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**Studies on processing of aonla (*Emblca officinalis*
Gaertn.) Fruits**

Vinod Singh and Bhakti Singh

Abstract

Various recipes evaluated for commercial processing of new aonla products viz. herbal squash, herbal jam, candy and toffee. The results reveal that the composition of 25 percent aonla pulp+5 percent asparagus root extract + 2 percent ginger juice with 50 percent total soluble solids (TSS) and 1.2 percent acidity for herbal squash; 50 percent aonla pulp + 5 Percent asparagus root extract + 2 percent ashwagandha extract with 68 percent TSS and 1.2 % acidity for herbal jam; candy with pectin coating particularly segmented candy; 55 percent aonla pulp + 2.5 percent butter + 0.5 percent custard powder and 42 percent sugar for toffee was found excellent for preparation of value added products from aonla fruits. The recipes developed for commercial processing of new aonla products will be helpful for establishing agro processing industry so that produce could be utilized in an effective manner.

Keywords: Processing, aonla, *Emblca officinalis* Gaertn

Introduction

Aonla or Indian gooseberry (*Emblca officinalis* Gaertn) belongs to the family Euphorbiaceae and is one of the important fruits indigenous to India. Aonla fruit is sour and astringent in taste, hence it is not popular as a table fruit. The excellent nutritive and therapeutic value of fruit has great potentiality for processing into value added products. Presently aonla fruit has significance in medicinal (Chyavanprash, Triphla, Amrit Kalash, Amal ki Rasayan etc.) and cosmetic (hair oil, shampoo, hair dyes etc.) products. Very little attention has been paid towards the value added food products as these food items can get points in view the present investigation was undertaken to develop ideal recipes for preparation of herbal jam, herbal squash, candy and toffee from aonla fruit pulp.

Material and Methods

Mature fruits of aonla (cv. Narendra aonla-6) having TSS 11.12 and acidity 1.8 percent were used for preparation of various product because of better processing attributes.

Table 1: Organoleptic Quality of Herbal Squash Prepared from Different from Different Recipes

Recipes	Aonla Pulp (%)	Asparagus Juice (%)	Ginger Juice (%)	TSS (%)	Acidity (%)	Organoleptic Quality	
						Score	Rating
1	25	-	-	50	1.2	5.9	Liked Slightly
2	25	-	2	50	1.2	8.0	Liked Very Much
3	25	5.0	2	50	1.2	8.8	Liked Extremely
4	25	7.5	2	50	1.2	6.6	Liked slightly
5	25	10.0	2	50	1.2	5.8	Liked slightly

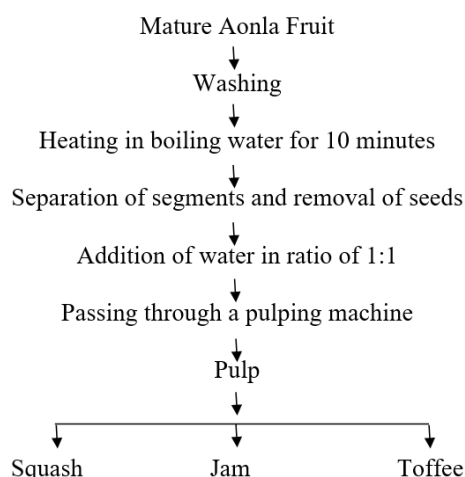
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Table 2: Organoleptic Quality of Herbal Jam Prepared from Different from Different Recipes

Recipes	Aonla Pulp (%)	Asparagus Juice (%)	Ashwagandha Extract (%)	Sugar (%)	Acidity (%)	Organoleptic Quality	
						Score	Rating
1	50	5	2	68	1.2	8.3	Liked Very Much
2	50	10	2	68	1.2	8.1	Liked Very Much
3	50	15	2	68	1.2	7.2	Liked Moderately
4	50	20	2	68	1.2	6.8	Liked Moderately
C.D. at 5%						0.2	

Extraction of pulp

Fruits were washed in running water to remove dirt and dust particles. Extraction of pulp is necessary for processing of herbal squash, jam and toffee. (Fig.1)

**Fig 1:** Flowsheet for Extraction of Aonla Fruit Pulp

Preparation of products

Five liter of herbal squash, five kg herbal jam and two kg toffee were prepared by employing calculated amount of pulp and other ingredients according to different rates of each product as given in respective tables. For formulation of recipes TSS and acidity present in food pulp were first determined by methods described in A.O.A.C. (1980) [1] and then the remaining amount of sugar and citric acid were adjusted during preparation of each product as per respective figures. Five kg candy was prepared as given in figure 4.

