scale for the preparation of syrup with 70 per cent TSS and 1.20 per cent acidity than other blend combinations *viz*., 100, 0, 0 and 0 percent (T_1); 0, 100, 0 and 0 percent (T_2); 0, 0, 100 and 0 percent (T_3); 0, 0, 0 and 100 percent (T_4); 25, 25, 25 and 25 percent (T_5); 40, 20, 20 and 20 percent (T_6); 70, 10, 10 and 10 percent (T_7); 20, 40, 20 and 20 percent (T_8) and 50, 20, 15 and 15 percent (T_{10}), mango pulp, kagzi lime juice, Aloe vera gel and ginger juice, respectively. During storage Total Soluble Solids, acidity, reducing sugars and total sugars increased whereas, vitamin-A, vitamin-C, non-reducing sugar and organoleptic score decreased with the advancement of storage period. The syrup was stored into glass and polypet bottles at ambient temperature (20.1-29.4^{0}C) and was found 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, colour, flavor, medicinal and therapeutic properties.

Keywords: Syrup, mango pulp (*Mangifera indica* L.), kagzi lime juice (*Citrus aurantifolia* Swingle.), Aloe vera gel (*Aloe barbadensis* Miller.), ginger juice *(Zingiber officinale* Rosc.), blend combination, glass and polypet bottles, storage, organoleptic quality

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 (Wikipedia, 2019) [12]. 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/100g **(**Anon., 1966) [3]. 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 (Aam Papar), 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 (Sadhu and Bose, 1976; Rameshwar *et al*., 1979; Kalra *et al*., 1981; 1982) [33, 31, 16-17].

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* (Ramachandra and Rao, 2008., Dubick and Michsel, 1983) [30, 13]. Aloe vera gel is colorless, transparent and slippery mucilage containing water and bioactive polysaccharides mainly acemannan and glucomannan. Aloe vera gel is used to treat constipation, coughs, ulcers, diabetes, headaches, arthritis, and immune-system deficiencies (Bozzi A. *et al.*, 2007) [9]. 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-Eastern-Asia. Since a very long time ginger is known for its medicinal values as a digestive aid, spiritual beverage, aphrodisiac, antiemetic, anticancer, anti-oxidant, anti-inflammatory and immune stimulating properties (Malhotra and Singh, 2003) [21]. 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.

The demands of natural beverages rich in nutrients and having therapeutic as well as medicinal values, are increasing because of changing life style, health consciousness and increasing purchasing capacity of the consumers. The present studies were carried out because 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.

Materials and Methods

Raw materials

Mango (var. Dashehari), kagzi lime purchased from local market, Aloe vera (var. Samsheetal) purchased from National Botanical Research Institute, Lucknow and ginger (Local variety) purchased from local market were used for the syrup preparation.

Extraction of mango pulp, kagzi lime juice, Aloe vera gel and ginger juice

The methods applied to extract the mango pulp, kagzi lime juice, Aloe vera gel and ginger juice are shown as flow sheets in Fig. 1, Fig. 2, Fig. 3 and Fig. 4, respectively.

