Advances in Bioresearch
Adv. Biores., Vol4 (2) June 2013: 109- 117
©2013 Society of Education, India
Print ISSN 0976-4585; Online ISSN 2277-1573
Journal's URL:http://www.soeagra.com/abr/abr.htm
CODEN: ABRDC3

ORIGINAL ARTICLE

To Study the Storage Analysis of Developed Amla Mango Blended

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ABSTRACT
The study show that the value of acidity, Reducing sugar and TSS increase while the value for the ph and ascorbic acid decreases during the two month storage with different preservatives at different temperatures. The preservatives increase the acidity, decrease the pH. It is observed that with freeze temperature less Vitamin C oxidized and more acidic conditions are maintained. The control show more number of microorganisms than with preservatives. The highest inhibitory effects on bacterial growth in R.T.S were exerted by PMS alone followed by combination of PMS and SB each. With two different temperatures more microorganism are found at room temperature than at freeze temperature. The drink stored at refrigeration temperature (4-6^{0}C) was ranked the best for colour, flavor, taste, texture, appearance and overall acceptability as compared to the others stored at room temperature (30^{0}C).
KEYWORDS: *RTS, BLANCHING, PMS, SB*

Received: 25/04/2013 Accepted: 15/05/2013

INTRODUCTION

A variety of soft drinks are being presently produced in the country, e.g. sweetened carbonated (aerated) soft drinks, still beverages containing fruit juice / pulp and soda water [1]. Among these, the share of fruit juice based beverages is presently quite small as compared to synthetic carbonated drinks. Gradually there is a distinct shift towards fruit juice based ready to serve beverages for obvious advantages of the higher nutritional value over the synthetic aerated water[2]. It is found that during the storage at the termination point more number of bacteria and yeast, mold is present.

MATERIALS AND METHOD

Material: Present study was conducted in the year 2012 at Baba Farid Group of Institution, Department of Food Technology, Dehradun, Uttrakhand, India. The fresh Amla and raw mangoes and other raw material like sugar, jaggery, cumin, citric acid and black salt were also procured from the local market. All the chemicals required during the investigation were provided by department laboratory.

Preparation of Product

Extraction of Amla and Raw Mango Juice

Fresh, fully ripe, sound Amla and raw mangoes were used for extraction of juice [3].The each fruits were cleaned, thoroughly washed and blended in a laboratory blender to a pulp and the juice was extracted by filtering through muslin cloth and stored separately in glass bottle[4].

Blended Crush Preparation and Selection of Final Product

The Amla and raw mango juice content of the each formulation (v/v) were 25:75 (T1), 37.5:62.5 (T2), 50:50 (T3), 62.5:37.5(T4) and 75:25 (T5), Std1 was prepared with 100% Amla juice and Std 2 with 100% raw mango juice[4]. Each of them consist of 10% sugar, 10% jaggery, 2% black salt, 2% cumin, 0.3% citric acid and 100ml of water. Then selection of final product was done on the basis of vitamin C content and sensory analysis of all the treatments [5-8].

