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# Production of synbiotic lassi using honey, carrot extract and *Aloe vera* extract

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**Abstract**
Lassi is the fermented milk product which is consumed as refreshing drink during summer in India. The lassi was prepared with different prebiotics like Honey at 2.5, 5, 7.5, 10 and 12 per cent, carrot extract at 5, 10, 15 and 20 per cent and *Aloe vera* extract at 5, 10, 15 and 20 per cent levels. The acceptable levels for the production of synbiotic lassi were selected by sensory evaluation with 9 point hedonic scale. It may be concluded that Honey, carrot extract and *Aloe vera* extract at 5, 15, 15 per cent levels, respectively can be sued in the development of synbiotic milk products.

**Keywords:** Lassi, fermented milk product, 9 point hedonic scale, sensory evaluation and prebiotics

## Introduction
India is a country with diverse climatic conditions and food habits resulted in emergence of region specific foods. Fermented products with desired acidity and flavour are prepared by controlled fermentation. Savitri and Bhalla, (2007) [8]. Reported that fermentation improves digestibility, flavour and aroma of food and exerts health promoting benefits through biological enrichment of food substrates with protein, essential amino acids, essential fatty acids, and vitamins.

The Lactic Acid Bacteria (LAB) and their food products produce several health benefits like exclusion of pathogenic microorganisms, elimination of lactose intolerance, food allergy, relief from inflammatory bowel diseases and constipation, amelioration of atherosclerosis, diabetes and colon carcinogenesis, and improvement of the immune system.

Gibson and Roberfroid (1995) [5]. defined synbiotics as "Mixtures of probiotics and prebiotics that beneficially affect the host by improving the survival and implantation of live microbial dietary supplements in the gastrointestinal tract by selectively stimulating the growth and/or by activating the metabolism of one or a limited number of health-promoting bacteria, thus improving host welfare".

Honey contains carbohydrates, water and several amino acids, vitamins, minerals and enzymes and also oligosaccharides. In addition, Bee honey is used in apitherapy for its pro health, antioxidative and antibacterial properties. In food products, honey also provides colour, aroma, browning, texture, improved moisture retention and extended keeping quality.

*Aloe* contains polysaccharides which function like prebiotic and act as a substrate for LAB fermentation (Cuvas-limon *et al.*, 2016) [4]. It has been used for the preparation of probiotic foods (Basannavar *et al.*, 2014) [3]. Al-Madboly *et al.* (2017) [1] demonstrated the synbiotic effect of *Aloe vera* juice on the growth of L. *helveticus* and L. *fermentum in-vitro*.

Carrot is rich in β- carotene, ascorbic acid and tocopherol. It contains 60 – 120 mg carotene per 100g of carrot. It is an important source of dietary carotenoids and natural antioxidants (Sharma *et al.*, 2012) [9]. It has several functional components and significant health promoting properties.

Milk and dairy products have been used in the functional food area and at present, they continue to be the main vehicle for the administration of probiotics and prebiotics through the diet. The development of functional food products containing both probiotics and prebiotics provides supplementation of the bacterial flora in the intestines. The consumption of probiotics stimulates the first-line nonspecific immune response by increasing the macrophage phagocytic activity and provides protective defence against the food antigens and/or pathogenic bacteria in the gut lumen.

The consumer demand for probiotic products has increased nowadays. This is due to growing public awareness of diet related health issues and mounting evidence regarding health benefits of probiotics.

**Materials and methods**

Fresh milk and honey obtained from commercial source and was used for the preparation of the lassi. Fresh *Aloe vera* and carrot was cleaned and the juice was extracted by juice extractor and was used as prebiotic source. Common lassi culture was used for the preparation of lassi.

**Procedure for preparation of lassi**

Milk was standardized to 3 per cent fat and 8.5 per cent SNF and it was preheated to 60 ºC and homogenized. The homogenized milk was pasteurized (80 ºC for 10 minutes) with different levels of Honey (2.5, 5, 7.5, 10 and 12 per cent) carrot and *Aloe vera* extract (5, 10, 15 and 20 per cent) and the milk was cooled to 40 ºC and the starter culture was added at 1 per cent level. This mixture was incubated at 37 ºC for 4 hrs. After that the set curd was blended with 12 per cent sugar syrup which is prepared with 0.8 per cent fresh rose petals as flavoring agent. The prepared lassi was stored at 4 ºC.