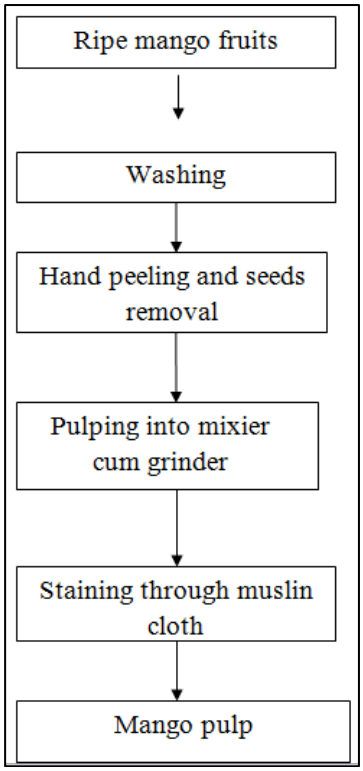

Fig 1: Flow chart for extraction of pulp from mango fruits

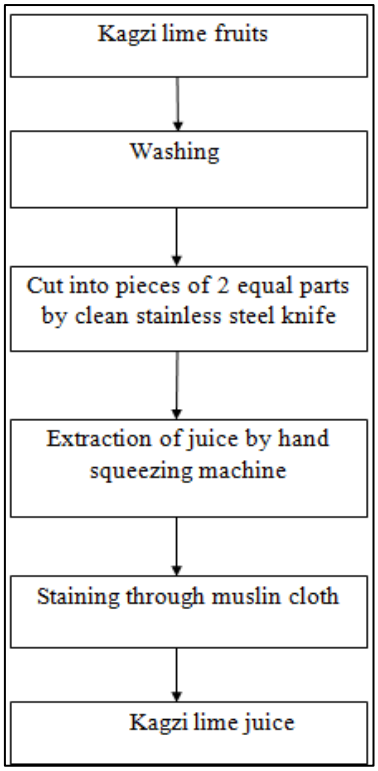

Fig 2: Flow chart for extraction of juice from kagzi lime fruits

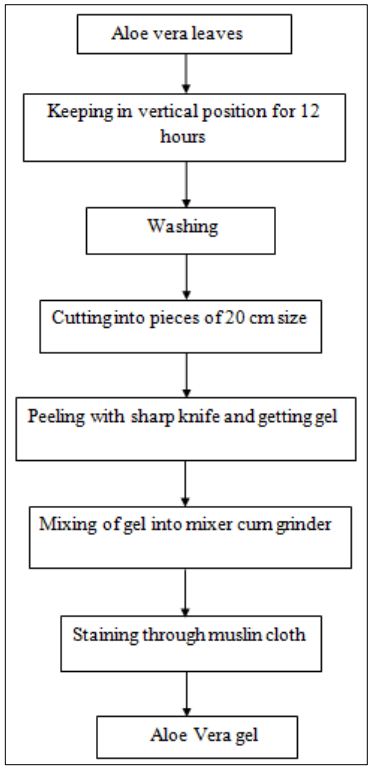

Fig 3: Flow chart for extraction of Aloe vera gel

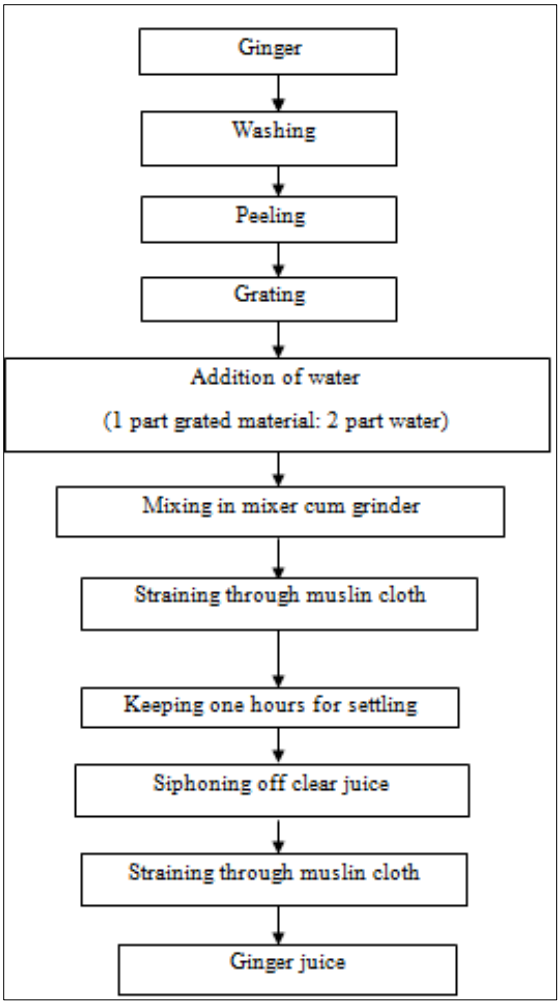

Fig 4: Flow chart for extraction of ginger juice

Standardization of blends for syrup

The following combinations of mango pulp, kagzi lime juice, Aloe vera gel and ginger juice were evaluated to standardize the blend for the development of palatable and quality syrup:

T_1: 25 % blend comprising 100 % mango pulp + 0 % kagzi lime juice + 0 % Aloe vera gel + 0 % ginger juice and adjusted to 70 % TSS and 1.20 % acidity.

T_2: 25 % blend comprising 0 % mango pulp + 100 % kagzi lime juice + 0 % Aloe vera gel + 0 % ginger juice and adjusted to 70 % TSS and 1.20 % acidity.

T_3: 25 % blend comprising 0 % mango pulp + 0 % kagzi lime juice + 100 % Aloe vera gel + 0 % ginger juice and adjusted to 70 % TSS and 1.20 % acidity.

T_4: 25 % blend comprising 0 % mango pulp + 0 % kagzi lime juice + 0 % Aloe vera gel + 100 % ginger juice and adjusted to 70 % TSS and 1.20 % acidity.