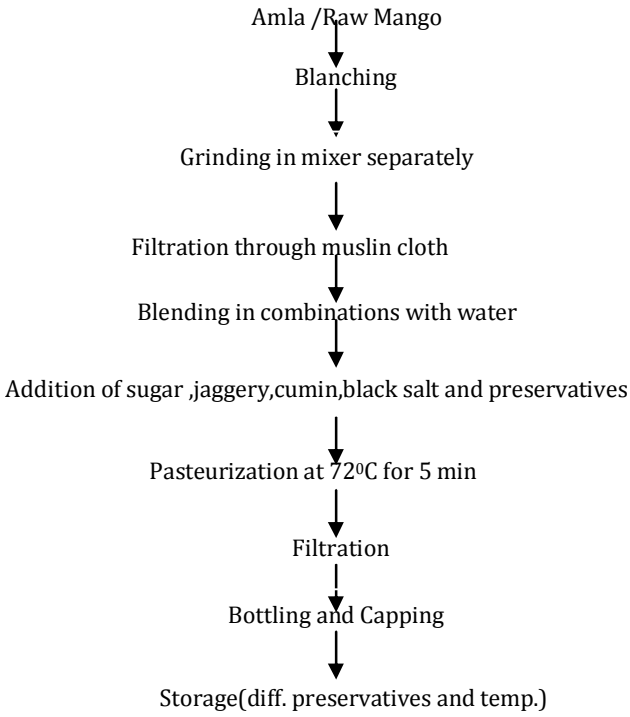

Fig 1 Flow diagram for production of Amla Raw Mango blended RTS.

RESULTS

TO STUDY THE STORAGE ANALYSIS OF THE R.T.S BEVERAGE

RTS beverages were subjected to storage studies at room temperature (30⁰C) (T1) and freeze temperature (4-6⁰C) (T2) at various combinations with preservatives sodium benzoate 100mg (P1) , potassium metabisulphite 100mg (P2), P(50mg P1+50mg P2) and (P0)no preservatives per 100 ml RTS on chemical, microbiological and sensory quality qualities viz., colour, flavour, taste, texture, appearance and overall acceptability was assessed for a period of 2 months by drawing samples at 10 days intervals to evaluate changes in chemical and microbiological and sensory parameters [9-13].

Different Combinations	**P0**	**P1**	**P2**	**P**
T1	**P0T1**	**P1T1**	**P2T2**	**PT1**
T2	**P0T2**	**P1T2**	**P2T2**	**PT2**

(A) CHEMICAL ANALYSIS OF RTS BEVERAGE

FOR P0T1

Storage Period	**Acidity%**	**pH**	**Ascorbic Acid (mg/100ml)**	**Reducing Sugars %**	**⁰Brix**
0DAY	2.1	3.9	419	8.7	15.2
10DAY	2.3	3.9	356	9.3	15.4
20DAY	2.5	3.7	345	10.2	15.5
30DAY	2.8	3.5	289	11.6	15.8
40DAY	2.9	3.5	256	13.5	15.8
50DAY	3.1	3.4	242	14.3	16.2
60DAY	3.2	3.4	205	14.6	16.8

Table 1 Shows the variation of the chemical analysis during the storage for P0T1.

FOR P0T2

StoragePeriod	Acidity%	pH	AscorbicAcid (mg/100ml)	ReducingSugars %	^{0}Brix
0DAY	1.9	3.9	419	8.3	15.4
10DAY	1.9	3.9	409	8.5	15.5
20DAY	2.0	3.8	401	9.1	15.7
30DAY	2.1	3.8	393	9.4	15.7
40DAY	2.1	3.7	387	11.3	16.5
50DAY	2.2	3.7	378	13.6	16.7
60DAY	2.3	3.7	292	13.7	16.9

Table 2 Shows the variation of the chemical analysis during the storage for P0T2.

FOR P1T1

Storage Period	Acidity%	pH	Ascorbic Acid (mg/100ml)	Reducing Sugars %	^{0}Brix
0DAY	2.1	3.6	419	8.7	15.2
10DAY	2.2	3.6	402	9.5	15.3
20DAY	2.4	3.5	386	10.1	15.3
30DAY	2.6	3.4	375	11.5	15.7
40DAY	2.7	3.2	344	13.6	15.8
50DAY	2.9	3.2	312	14.7	16
60DAY	3.0	3.1	306	14.9	16.2

Table 3 Shows the variation of the chemical analysis during the storage for P1T1.

FOR P1T2

StoragePeriod	Acidity%	pH	AscorbicAcid (mg/100ml)	ReducingSugars %	^{0}Brix
0DAY	1.9	3.8	419	8.5	15.5
10DAY	2.0	3.7	412	8.5	15.6
20DAY	2.0	3.7	405	9.5	15.8
30DAY	2.2	3.6	399	9.7	15.9
40DAY	2.2	3.6	394	11.6	16.2
50DAY	2.3	3.5	387	13.6	16.4
60DAY	2.3	3.4	381	13.4	16.5

Table 4 Shows the variation of the chemical analysis during the storage for P1T2.