Sensory evaluation

A panel consisting of seven members evaluated all the products organoleptically. The samples were rated on the Hedonic Rating Scale where 1 and 9 represented disliked extremely and liked extremely, respectively (Larmond, 1982) [4].

Statistical analysis

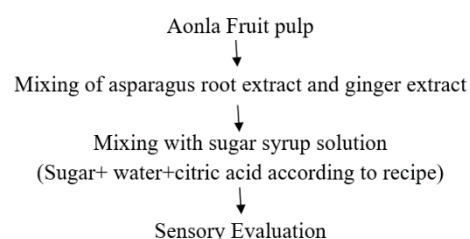
The data for sensory evaluation were analyzed statistically by the technique of analysis of variance (ANOVA) as described by Raghuramula *et al.*, (1983) [5].

Results and Discussion

Herbal squash

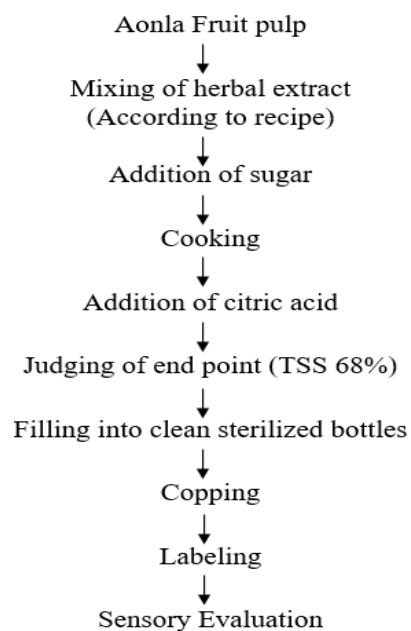
The data and formulation and organoleptic evaluation of aonla herbal squash furnished in table 1 reveal that a recipe containing 25 percent aonla pulp 5 percent asparagus extract and 2 percent ginger juice with 50 percent TSS and 1.2 percent acidity was found to be most ideal for preparation of herbal squash. An increase in asparagus extract beyond the level of five percent reduced the organoleptic quality of squash. Recipes reported in Literature for preparation of

squash differ from fruit to fruit this is due to variation in composition of various fruits. The findings of Lal *et al.*, (1986) [3] also support the contention that recipe for preparation of squares from various sources varied according to the type of fruit. Literature indicated that no attempt has earlier been made by any worker to formulate the recipe for preparation of aonla squash with herbal extract.

**Fig 2:** Flowsheet for the Preparation of Herbal Squash

Herbal Jam

The data on organoleptic evaluation of various recipes of herbal jam is presented in Table-2. Recipe No. 1 containing 50% aonla pulp + 5 percent asparagus + 2 percent ashwagandha extract with 68 percent TSS and 1.2 percent acidity was found to be the best and it was closely followed by recipe No. 2 which contained 10 percent asparagus juice. Bhatt *et al.*, (1982) [2] also reported at least 68 percent TSS for preparation of apple, mango and strawberry jam. Similarly Singh *et al.*, (1993) [9] suggested the recipe for aonla jam that contained 45 percent pulp with 68 percent TSS and 0.5 percent acidity. Herbal extracts were added in aonla pulp for preparation of jam to improve the medicinal quality and attract the market. Earlier little or no information was available for preparation of Aonla jam with herbal extract.

**Fig 3:** Flowsheet for preparation of Aonla Herbal Jam Candy

Data furnished in Table 3 clearly shows that candy prepared from segmented fruit with pectin coating recorded the highest score because of most attractive colour and taste in present findings, followed by whole fruit and candy with pectin coating. Earlier workers suggested the recipe and technique for preparation of Candy from various fruits without pectin. (Lal *et al.*, 1986 and Singh *et al.*, 1998) [3, 8] Pectin coating improved the quality of candy, hence it has better consumer appeal. The candy prepared from aonla fruit has bright scope for both internal and external market.