T_5: 25 % blend comprising 25 % mango pulp + 25 % kagzi lime juice + 25 % Aloe vera gel + 25 % ginger juice and adjusted to 70 % TSS and 1.20 % acidity.

T_6: 25 % blend comprising 40 % mango pulp + 20 % kagzi lime juice + 20 % Aloe vera gel + 20 % ginger juice and adjusted to 70 % TSS and 1.20 % acidity.

T_7: 25 % blend comprising 70 % mango pulp + 10 % kagzi lime juice + 10 % Aloe vera gel + 10 % ginger juice and adjusted to 70 % TSS and 1.20 % acidity.

T_8: 25 % blend comprising 20 % mango pulp + 40 % kagzi lime juice + 20 % Aloe vera gel + 20 % ginger juice and adjusted to 70 % TSS and 1.20 % acidity.

T_9: 25 % blend comprising 55 % mango pulp + 25 % kagzi lime juice + 10 % Aloe vera gel + 10 % ginger juice and adjusted to 70 % TSS and 1.20 % acidity.

T_{10}: 25 % blend comprising 50 % mango pulp + 20 % kagzi lime juice + 15 % Aloe vera gel + 15 % ginger juice and adjusted to 70 % TSS and 1.20 % acidity.

Preparation of syrup

Syrup comprising 25 % blend, 70 % TSS 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-5.

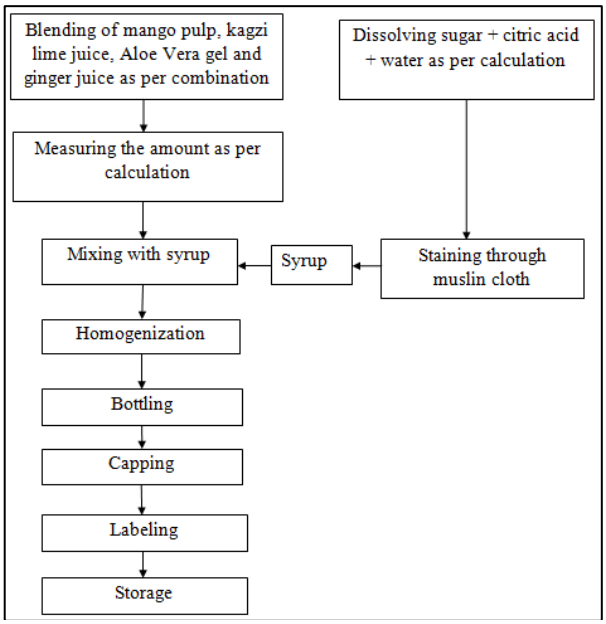

Fig 5: Flow sheet for preparation of mango + kagzi lime + Aloe vera + ginger blended syrup.

Storage studies

Finally 5 litres of syrup was prepared with best combination of blend, and filled into 750 ml glass bottles and polypet bottles of 750 ml capacity leaving 2 cm head space, capped and put for storage studies under ambient condition (20.1-29.4^{0}C). During storage observation on changes in TSS, acidity, vitamin-A, vitamin-C, reducing sugars, non-reducing sugar, total sugars and organoleptic quality were recorded at monthly interval. Observations were recorded for changes in TSS, acidity and vitamin-C (Rangana, 2010), vitamin-A (AOAC, 1970) [4], sugars (Lane and Eynone, 1923) [1] and organoleptic quality (Amerine *et al.*, 1965) [1] at monthly intervals during 5 months of storage period and are described as follows.

The Total Soluble Solids of sample was determined with the help of model (ERMA INC. TOKYO JAPAN) hand refractometer (58-92%) in terms of percentage. The value of TSS recorded at ambient temperature were corrected at 20°C with the help of reference table and the mean value was expressed as per cent TSS content of the sample whereas (Rangana, 2010). The acidity was determined by titrating known quantity of sample against 0.1 N sodium hydroxide solution using phenolphthalein indicator and expressed in percent anhydrous citric acid. Vitamin-A determined by preparing sample in acetone, then in petroleum ether and thereafter in sodium sulphate till the

appearance of dark yellow-greenish colour and measured the optical density (OD) at 452 nm and 503 nm by Spectrophotometer whereas, Vitamin-C content was estimated by preparing sample in 3 percent metaphosphoric acid solution and titrating against 2, 6 dichlorophenol indophenols dye solution till the appearance of light pink colour. The reducing, non-reducing and total sugars were analysed by using Fehling's solution A and B and methylene blue indicator. A panel of 9 semi trained judges evaluated syrup for its colour, flavour, taste, appearance and overall acceptability on 9-point Hedonic scale.

