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## Preparation of Whey Based Indian Goose Berry (Aonla) Beverage

**Avaneesh Kumar Singh, Shanta Peter**

#### Abstract

*Whey Based Indian Goose Berry (Aonla) Beverage* samples were prepared and evaluated for various quality (sensory, chemical and microbial) parameters. The minimum score obtained by sample T<sub>1</sub> (6.78 ± 0.05) and was very closer to T<sub>3</sub>, T<sub>0</sub> and T<sub>1</sub>, they were at par. Sample T<sub>3</sub> was graded as “liked very much”. About the chemical parameters the Fat content in *Whey Based Indian Goose Berry (Aonla) Beverage* sample T<sub>0</sub>, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> differed significantly (P < 0.05). The fat content of *Whey Based Indian Goose Berry (Aonla) Beverage* in T<sub>0</sub> was lowest (0.05%) while it was highest in T<sub>3</sub> (0.07%). The protein content of *Whey Based Indian Goose Berry (Aonla) Beverage* in T<sub>3</sub> was lowest (0.49%) while it was highest in T<sub>3</sub> (0.56%). Ash content in *Whey Based Indian Goose Berry (Aonla) Beverage* sample T<sub>0</sub>, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> differed significantly (P < 0.05). The ash content of *Whey Based Indian Goose Berry (Aonla) Beverage* in T<sub>0</sub> was lowest (0.51%) while it was highest in T<sub>3</sub> (0.52%). The carbohydrate content of *Whey Based Indian Goose Berry (Aonla) Beverage* in T<sub>0</sub> was lowest (14.72%) while it was highest in T<sub>3</sub> (17.27%). The total solid content of *Whey Based Indian Goose Berry (Aonla) Beverage* in T<sub>0</sub> was lowest (15.79%) while it was highest in T<sub>3</sub> (18.54%). The acidity content of *Whey Based Indian Goose Berry (Aonla) Beverage* in T<sub>0</sub> was lowest (0.46%) while it was highest in T<sub>3</sub> (0.87%). Control (T<sub>0</sub>) and sensorily best sample (T<sub>3</sub>) were considered. The SPC was observed more or less same; T<sub>0</sub> (14.4 × 10<sup>3</sup> cfu /g) and T<sub>3</sub> (12.40 × 10<sup>3</sup> cfu /g) The samples under study showed presence of yeast and mould count at very low levels, (3.20 × 10<sup>2</sup> cfu /g) for T<sub>3</sub> and (4.60 × 10<sup>2</sup> cfu /g) for T<sub>0</sub>. Coliforms was nil which is an indicative that means hygienic conditions were followed during production, processing, handling and storage.

**Keywords:** *Whey Beverage, Aonla*

#### Introduction

Whey is a nutritious by- product from cheese, chhana and paneer industry containing valuable nutrients like lactose, proteins, minerals and vitamins etc. which have indispensable value as human food. (Horton, 1995) [3]. Considerable work has been done throughout the world to utilize whey for production of whey protein concentrate (WPC), whey powder, lactose, lactic acid, whey paste etc (Panesar *et al.*, 2007) [6]. According to its average composition whey is approximately 93% water and contains about 50% of total solids present in the milk of which lactose is the main constituent (Beucler *et al.*, 2005) [1].

The conversion of whey into beverages through fermentation or without fermentation is one of the most attractive avenues for the utilization of whey for human consumption. The production of a beverage from whey butter cheese and aonla juice has been shown to have good commercialization potential, uniting the benefits provided by the former with those of latter, including the ingestion of essential amino acids and increasing the vitamin C content, resulting in a product of differentiated nutritive value (Cruz *et al.*, 2009) [2].