**Sensory evaluation**

The parameters for sensory evaluation include Colour and appearance, Flavour, Body and texture (consistency) and Overall acceptability. The quality was evaluated by the panelists on the basis of 9-point hedonic scale, where 9 indicate extremely like and 1 extremely dislike (Amerine *et al.*, 1965) [2].

**Results and discussion**

**Sensory qualities of lassi containing different levels of honey**

The mean (n=6) sensory scores of lassi containing different levels of honey (2.5, 5.0 and 7.5 per cent) are presented in Table 1. Highest mean (n=6) sensory scores were observed at 5 per cent level of incorporation of honey in colour and appearance, flavour, consistency and overall acceptability characteristics compared to other treatments. At 10 per cent level of incorporation curd formation was delayed and at 12 per cent level of addition curd formation was affected. Lowest sensory scores were observed at the level of 2.5 per cent incorporation of honey in colour and appearance, flavour, consistency and overall acceptability characteristics compared to other treatments. Hence, 5 per cent level of addition was found to be good by sensory evaluation. These findings are in agreement with the reports of Sharma *et al.* (2016) [10]. They reported good sensory scores at 5 per cent level of incorporation of honey.

**Table 1:** Sensory qualities of lassi containing different levels of honey

| Levels of Honey (%) | Sensory characteristics | | | |
|---|---|---|---|---|
| | Colour and appearance | Flavour | Body and texture (consistency) | Overall acceptability |
| Control | $8.50^{b} \pm 0.17$ | $8.82^{a} \pm 0.02$ | $8.78^{b} \pm 0.02$ | $8.82^{a} \pm 0.02$ |
| 2.5 | $8.52^{b} \pm 0.14$ | $8.53^{b} \pm 0.12$ | $8.65^{c} \pm 0.09$ | $8.63^{b} \pm 0.08$ |
| 5.0 | $8.94^{a} \pm 0.11$ | $8.85^{a} \pm 0.05$ | $8.85^{a} \pm 0.14$ | $8.85^{a} \pm 0.06$ |
| 7.5 | $8.72^{ab} \pm 0.17$ | $6.50^{c} \pm 0.16$ | $8.61^{c} \pm 0.14$ | $6.75^{c} \pm 0.06$ |

**Sensory qualities of lassi containing different levels of carrot extract**

The mean (n=6) sensory scores of lassi containing different levels carrot extract (5, 10, 15 and 20 per cent) are presented in Table 2. At 15 per cent level of incorporation the sensory quality of the lassi was highest compared to other levels in the sensory characteristics viz. colour and appearance, flavour, consistency and overall acceptability. Sharp carrot flavour was noticed at the 20 per cent level of incorporation which was objectionable. Hence, 15 per cent level of addition was found to be good by sensory evaluation. Srishti *et al.* (2017) [11]. reported a lower level (10 per cent) of inclusion of carrot extract to score higher sensory points. This may be due to variation in the quality of the carrot extract which in turn depends on the variety of carrot and yield of the juice.

**Table 2:** Sensory qualities of lassi containing different levels of carrot extract

| Levels of Carrot Extract (%) | Sensory characteristics | | | |
|---|---|---|---|---|
| | Colour and appearance | Flavour | Body and texture (consistency) | Overall acceptability |
| Control | $8.50^{b} \pm 0.17$ | $8.82^{a} \pm 0.02$ | $8.78^{b} \pm 0.02$ | $8.82^{a} \pm 0.02$ |
| 5 | $8.47^{b} \pm 0.14$ | $7.36^{e} \pm 0.15$ | $8.39^{e} \pm 0.14$ | $7.45^{d} \pm 0.06$ |
| 10 | $8.49^{b} \pm 0.21$ | $7.85^{c} \pm 0.08$ | $8.64^{d} \pm 0.25$ | $7.91^{c} \pm 0.10$ |
| 15 | $8.80^{a} \pm 0.07$ | $8.15^{b} \pm 0.07$ | $8.86^{a} \pm 0.19$ | $8.73^{b} \pm 0.08$ |
| 20 | $8.97^{a} \pm 0.01$ | $7.75^{d} \pm 0.01$ | $8.71^{c} \pm 0.01$ | $7.00^{e} \pm 0.01$ |

**Sensory qualities of lassi containing different levels of *Aloe vera* extract**

The mean (n=6) sensory scores of lassi containing different levels of *Aloe vera* extract (5, 10, 15 and 20 per cent) are presented in Table 3. Incorporation of 15 per cent *Aloe vera* extract in lassi scored higher mean (n=6) sensory points compared to other treatments in the sensory characteristics viz. colour and appearance, flavour, consistency and overall acceptability. The overall acceptability ($8.85 \pm 0.10$) score was higher than that of control lassi ($8.82 \pm 0.02$). At 20 per cent level of incorporation of *Aloe vera* extract gave bland taste with gel like consistency compared to 15 per cent level of incorporation. Hence, 15 per cent level of addition was found to be good by sensory evaluation. The acceptable level (15 per cent) of *Aloe vera* extract is in close agreement with the result of Hussain *et al.* (2015) [7]. Who reported better sensory qualities at 16 per cent level of inclusion of *Aloe vera* in lassi.