Statistical analysis

The experiments were conducted in 3 replications and the statistical analysis of the data was done by computer software as the method described by Panse and Sukhatne (1985) [26] for CRD experiment.

Results and Discussion

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-1 and revealed that the mango pulp used in syrup making contained 19.00 percent Total Soluble Solids, 1.36 percent acidity, 2650.17 I.U. vitamin-A, 17.33 mg/100g vitamin-C, 4.24 percent reducing sugars, 12.66 percent non-reducing sugar and 16.90 percent total sugars. Similarly Chaudhary *et al.* (2017) [11] reported 23.10 percent total soluble solids, 0.31 percent acidity, 16.00 mg/100 g vitamin-C, 7.08 percent reducing sugars, 12.24 percent non reducing sugar, 19.32 percent total sugars and 14.30236mg/100g total carotene in mango pulp. Kagzi lime juice contained 5.00 percent Total Soluble Solids, 7.68 percent acidity, 2.78 I.U. vitamin-A, 59.80 mg/100ml vitamin-C, 1.43 percent reducing sugars, 1.08 percent non-reducing sugar and 2.51 percent total sugars whereas, Hariharan and Mahendran (2016) reported that 6.21^{0}B TSS, 5.88 percent acidity, 38.91 mg/100ml vitamin-C and 1.43 percent total sugars in kagzi lime juice. Aloe vera gel contained 1.88 percent Total Soluble Solids, 0.24 percent acidity, 0.00 I.U. vitamin-A, 2.53 mg/100g vitamin-C, 0.53 percent reducing sugars, 1.18 percent non-reducing sugar and 1.71 percent total sugars whereas, Sudhendra *et al.* (2012) reported that Aloe vera gel contains 0.80-0.86^{0}B TSS, 4.50-4.52 pH, 0.23-0.26 percent acidity, 3.76-3.86 mg/100g vitamin-C, 97.8-99.0 percent moisture, 0.026 percent reducing sugars, 1.894 percent non-reducing sugar, 1.92 percent total sugars, 8.86-9.00 mg/100g calcium and 0.92-0.94 mg/100g iron. Ginger contained 2.20 percent Total Soluble Solids, 0.26 percent acidity, 0.00 I.U. vitamin-A, 1.90 mg/100g vitamin-C, 0.63 percent reducing sugars, 1.12 percent non-reducing sugar and 1.75 percent total sugars similarly Hegde *et al.* (2018) [15] observed 1.50^{0}B TSS, 5.20 pH, 0.24 percent acidity, 2.70 mg/100g vitamin-C, 0.64 percent reducing sugars and 1.60 percent total sugars in ginger. 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 (Table-2). Similarly Tiwari and Deen (2016) [39] observed that syrup containing 50% bael pulp and 50% Aloe vera gel has secured highest organoleptic score. Chaudhary *et al.* (2017) [11] 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.