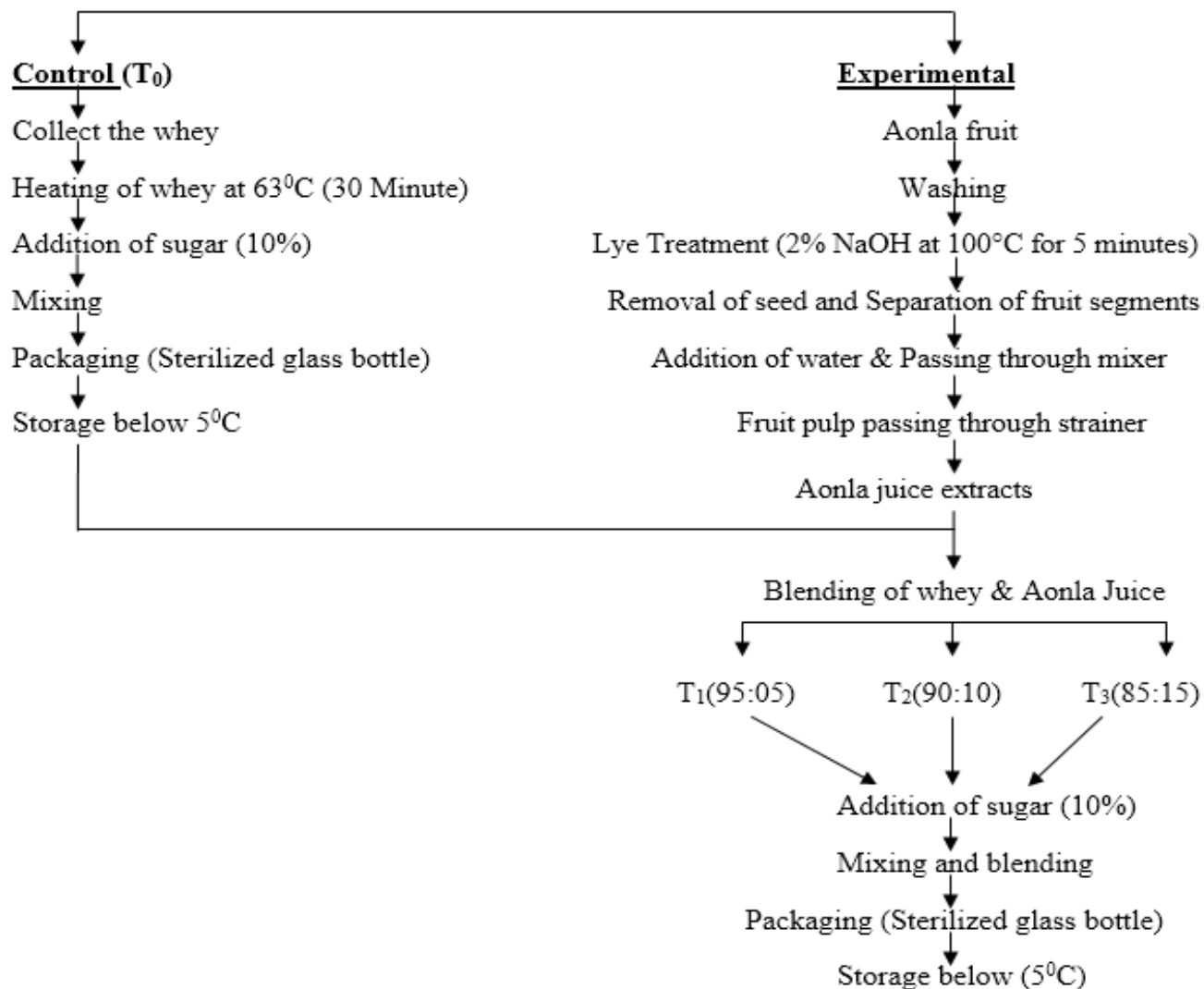
Aonla is known for its medicinal and nutritional properties. It is the richest source of vitamin C among fruits like Barbados cherry or West Indian cherry. (Tripathi *et al.*, 1998) [7]. The aonla (*Emblca officinalis* syn. *Phyllanthus emblica*) or Indian goose berry is an important minor arid zone fruit and a crop of commercial significance. There is growing evidence that the humble aonla berry offers nearly legendary powers in healing and preventing atherosclerosis and related cardiovascular disease (Kim *et al.*, 2005) [4]. Aonla fruit enjoys a special place in Ayurveda, as a nurturing food, that is credited with a number of health benefits (Majeed *et al* 2000) [5].

#### Material and Method

Based on the results of various pre -experimental trials, the experimental trials were planned and conducted. Aonla and sugar at pre-decided levels were incorporated in *whey* for the preparation of *Whey Based Aonla beverage*. Levels of sugar were kept constant for each treatment.

On the basis of different levels of Aonla juice; various lots of *Whey Based Aonla beverage* were prepared and evaluated for

sensory, chemical and microbial quality. Rests of the conditions were maintained uniform.



**Proximate analysis:** Fat content was determined by Soxhlet method as per procedure stated in IS: 1224 (Part – I) 1977. Protein nitrogen content was determined by semi – microkjeldahl’s method described in IS: 1981 (Part – II). This was multiplied by 6.38 to obtain protein percentage. Lactose was determined as per Lane and Eynon method given in IS – 1479 (Part – II) 1961, Ash content was determined by IS: 1479 (Part – II) 1961. Total solids were determined by IS: 1479 (Part – II) 1961. Acidity (% LA) was determined by IS: 1479 (Part – I) 1960. For the chemical analysis of Aonla the percentage of proteins, carbohydrates and ash in Aonla was determined by Ratnavathi CV (2013). For sensory evaluation score card given by Dharam Pal and Gupta (1985) with slight modification (Ashwani, 1992) was used for sensory evaluation of *Whey Based Aonla beverage*. Standard Plate Count (SPC) was determined by adopting standard procedure using Standard Plate Count Agar (SPCA) media as mentioned by Amin (1997). Yeast and Mould Count (YMC) was determined as per procedure described in IS: 5403 (1969) using Potato Dextrose Agar (PDA). Coliform count of *Whey Based Aonla beverage* samples was determined as per procedure described in IS: 5550 (1970) using McConkey’s

agar. Different media like SPCA, PDA, MA, LPA and MRS were prepared as per the procedures explained by Amin (1997).

