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RESEARCH PAPER

Effect of pre-treatments on chemical composition of aonla slices during preparation of dehydrated slices

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SUMMARY : An investigation was conducted to study effect of pre-treatments on chemical composition of aonla slices during preparation of dehydrated slices. The results revealed that there was significant effect of pre-treatments on changes in ascorbic acid, total phenol, reducing sugar, non-reducing sugar, total sugar content and sugar: acid ratio. Greater reduction of ascorbic acid content, total sugar and titrable acidity was noticed in blanching fruits for five minutes and sliced pieces steeped in two per cent salt for three hours + steeping in 70^0B sugar syrup for 24 hours.

KEY **W**ORDS : Aonla fruits, Salt solution, Sugar syrup, Ascorbic acid

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Aonla (*Emblica officinalis* Gaerth), is an important minor fruit crop of the tropics. Its wide popularity all over the world due to nutritional and medicinal properties and is frequently recommended in both Ayurvedic and Unani systems of medicines. The fruit is rich in vitamin 'C'. Fresh aonla fruits are sour and astringent in taste. Hence, cannot be consumed as a table fruit. It is consumed as a processed product like dehydrated slices, murabba, candy, juice, RTS, etc. Usually dehydrated product has always an upper hand in the consumer preference because of its easy availability, long shelf life and comparatively at a lower cost. Pre-treatments are the necessary pre-requisites for the successful dehydration process. Pre-treatments like blanching, brining and syruping lead to destroying some elements by leaching effect. Hence, the present investigation was undertaken to assess effect of pre-treatments on chemical composition of aonla slices during preparation of dehydrated slices.

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EXPERIMENTAL METHODS

Fresh aonla fruits cv. Sureban (local variety) procured from Lingadhal village, Belgaum district (Karnataka) were used to present investigation consisting of 15 treatments. The treatments are as follows:

T_1 – Blanching for 5 minutes
T_2 – Blanching + 2% salt for 1 hour
T_3 – Blanching + 2% salt for 2 hour
T_4 – Blanching + 2% salt for 3 hour
T_5 – Blanching + 2% salt for 1 hour + 50^0B sugar syrup for 24 hours
T_6 – Blanching + 2% salt for 2 hour + 50^0B sugar syrup for 24 hours
T_7 – Blanching + 2% salt for 3 hour + 50^0B sugar syrup for 24 hours
T_8 – Blanching + 2% salt for 1 hour + 60^0B sugar syrup for 24 hours
T_9 – Blanching + 2% salt for 2 hour + 60^0B sugar syrup for 24 hours
T_{10} –Blanching + 2% salt for 3 hour + 60^0B sugar syrup for 24 hours

T_{11} –Blanching + 2% salt for 1 hour + 70^{0}B sugar syrup for 24 hours

T_{12} – Blanching + 2% salt for 2 hour + 70^{0}B sugar syrup for 24 hours

T_{13} –Blanching + 2% salt for 3 hour + 70^{0}B sugar syrup for 24 hours

T_{14} –Lye blanching + 60^{0}B sugar syrup for 24 hours

T_{15} –Lye blanching + 70^{0}B sugar syrup for 24 hours

Both fresh and pre-treated slices were analysed for chemical parameters. Ascorbic acid was estimated as per AOAC method (Anonymous,1984). Total phenols were estimated as per the folin ciocalteau reagent (FCR) method. Acidity in fruit extract was estimated by titrating it against 0.1 N sodium hydroxide solution using phenolphthalein as indicator and reported in terms of citric acid. Reducing sugar was estimated as per the dinitrosalicylic acid method.

The data has been analysed statistically and reported at 1 per cent significance level (Panse and Sukhatme,1985).

EXPERIMENTAL FINDINGS AND ANALYSIS

The fresh aonla fruits contain ascorbic acid – 554 mg/ 100g, total phenol-166mg/100g, reducing sugar – 2.66 per cent, non-reducing sugar-1.50 per cent total sugar-4.17 per cent total titrable acidity- 2.45 per cent and sugar:acid ratio 1.64.

Among the treatments, the highest ascorbic acid content was recorded in T_1 (294.17 mg /100g) followed by T_2 (283.33mg/ 100g), while the lowest ascorbic acid content was recorded in T_{13} (203.5 mg/100g) (Table 1). It was also observed that, with the increase in dipping time in two per cent salt, there was significant decrease in the ascorbic acid content. This may be due to the leaching losses occurred during the soaking period. These results corroborate with the results obtained by Agarwal and Chopra (2004) in aonla.

Among the treatments, the highest total phenols T_1 (99.17 mg /100g) followed by T_2 (92.83mg/100g), while the lowest total phenol content was recorded in T_{13} (58.67 mg/100g). It was also observed that, with the increase in steeping time in two per cent salt solution and increase in the syrup strength from 50^{0}B to 70^{0}B, there was significant decrease in total phenol. Thus, the phenol content which is responsible for acrid taste could be reduced due to leaching during the pre-treatments. Similar results of reduction in phenol content were observed by Kalra (1988) and Agarwal and Chopra (2004) in aonla.