FOR P2T1

StoragePeriod	Acidity%	pH	AscorbicAcid (mg/100ml)	ReducingSugars %	^{0}Brix
0DAY	2.1	3.4	419	8.5	15.3
10DAY	2.1	3.4	414	9.3	15.4
20DAY	2.2	3.4	409	10.7	15.4
30DAY	2.3	3.3	402	11.4	15.7
40DAY	2.3	3.2	398	13.9	15.7
50DAY	2.4	3.2	391	14.3	15.9
60DAY	2.4	3.1	386	14.8	16

Table 5 Shows the variation of the chemical analysis during the storage for P2T1.

FOR P2T2

StoragePeriod	Acidity%	pH	AscorbicAcid (mg/100ml)	ReducingSugars %	^{0}Brix
0DAY	1.8	3.6	419	8.5	15.2
10DAY	1.9	3.6	412	8.9	15.6
20DAY	1.9	3.5	409	9.3	15.7
30DAY	1.9	3.5	405	9.9	15.9
40DAY	2.0	3.4	400	11.4	16.1
50DAY	2.1	3.3	396	13.2	16.5
60DAY	2.1	3.3	390	13.8	16.7

Table 6 Shows the variation of the chemical analysis during the storage for P2T2.

FOR PT1

StoragePeriod	Acidity%	pH	AscorbicAcid (mg/100ml)	Reducing Sugars %	^{0}Brix
0DAY	2.1	3.5	419	8.6	15.3
10DAY	2.2	3.5	412	8.9	15.3
20DAY	2.5	3.5	406	9.8	15.5
30DAY	2.6	3.4	399	10.9	15.6
40DAY	2.7	3.4	391	12.4	15.6
50DAY	2.8	3.3	387	13.8	15.9
60DAY	2.8	3.3	380	14.2	16.1

Table 7 Shows the variation of the chemical analysis during the storage for PT1.

FOR PT2

StoragePeriod	Acidity%	pH	AscorbicAcid (mg/100ml)	ReducingSugars %	^{0}Brix
0DAY	1.8	3.7	419	8.6	15.3
10DAY	1.8	3.7	412	8.8	15.4
20DAY	1.9	3.6	408	9.2	15.7
30DAY	2.0	3.6	399	9.4	15.7
40DAY	2.0	3.5	394	12.3	15.9
50DAY	2.1	3.5	390	12.8	16.4
60DAY	2.2	3.5	386	13.2	16.6

Table 8 Shows the variation of the chemical analysis during the storage for PT2.

(B) MICROBIOLOGICAL ANALYSIS OF RTS BEVERAGE

The prepared juice was studied for microbial load. The total microbial load was calculated by standard plate count method for bacteria. The standard plate count and yeast and mold count was done according to the method described in recommendation method for the microbiological examination of food [14-18].

FOR P0T1

DAYS	TOTALPLATECOUNT(CFUg^{-1})	YEASTANDMOLDCOUNT(CFUg^{-1})
0	5	0
10	7	0
20	9	5
30	14	7
40	18	8
50	22	9
60	45	10

Table 9 Shows the variation of the microbial analysis during the storage for P0T1

FOR P0T2

DAYS	TOTALPLATECOUNT(CFUg^{-1})	YEASTANDMOLDCOUNT(CFUg^{-1})
0	3	0
10	4	0
20	6	0
30	10	2
40	13	3
50	18	4
60	30	7

Table 10 Shows the variation of the microbial analysis during the storage for P0T2.

FOR P1T1

DAYS	TOTALPLATECOUNT(CFUg^{-1})	YEASTANDMOLDCOUNT(CFUg^{-1})
0	3	0
10	4	0
20	5	0
30	9	4
40	12	6
50	17	7
60	24	8

Table 11 Shows the variation of the microbial analysis during the storage for P1T1.