Biochemical changes during storage

Data pertaining to biochemical changes during storage of syrup into glass and polypet bottles are presented in Table-3 and Table-4, respectively which indicates that the Total Soluble Solids of syrup increased gradually after 5 months of storage from 70.00 per cent to 71.42 per cent and from 70.00 per cent to 73.30 per cent into glass and polypet bottles, respectively. This change might be due to the conversion or hydrolysis of polysaccharides into simple sugars (monosaccharides and oligosaccharides). The conversion rate was comparatively higher in polypet container than glass bottles which might be due to container effects. Similarly an increasing trend in TSS during storage was reported in pummelo based blended syrup (Bohra *et al.*, 2012) [8], mango-aloe vera blended syrup **(**Chaudhary, 2014) [10], bael and aloe vera blended syrup (Tiwari and Deen, 2016) [39], mango squash (Pinkoo *et al.*, 2017) [28], mango, orange and pineapple mixed juice (Begum *et al.*, 2018) [6], wood apple squash (Kumar and Deen, 2018) [18] and phalsa-pear blended juice (Pangotra *et al.*, 2018) [25], which are in agreement of present observations. The acidity of syrup increased gradually during storage period. Total acidity was increased from 1.20 per cent at initial day to 1.81 per cent at final day of storage into glass bottles while, from 1.20 per cent at initial day to 1.87 per cent into polypet bottles. Degradation of pectic substances and formation of organic acid have been reported to increase the acidity of fruit products (Conn and Stumf, 1976) [12]. Similarly an increasing trend in acidity during storage was observed by Chaudhary, (2014) [10] in mango-aloe vera blended syrup, Biswas *et al.* (2016) [7] in Aloe vera and pineapple blended beverage, Tiwari and Deen (2016) [39] in bael and aloe vera blended syrup, Begum *et al.* (2018) [6] in mango, orange and pineapple mixed juice and Kumar and Deen (2018) [18] in wood apple squash. Vitamin-A content was continuously decreased from the first day (664.50 I.U.) to the end of storage (661.74 I.U.) throughout the storage period into glass bottles and (664.50 I.U.) to (661.11 I.U.) into polypet bottles. This decrease in vitamin-A content might be due to the auto-oxidative degradation during storage and/or due to oxidative breakdown, isomerization or enzymatic destruction of the pigments. The loss of vitamin-A in syrup of different fruits based beverages during storage at ambient temperature was also reported in other studies (Anju *et al.*, 2017; Kumar *et al.*, 2018; Avhad *et al.*, 2019; Prabha *et al.*, 2019 and Vignesh *et al.*, 2019) [2, 18, 5, 29, 40]. Vitamin-C content was continuously decreased from the first day (23.41 mg/100 ml) to the end of storage (21.87 mg/100 ml) into glass bottles and (23.41 mg/100 ml) to (21.77 mg/100ml) into polypet bottles throughout the storage period. This decrease in vitamin-C content might be due to the oxidation of ascorbic acid into dehydro-ascorbic acid by oxygen. The loss of vitamin C in syrup of different fruits

based beverages during storage at ambient temperature was also reported in previous studies (Bohra *et al.,* 2012; Chaudhary, 2014; Tiwari and Deen, 2016; Anju *et al.*, 2017**;** Begum *et al.,* 2018**;** Kumar and Deen, 2018; Kumar *et al.*, 2018; Pangotra *et al.,* 2018 and Thirukumar *et al.,* 2018) [2, 6, 8, 10, 39, 18, 25, 38]**.** The reducing sugars and total sugars of blended syrup, increased gradually and it was increased from 1.65 per cent to 3.93 per cent and 69.75 per cent to 70.91 per cent, respectively in case of glass bottles whereas, from 1.65 per cent to 4.10 per cent and 69.75 per cent to 71.00 per cent, respectively in case of polypet bottles. The increase in reducing and total sugars of processed fruit products could be due to inversion of non-reducing sugar into reducing sugars. These finding were supported by Bohra *et al.* (2012) [8] in pummelo based blended syrup, Smitha *et al.* (2012) [36] in avocado based squash blended with sapota and Aloe vera, Chaudhary (2014) [10] in blended syrup of mango and aloe vera, Shahid *et al.* (2015) [34] in mango-mandarin squash, Tiwari and Deen (2016) [39] in bael and aloe vera blended syrup, Sherzed *et al.* (2017) in strawberry based blended squash and Kumar *et al.* (2018) [18] in mango squash. The non-reducing sugar of blended syrup, decreased continuously throughout the entire period of storage and it was decreased from 68.10 per cent to 66.98 per cent and from 68.10 per cent to 66.90 per cent into glass and polypet bottles, respectively. The decrease in non-reducing sugar of processed fruit products might be due to inversion of non-reducing sugar. This finding was supported by published works of Tiwari and Deen (2016) [39] in bael and aloe vera blended syrup, Mishra *et al.* (2017) [22] in mango-Aloe vera blend squash, Kumar and Deen (2018) [18] in wood apple squash and Noor uddin *et al.* (2019) [23] in blended mango-guava squash. Organoleptic score of blended syrup decreased gradually with the storage period at room temperature (20.1-29.4 ^{0}C) but the acceptability of syrup was maintained up to five months. The score was significantly decreased from 8.10 at first day to 7.08 at final day of storage into glass bottles and from 8.10 to 7.01 into polypet bottles. The loss in organoleptic quality of beverages after certain period is obvious because of undesirable changes in the products. Temperature plays an important role in biochemical changes that leads to development of off flavour as well as discolouration in the beverages. Reduction in organoleptic quality are also reported in pummelo based blended syrup (Bohra *et al.,* 2012) [8], lime squash (Papade *et al.,* 2015) [27], bael and Aloe vera blended syrup (Tiwari and Deen, 2016) [39], concentrated orange juice (Obasi *et al.,* 2017) [24] and guava-papaya blended bar (Avhad *et al.,* 2019) [5]. These reported observations are in the support of the present findings.