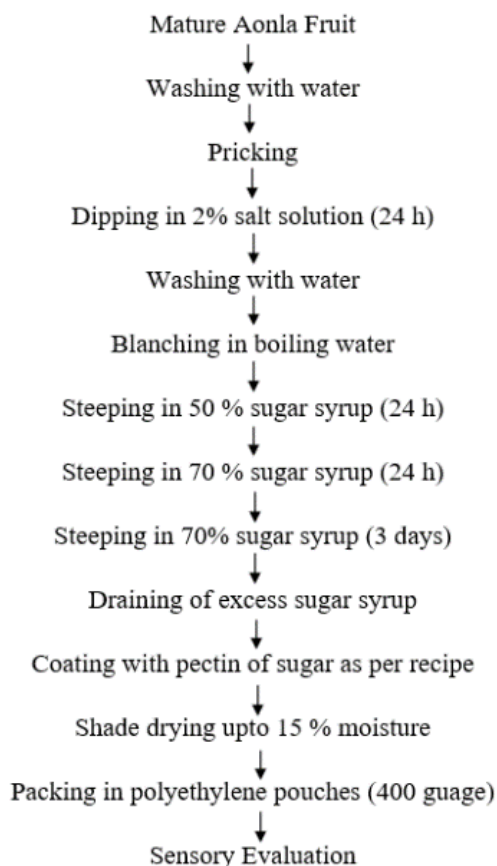


Fig 4: Flowsheet for preparation of Aonla Candy

Table 3: Organoleptic Quality of Candy prepared from Different Methods

Recipes	Methods	Organoleptic Quality	
		Score	Rating
1	Whole fruit with sugar coating	7.6	Liked Moderately
2	Segmented fruit with sugar coating	7.8	Liked Moderately
3	Whole fruit with pectin coating	8.4	Liked Very Much
4	Segmented fruit with pectin	9.0	Liked Extremely
C.D. at 5%		0.4	

Toffee

Aonla fruit toffee was successfully prepared in the present study by mixing 55 percent pulp, 42 percent sugar 2.5 percent butter and 0.5 percent custard powder. Addition of glucose or skim milk powder or both reduced the score of toffee considerably (table 4). Generally fruit toffees are most nutritious than ordinary toffees. The aonla fruit toffee possibly can have additional advantage because of its medicinal properties. Various reports (Bhatt *et al.*, 1982; Singh, 1996 and Roy and Singh, 1979) [2, 7] are available on the preparation of fruit toffees from different fruits but no report aonla fruit toffee is available in literature.

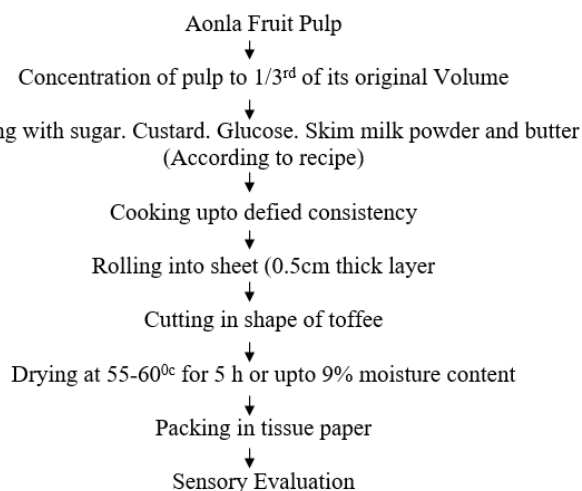


Fig 5: Flowsheet for preparation of Aonla Toffee

Table 4: Organoleptic Quality of toffee prepared from Different Recipes

Recipes	Aonla Pulp (%)	Sugar (%)	Butter (%)	Custard Powder (%)	Glucose (%)	Skim Milk (%)	Organoleptic	
							Score	Rating
1	55	42	2.5	0.5	-	-	8.5	Liked Very Much
2	55	35	2.5	0.5	7.0	-	6.2	Liked Slightly
3	55	35	2.5	-	5.0	2.5	6.4	Liked Slightly
C.D. at 5%							0.2	

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