FOR P1T2

DAYS	TOTALPLATECOUNT(CFUg^{-1})	YEASTANDMOLDCOUNT(CFUg^{-1})
0	1	0
10	2	0
20	2	0
30	4	1
40	8	2
50	12	3
60	18	6

Table 12 Shows the variation of the microbial analysis during the storage for P1T2.

FOR P2T1

DAYS	TOTALPLATECOUNT(CFUg^{-1})	YEASTANDMOLDCOUNT(CFUg^{-1})
0	1	0
10	2	0
20	4	0
30	5	2
40	8	2
50	12	3
60	20	4

Table 13 Shows the variation of the microbial analysis during the storage for P2T1.

FOR P2T2

DAYS	TOTALPLATECOUNT(CFUg^{-1})	YEASTANDMOLDCOUNT(CFUg^{-1})
0	0	0
10	1	0
20	2	0
30	2	0
40	3	1
50	4	1
60	8	2

Table 14 Shows the variation of the microbial analysis during the storage for P2T2.

FOR PT1

DAYS	TOTALPLATECOUNT(CFUg^{-1})	YEASTANDMOLDCOUNT(CFUg^{-1})
0	1	0
10	2	0
20	4	0
30	6	1
40	9	3
50	13	5
60	21	6

Table 15 Shows the variation of the microbial analysis during the storage for PT1.

FOR PT2

DAYS	TOTALPLATECOUNT(CFUg^{-1})	YEASTANDMOLDCOUNT(CFUg^{-1})
0	1	0
10	2	0
20	2	0
30	3	1
40	5	2
50	8	2
60	10	3

Table 16 Shows the variation of the microbial analysis during the storage for PT2.

(C) SENSORY ANALYSIS FOR RTS BEVERAGES

To carry out the initial optimization of ingredients, the prepared formulation were judged by a panel of 5-member using a 9 point Hedonic rating (9-like extremely and 1-dis like extremely) [19] for color, flavor, taste, texture, appearance and overall acceptability.

FOR P0T1

DAYS	COLOUR	TEXTUE	FLAVOR	TASTE	APPEARANCE	OVERALL
0	8	9	9	9	8	9
10	8	9	9	9	7	9
20	8	9	9	9	7	9
30	8	9	9	9	7	9
40	7	7	7	8	7	8
50	7	7	7	7	7	8
60	7	7	7	7	7	8

Table 17 Shows the variation of the sensory analysis during the storage for P0T1

FOR P0T2

DAYS	COLOUR	TEXTUE	FLAVOR	TASTE	APPEARANCE	OVERALL
0	9	9	9	8	9	9
10	9	9	9	8	9	9
20	9	9	8	8	9	9
30	8	9	8	8	9	9
40	8	9	8	8	9	9
50	8	8	8	8	9	9
60	8	7	7	7	8	8

Table 18 Shows the variation of the sensory analysis during the storage for P0T2.

FOR P1T1

DAYS	COLOUR	TEXTUE	FLAVOR	TASTE	APPEARANCE	OVERALL
0	8	8	8	8	8	8
10	8	8	8	8	8	8
20	8	8	8	8	8	8
30	8	7	7	7	7	8
40	7	6	7	6	6	7
50	7	6	7	6	6	7
60	6	6	7	6	6	6

Table 19 Shows the variation of the sensory analysis during the storage for P1T1.

FOR P1T2

DAYS	COLOUR	TEXTUE	FLAVOR	TASTE	APPEARANCE	OVERALL
0	7	8	8	8	8	8
10	7	8	8	8	8	8
20	7	8	8	8	8	8
30	6	7	8	8	7	8
40	6	7	8	8	7	8
50	6	7	8	7	7	7
60	5	6	8	7	6	7

Table 20 Shows the variation of the sensory analysis during the storage for P1T2.