Table 1: Chemical attributes of mango pulp, kagzi lime juice, Aloe vera gel and ginger juice.

S. No.	Chemical attributes	Mean value			
		Mango pulp	Kagzi lime juice	Aloe vera gel	Ginger juice
1.	Total soluble solids (%)	19.00	5.00	1.88	2.20
2.	Acidity (%)	1.36	7.68	0.24	0.26
3.	Vitamin-A ((I.U.)	2650.17	2.78	0.00	0.00
4.	Vitamin-C (mg/100 g)	17.33	59.80	2.53	1.90
5.	Reducing sugars (%)	4.24	1.43	0.53	0.63
6.	Non-reducing sugar (%)	12.66	1.08	1.18	1.12
7.	Total sugars (%)	16.90	2.51	1.71	1.75

Table 2: Organoleptic quality of syrup prepared from different blends of mango pulp, kagzi lime juice, Aloe vera gel and ginger juice.

Treatments (Recipe No.)	Different combination of blends				Organoleptic quality	
	Mango pulp (%)	Kagzi lime juice (%)	Aloe vera gel (%)	Ginger juice (%)	Score	Rating
T_1	100	Nil	Nil	Nil	7.56	Like moderately
T_2	Nil	100	Nil	Nil	6.56	Like slightly
T_3	Nil	Nil	100	Nil	6.45	Like slightly
T_4	Nil	Nil	Nil	100	6.05	Like slightly
T_5	25	25	25	25	7.10	Like moderately
T_6	40	20	20	20	7.25	Like moderately
T_7	70	10	10	10	7.95	Like moderately
T_8	20	40	20	20	6.87	Like slightly
T_9	55	25	10	10	8.10	Like very much
T_{10}	50	20	15	15	7.44	Like moderately
SE.m±					0.03	
CD at 5%					0.08	

Table 3: Biochemical and organoleptic changes of syrup during storage into glass bottles

Storage period (in months)	TSS (%)	Acidity (%)	Vitamin-A (I.U.)	Vitamin-C (mg/100ml)	Reducing sugars (%)	Non-reducing sugars (%)	Total sugars (%)	Organoleptic	
								Score	Rating
0	70.00	1.20	664.50	23.41	1.65	68.10	69.75	8.10	LVM
1	70.24	1.28	663.95	23.16	1.99	67.99	69.98	8.00	LVM
2	70.46	1.39	663.04	22.93	2.45	67.69	70.14	7.85	LM
3	70.73	1.53	662.72	22.64	2.82	67.50	70.32	7.62	LM
4	71.00	1.70	661.94	22.15	3.20	67.29	70.49	7.33	LM
5	71.42	1.81	661.74	21.87	3.93	66.98	70.91	7.08	LM
SE.m±	0.04	0.03	0.03	0.03	0.03	0.04	0.03	0.02	
CD at 5%	0.12	0.09	0.10	0.08	0.08	0.13	0.10	0.07	

LVM: Like very much, LM: Like moderately

Table 4: Biochemical and organoleptic changes of syrup during storage into polypet bottles

Storage period (In months)	TSS (%)	Acidity (%)	Vitamin-A (I.U.)	Vitamin-C (mg/100ml)	Reducing sugars (%)	Non-reducing sugars (%)	Total sugars (%)	Organoleptic	
								Score	Rating
0	70.00	1.20	664.50	23.41	1.65	68.10	69.75	8.10	LVM
1	71.50	1.32	663.65	23.22	2.04	67.91	69.95	7.87	LM
2	72.46	1.43	663.00	22.92	2.52	67.74	70.26	7.60	LM
3	72.83	1.57	662.48	22.60	2.94	67.44	70.36	7.45	LM
4	73.00	1.72	661.74	22.07	3.40	67.15	70.55	7.25	LM
5	73.30	1.87	661.11	21.77	4.10	66.90	71.00	7.01	LM
SE.m±	0.02	0.04	0.06	0.03	0.04	0.03	0.05	0.03	
CD at 5%	0.07	0.11	0.17	0.10	0.11	0.08	0.16	0.08	

LVM: Like very much, LM: Like moderately

Acknowledgement
The Acharya Narendra Deva University of Agriculture and Technology, Kumarganj, Ayodhya, U.P. is gratefully acknowledged for providing all kinds of support and facilitate for this experiment.

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 (20.1-29.4^{0}C) into both glass and polypet bottles with acceptable quality.

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