The highest titrable acidity was recorded in T_1 (1.43%), while the lowest titrable acidity was recorded in T_{13} (0.59%). It was also observed that with the increase in steeping time in two per cent salt solution, there was significant decrease in the titrable acidity. This is resulting from osmosis between syrup and slices.

The reducing, non-reducing and total sugar contents were significantly affected by the treatments. The highest reducing sugar content was recorded in T_{15} (6.83%), which was at par with T_{11} (6.79%) followed by T_{12} (6.51%), while the lowest

Table 1: Effect of pre-treatments on chemical composition of aonla slices during preparation of dehydrated slices

Treatments	Ascorbic acid (mg/100g)	Total phenols (mg/100g)	Reducing sugars (%)	Non-reducing sugars (%)	Total sugars (%)	Titrable acidity (%)	Sugar: acid ratio
T_1 – Blanching for 5 minutes	294.17	99.17	1.47	1.52	3.07	1.43	2.14
T_2 – Blanching + 2% salt for 1 hour	283.33	92.83	1.17	1.72	2.98	1.15	2.58
T_3 – Blanching + 2% salt for 2 hour	274.17	86.45	1.03	1.81	2.94	1.04	2.84
T_4 – Blanching + 2% salt for 3 hour	255.00	80.47	0.99	1.82	2.91	0.98	2.94
T_5 – Blanching + 2% salt for 1 hour + 50^{0}B syrup	240.67	79.67	3.49	8.55	12.82	0.77	17.56
T_6 – Blanching + 2% salt for 2 hour + 50^{0}B syrup	232.83	73.13	3.29	9.18	12.76	0.68	19.85
T_7 – Blanching + 2% salt for 3 hour + 50^{0}B syrup	210.83	66.82	3.08	8.53	12.06	0.65	20.57
T_8 – Blanching + 2% salt for 1 hour + 60^{0}B syrup	235.67	73.67	5.84	12.65	19.17	0.76	25.29
T_9 – Blanching + 2% salt for 2 hour + 60^{0}B syrup	224.17	67.00	5.54	12.84	19.07	0.63	30.41
T_{10} – Blanching + 2% salt for 3 hour + 60^{0}B syrup	216.73	60.50	5.20	12.16	18.00	0.61	29.51
T_{11} – Blanching + 2% salt for 1 hour + 70^{0}B syrup	222.33	72.00	6.79	20.02	27.86	0.73	35.99
T_{12} – Blanching + 2% salt for 2 hour + 70^{0}B syrup	213.33	66.83	6.51	19.80	27.35	0.64	40.21
T_{13} – Blanching + 2% salt for 3 hour + 70^{0}B syrup	203.50	58.67	6.19	18.08	25.33	0.59	39.08
T_{14} – Lye blanching + 60^{0}B syrup	245.20	83.83	5.87	13.71	20.30	0.93	21.82
T_{15} – Lye blanching + 70^{0}B syrup	243.48	80.50	6.83	17.74	26.17	0.92	28.43
Mean	242.99	77.19	4.02	10.11	14.74	0.87	20.09
S.E.±	1.782	0.825	0.041	0.427	0.592	0.018	0.915
C.D. at 1%	6.899	3.190	0.159	1.653	2.289	0.071	3.047

reducing sugar was recorded in T_4 (0.99%). The highest non-reducing sugar content was recorded in T_{11} (20.02%) followed by T_{12} (19.80%), while the lowest non-reducing sugar was recorded in T_1 (1.52%). The maximum total sugar content was recorded in T_{11} (27.86%) followed by T_{12} (27.35%), which was at par with T_{15} (26.17%), while the lowest total sugar was recorded in T_4 (2.91%). However, it can be observed that, reducing, non-reducing and total sugar contents increased significantly and proportionately with the increase in the syrup strength from 50^0B to 70^0B. This may be attributed to the greater osmotic potential created between the slices and different concentrations of syrup. These results are comparable with the results reported by Kannan and Susheela (2001) in guava, Gajanana (2002) in aonla, Basavaraj (2002) in sapota and Keshatti (2003) in aonla.

The results on sugar : acid ratio of treated aonla slices indicated that, there were highly significant difference among the treatments. The highest sugar: acid ratio was recorded in T_{12} (40.21) followed by T_{13} (39.08), whereas the lowest sugar : acid ratio was recorded in T_1(2.14). The sugar : acid ratio in general was found to increase in strength of syrup from 50^0B to 70^0B.

The results revealed that, there was significant effect of pre-treatments on all the seven chemical components estimated immediately after pre-treatment.

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