FOR P2T1

DAYS	COLOUR	TEXTUE	FLAVOR	TASTE	APPEARANCE	OVERALL
0	7	8	8	8	8	8
10	7	8	8	8	8	8
20	7	8	8	8	8	8
30	7	8	8	8	8	8
40	7	8	8	8	8	7
50	6	7	6	8	7	6
60	6	7	6	8	6	6

Table 21 Shows the variation of the sensory analysis during the storage for P2T1.

FOR P2T2

DAYS	COLOUR	TEXTUE	FLAVOR	TASTE	APPEARANCE	OVERALL
0	9	8	8	8	9	8
10	8	8	8	8	9	8
20	8	8	8	8	8	8
30	8	7	7	7	8	8
40	8	7	7	6	8	8
50	7	7	7	6	7	7
60	6	7	7	6	7	7

Table 22 Shows the variation of the sensory analysis during the storage for P2T2.

FOR PT1

DAYS	COLOR	TEXTUE	FLAVOR	TASTE	APPEARANCE	OVERALL
0	8	8	7	7	8	7
10	8	7	7	7	7	7
20	8	7	7	7	7	7
30	8	7	7	7	7	7
40	7	6	6	7	7	6
50	6	6	6	7	7	6
60	6	6	6	7	7	6

Table 23 Shows the variation of the sensory analysis during the storage for PT1.

FOR PT2

DAYS	COLOR	TEXTUE	FLAVOR	TASTE	APPEARANCE	OVERALL
0	8	8	8	8	8	8
10	8	8	8	8	7	8
20	7	8	8	8	7	8
30	7	7	7	7	7	7
40	7	7	7	7	7	7
50	6	7	7	7	7	7
60	6	7	6	7	7	7

Table 24 Shows the variation of the sensory analysis during the storage for PT2.

DISCUSSION AND CONCLUSION

From this study it is concluded that the value of acidity, Reducing sugar and TSS increase while the value for the ph and ascorbic acid decreases during the two month storage with different preservatives at different temperatures[20-21]. The preservatives increase the acidity, decrease the pH. The storage temperatures and preservatives also significantly affected all the sensory characteristics. The preservatives in RTS were organoleptically evaluated for colour, flavor, taste, texture, appearance and over acceptability during two months of storage. The statistical analysis revealed that all sensory characteristics differed significantly with regard to the storage. The drink stored at refrigeration temperature (4-6^{0}C) was ranked the best for colour, flavor, taste, texture, appearance and overall acceptability as compared to the others stored at room temperature (30^{0}C). Each observation was made on the basis of nine point hedonic scale [22-24]. The difference in colour was due to the browning reaction between reducing sugars and amino acids accelerated by high temperature. Under refrigeration; there was less loss of flavour and taste. Concentration and synergistic addition of PMS and SB seem to have no effect on their ability to act differently for deteriorating the colour, flavour and overall acceptability of stored RTS.