**Table 3:** Sensory qualities of lassi containing different levels of *Aloe vera* extract

| Levels of *Aloe vera* Extract (%) | Sensory characteristics | | | |
|---|---|---|---|---|
| | Colour and appearance | Flavour | Body and texture (consistency) | Overall acceptability |
| Control | $8.50^{bc} \pm 0.17$ | $8.82^{a} \pm 0.02$ | $8.78^{a} \pm 0.02$ | $8.82^{b} \pm 0.02$ |
| 5 | $8.36^{c} \pm 0.15$ | $7.47^{d} \pm 0.14$ | $8.15^{d} \pm 0.10$ | $8.39^{d} \pm 0.10$ |
| 10 | $8.64^{b} \pm 0.04$ | $7.74^{c} \pm 0.02$ | $8.35^{c} \pm 0.09$ | $8.51^{c} \pm 0.03$ |
| 15 | $8.82^{a} \pm 0.01$ | $8.75^{b} \pm 0.04$ | $8.68^{b} \pm 0.17$ | $8.85^{a} \pm 0.10$ |
| 20 | $8.52^{bc} \pm 0.01$ | $7.33^{e} \pm 0.01$ | $7.25^{e} \pm 0.01$ | $7.16^{e} \pm 0.01$ |

## Conclusion

Synbiotic lassi with good sensory and microbial qualities could be prepared with prebiotics like honey, carrot extract and *Aloe vera* extract at the levels of 5, 15 and 15, per cent, respectively.

## References


1. Al-madboly L, Kabbash A, El-Aasr M, Yagi A. Symbiotic effect of *aloe vera* juice on the growth of *Lactobacillus fermentum* and L. *helveticus* isolates *in-vitro*. J Gastroenterol. Hepatol Res. 2017; 6:2365-2369.
2. Amerine A, Maynard Pangborm, Marie R, Edward R. Principles of sensory evaluation of food (1st edn). Academic Press., New York, 1965.
3. Basannavar S, Pothuraju R, Sharma RK. Effect of *Aloe vera* (*Aloe barbadensis* Miller) on survivability, extent of proteolysis and ACE inhibition of potential probiotic cultures in fermented milk. J Sci. Food. Agri. 2014; 94:2712-2717.
4. Cuvas-Limon R, Julio BMS, Carlos CEJ, Mario CH, Mussatto SI, Ruth BC. *Aloe vera* and probiotics: A new alternative to synbiotic functional foods. Annual Res. Rev. Biol. 2016; 9:1-11.
5. Gibson GR, Roberfroid B. Dietary modulation of the human colonic microbiota: Updating the concept of prebiotics. J Nutr. 1995; 125:1401-12.
6. Gibson GR, Probert HM, Loo JV, Rastall RA, Roberfroid MB. Dietary modulation of the human colonic microbiota: updating the concept of prebiotics. Nutr. Res. Rev. 2004; 17:259-275.
7. Hussain SA, Patil GR, Yadav V, Singh RRB. Effect of storage on sensory quality, pH, wheying-off and probiotic count of lassi supplemented with *Aloe barbadensis* Miller juice. Indian J Dairy Sci. 2015; 68:105-110.
8. Savitri Bhalla TC. Traditional foods and beverages of Himachal Pradesh, Indian J Traditional Knowledge. 2007; 6(1):17-24.
9. Sharma KD, Karki S, Thakur NS, Attri S. Chemical composition, functional properties and processing of carrot - A review. J Food Sci. Tech. 2012; 49:22-32.
10. Sharma S, Sreeja V, Prajapati JB. Development of synbiotic lassi containing honey: Studies on probiotic viability, product characteristics and shelf life. Indian J Dairy Sci. 2016; 69:148-153.
11. Srishti U, Parimita Prafull K. Preparation of carrot lassi. Pharma Innov. J., 2017; 6(8):302-305.