**Results and Discussion**

**Chemical composition:** The fat content of the *Whey Based Aonla beverage* sample under treatment T<sub>0</sub>, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> was 0.05, 0.05, 0.06 and 0.07, respectively and it differed significantly (P < 0.05) from each other (Table 1). The protein content of *Whey Based Aonla beverage* is differed significantly (P < 0.05) from each other. The ash content of T<sub>0</sub>, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> is 0.51, 0.51, 0.51 and 0.52 per cent, respectively. The ash content in *Whey Based Aonla beverage* is differed significantly (P < 0.05) from each other. The carbohydrate content of T<sub>0</sub>, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> was 14.72, 15.46, 16.50 and 17.27 per cent, respectively and it differed significantly (P > 0.05) from each other. It is observed that the total solid content of T<sub>0</sub>, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> were 15.79, 16.56, 17.62 and 18.54 per cent, respectively and it differed significantly (P > 0.05) from each other. The higher acidity content in T<sub>3</sub> while lower acidity content can observe in T<sub>0</sub> and it differed significantly (P < 0.05) from each other.

**Table 1:** Chemical composition of Whey Based Aonla beverage (per cent)

Constituents (per ml)								
Treatments	Fat	T. S.	Moisture	Acidity	Protein	Carbohydrate	Ash	pH
T <sub>0</sub>	0.05	15.79	84.23	0.46	0.56	14.72	0.51	5.53
T <sub>1</sub>	0.05	16.56	83.06	0.58	0.54	15.46	0.51	5.40
T <sub>2</sub>	0.06	17.62	82.38	0.74	0.52	16.50	0.51	4.81
T <sub>3</sub>	0.07	18.54	81.62	0.87	0.49	17.27	0.52	4.59
S.Ed. (±)								
C.D at 5%	0.01	0.36	0.41	0.02	0.01	0.22	0.01	0.10

**Organoleptic evaluation :** It is noticed that the colour and appearance score of T<sub>0</sub>, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> sample of lassi was 7.92, 6.66, 7.14 and 8.24 percent respectively which differ significantly (P > 0.05) (Table 2). The flavour and taste of T<sub>0</sub>, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> is 7.60, 6.98, 7.24 and 7.88 respectively which differ significantly (P > 0.05). The consistency T<sub>0</sub>, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> of *Whey Based Aonla beverage* were 7.22, 6.84, 7.30 and

7.96, respectively which differ significantly (P > 0.05). The overall acceptability score of T<sub>0</sub>, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> of *Whey Based Aonla beverage* was 7.54, 6.78, 7.14 and 7.88, respectively which differ significantly (P > 0.05). The overall acceptability of Aonla Whey beverage increases as increase in the level of Aonla juice.

**Table 2:** Organoleptic evaluation of Whey Based Aonla beverage

Treatments	Colour & appearance	Flavor & Taste	Consistency	Overall acceptability
T <sub>0</sub>	7.92	7.60	7.22	7.54
T <sub>1</sub>	6.66	6.98	6.84	6.78
T <sub>2</sub>	7.14	7.24	7.30	7.14
T <sub>3</sub>	8.24	7.88	7.96	7.88
S.Ed. (±)	0.13	0.15	0.11	0.10
C.D. at 5%	0.31	0.40	0.36	0.24

**Microbial evaluation of Whey Based Aonla beverage:**

From the present study it was observed that the Standard Plate Count of T<sub>0</sub>, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> is 14.40, 13.80, 13.00 and 12.40 (× 10<sup>3</sup> cfu /g) respectively which differ significantly (P < 0.05) (Table 3). The coli form count in *Whey Based Aonla beverage* treatment T<sub>0</sub>, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> was 0.00, 0.00, 0.00 and 0.00 per gram respectively. It was observed that the yeast and mould count of T<sub>0</sub>, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> was 4.60, 3.80, 3.60 and 3.20 per gram respectively.

**Table 3:** Microbial Analysis of Whey Based Aonla beverage

Treatments	SPC (× 10 <sup>3</sup> cfu /g)	Coliform count / gm	Yeast and mould / gm
T <sub>0</sub>	14.40	0.00	4.60
T <sub>1</sub>	13.80	0.00	3.80
T <sub>2</sub>	13.00	0.00	3.60
T <sub>3</sub>	12.40	0.00	3.20
S.Ed. (±)	0.36	0.00	0.19
C.D at 5% level	1.40	0.00	0.67

**Cost analysis:** There slight variation in cost of all treated *Whey Based Aonla beverage* sample prepared with Aonla. The *Whey Based Aonla beverage* prepared with addition of 15% Aonla having the cost Rs.18.21 per lit (Table 4). Good quality value added *Whey Based Aonla beverage* with more acceptability might be prepared by addition of 15% Aonla.

**Table 4:** Cost Analysis Of Whey Based Aonla Beverage.

Treatments	Whey	Aonla juice	Sugar	Total
T <sub>0</sub>	2.72	0.00	3.63	6.35
T <sub>1</sub>	2.59	4.10	3.63	10.32
T <sub>2</sub>	2.45	8.18	3.63	14.26
T <sub>3</sub>	2.31	12.27	3.63	18.21

**Conclusion**

It may be concluded that good quality, value added *Whey Based Aonla beverage* with more acceptability be prepared by addition of Aonla juice.

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