REFERENCES

1. Abbo, E. S., Odeyemi, G. and Glurius, T. O. (2006). Studies on the storage stability of Soursop juice. African Journal of Microbiology. 21(2): 197-214.
2. Akhtar, S., S. Mahmood, S. Naz, M. Nasir and M.T. Sultan. 2009. Sensory evaluation of mangoes (*Mangifera indica.L*) grown in different regions of Pakistan. *Pakistan journal of Botany,* 41(6): 2821-2829
3. Amerine MA, Pangborn RM, Roessler EB (1965) Principles of Sensory Evaluation of Food. New York: Academic Press.
4. Anonymous. 1992. *Compendium of Methods for the Microbiological* Examination *of Foods*.American Public Health Association, Washington, DC.
5. Anonymous. 1994. *Official Methods of Analysis*. The Association of the Official Analytical Chemists 13th. Ed. Washington DC.
6. AOAC. (2002). Official Methods of Analysis. (17th Edn). Association of Official Analytical Chemists. Washington, USA.
7. APHA, 1967. Recommended Methods for the Microbiological Examinations of Food. American Public Health Association Inc., New York, pp: 53-59.
8. Bajwa, E.E., Z. Naeem, J. Anjum and A. Nazir. 2003. Development, standardization and storage studies on watermelon-lemon. *Pak. J. Food Sci.,* 12: 21-24.
9. Balaswamy, K., P.P. Rao, A. Nagender and A. Satyanarayana, 2011. Preparation of sour grape (*Vitis vinifera*) beverages and evaluation of their storage stability. J. Food Process. Technol., 2: 116-116.
10. Branen and P.M. Davidson. Marcel Dekker Inc., New York, USA, p. 16.Anonymous. 1995. *Guide to the Safe Use of Food Additives*, Codex Alimentarius Commission,Rome
11. Carter, H. W., Charley, V. L. S. and Bristol. C. (2007). The preservation of fruit juice products with special reference to nutritional value. Journal of Cambridge. 8: pp. 12-14.
12. Chiply, J.R. 1983. Sodium benzoate and benzoic acid, In: *Antimicrobials in Foods* (Eds.), A.C.
13. Cole, M. B., Hofman, P. D. and Stafford, M. (2000). Fruit juices, fruit drinks and soft drinks. In: The Microbiological Safety and quality of food, (Vol.I). Gould, G. W, Lund, B. M. and Parker, T. C. B. (Eds.). Aspen Publishers, Marylands. pp. 836-861.
14. Daepp, H.U., 1973. State of technology of fruit juice concentrates. Report, *Int. Fed. of Fruit Juice Products, Scientific Tech. Commission* No. 13: 43–56. USA.
15. Doughari, J. H. and Elmahmood, A. M. (2007). Effect of some chemical preservatives on the shelf life of sobo drink. African Journal of Microbiology. 2: pp. 5-6.
16. Go Èksungur, Y., U. GuÈvencË and N. Zorlu. (1995). Effect of Sodium benzoate and potassium sorbate on cucumber pickle fermentation. DogÆa *Turkish J. Biol.*, 19: 143-149.
17. Hashmi, M.S., S. Alam, A. Riaz and A.S. Shah. (2007). Studies on microbial and sensory quality of mango pulp storage with chemical preservatives. *Pak. J. Nutr*., 6: 85-88.
18. Hummel, M. and R. Okey. (1950). Relation of canned tomato products to storage losses ascorbic acid. *Food Res.,* 15: 405-414.
19. Hussain, I., A. Zeb, I. Shakir and A.S. Shah. (2008). Combined effect of potassium sorbate and sodium benzoate on individual and blended juices of apricot and apple fruits grown in Azad Jammu and Kashmir. *Pak. J. Nutr*., 7(1): 181-185.
20. Hussain, S., S. Rehman, M.A. Randhawa and M. Iqbal. 2003. Studies on Physico-chemical, microbiological and sensory evaluation of mango pulp storage with chemical preservatives. *J. Res. (Sci.), BZ Uni., Multan, Pak*., 14: 01-09.
21. Inayang, E. and Abah, U. J. (1997). Chemical composition of organoleptic and valuation of juice from cashew apple blended with orange juice. In: Plant Foods for Human Nutrition. Kaluwer Academic Publishers, Netherlands. pp. 50, 295-300.
22. Jain, S.K. and D.S. Khurdiya, (2002). Studies on juice extraction of aonla (*Emblica officinalis* Gaertn.) cv. Chakaiya. J. Food Sci. Technol., 39: 515-516.

23. Larmond, E., (1977). *Laboratory Methods for Sensory Evaluation of Foods.* Canada Department of Agriculture, Pub. No. 1637.
24. LuÈck, F. (1990). Food applications of sorbic acid and its salts. *Food Addit Contam*., 7:711-715 Manganelli, E. and A. Casolari. 1983. Sensitivity of yeasts to sorbic and benzoic acids and their salts. *Ind Conserve,* 58: 23-25.

How to Cite This Article
Sarvesh R. and P. Kumar.(2013). To Study the Storage Analysis of Developed Amla Mango Blended. Adv. Biores. 4 (2): 109-117.