Review Article

Review on Quality Evaluation of Carbonated Falsa Drink through Microbial Activity

Abstract

Falsa is a small fruit available in summer season. It is known for its sweet and sour acidic taste and cooling effect. This fruit has high antioxidant activity and stupendous nutritional properties. The problem arises when we experience loss of the product owing to its lower shelf life. Falsa is a perishable fruit having a shelf life of 1-2 days only. Growers cannot afford cold storage facilities to store it for longer periods so the fruit has to be sold on a cheaper price or is often wasted. Processing of various fruits has been found fruitful by converting them into valuable products such as jams, jellies and candies. Carbonated drinks are popular for their pleasant fizzy taste and have strong consumer appeal. Falsa also contains variety of antioxidants and vitamins. Certain challenges exist in order to minimize losses because of perishability of falsa. Carbonation has become an important ingredient of sparkling drinks and has grown popular for its pleasant taste. Consuming a beverage containing carbon dioxide produces a pleasing and desired sensation, though the beverage can cause irritation to some group of people. Carbonation is responsible for flavor improvement and refreshing sensation in soft drinks. The carbonation process can be carried out by a carbonator or with addition of dry ice.

Keywords: Carbonated falsa, physiological analysis, quality enhancer, microbial activity

INTRODUCTION

Falsa

Falsa (*Grewia asiatica*) also spelled Phalsa is a small fruit bearing shrub that belongs to family, 'Malvaceae'. It is a summer season fruit that is known for its sweet and sour acidic taste and cooling effect. Falsa fruit is high in vitamins, minerals, and fiber and low in calories and fat (Nandal and Bhardwaj 2014).

In Pakistan, major falsa producing provinces are Sindh and Punjab. It is grown in South Asia and some parts of United States. Yield per plant is 12 kg while yield per acre is 110-250 kg. About 140 species of falsa are grown across the world. However, more than 70 percent falsa is produced by Pakistan, India, Sri Lanka, Nepal and Bangladesh (Tariq *et al.,* 2019). 100g of falsa contains 1.6 g protein, 21.1 g carbohydrates and 0.9 g fat. Other constituents include Vit. C, calcium, sodium, potassium and Vit. B (Nandal and Bhardwaj 2014).

Falsa fruits are harvested when the fruit berries turn from green to red or purple-red. The fruit berries are very soft, gentle and they spoil easily. Falsa fruit is nonlimacteric with a short shelf life. The transportation remoteness and storage duration of falsa is limited; causing a major problem for the use and commercial application of falsa fruit. Moreover, the shelf-life of the fruit is reduced as roadside vendors store it in unhygienic conditions. Ripe falsa is consumed in many ways; falsa berry can be eaten raw, used in sweets and desserts, processed into *chutney*, syrups, jams, ice-cream or in drinks such as; squash, juice, soft drinks and RTS (ready-to-serve) drinks. A falsa based drink, "*falsay ka sharbat*" is a famous drink used in summer season for its taste and cooling effect (Shugar et al., 2021).

Falsa fruit is enjoyable to consume, especially with the addition of salt or in the form of food products such as jams and pies. Falsa and falsa juice are a preferred choice in summer due to its delicious taste. Nevertheless, there are limitations to commercialize for highly competitive or international trade due to its short shelf-life (Lim, 2012).

Consuming fruit berries as part of daily diet provides important bioactive food components which impart dozens of benefits to health. In addition, these components also play role in improvement of respiratory and cardiac functions. Falsa also contains variety of antioxidants and vitamins. Certain challenges exist in order to minimize losses because of perishability of

falsa (Khan et al., 2019).

Flavor improvement in Falsa through carbonation

Carbonation has become an important ingredient of sparkling drinks and has grown popular for its pleasant taste. Consuming a beverage containing carbon dioxide produces a pleasing and desired sensation, though the beverage can cause irritation to some group of people (Descoins *et al.,* 2006). Carbonation is responsible for flavor improvement and refreshing sensation in soft drinks. The carbonation process can be carried out by a carbonator or with addition of dry ice (Cheng *et al.,* 2007).

Falsa is perishable commodity which has a shelf life of 1-2 days. This results in post- harvest losses of the produce. Farmers cannot afford High-Tech facilities or cold storage near their farm/orchard. Carbonation process is cheaper, easy and enhances the shelf life of falsa juice that can be bottled and sold as a value-added product. Carbonation of fruit juices significantly increases the aesthetic value, shelf life and economic value (Kumar *et al.,* 2016).

Carbonated fruit beverages offer more variety of flavors and longer shelf lives of nutrients. They also provide other functional advantages, more edge in safe consumption of drink and are cost-effective as compared to only fruit juices. Products having no CO_2 in their head space are vulnerable to contamination by moulds and certain types of bacterial infection (Abhinav *et al.,* 2015).

Carbonation enhances the organoleptic attributes through its effect on mouthfeel, described as tingling, which imposes a refreshing quality. For their refreshing effect and thirst satisfying attributes, carbonated soft drinks are a much liked choice in young generation but they have poor nutritional profile (Jain, 2019).

If fruit juices are carbonated, the prepared drink contains all the nutritional characteristics along with healthy traits of the fruit. They are liked and enjoyed by youth. Carbonation of apple juice extended its shelf life up to 8 weeks and retained the quality of the product. The process of carbonation extends the shelf life of juices. After carbonation, the carbonated guava drink achieved a shelf-life of 3 months. This shelf-stability was possible at room temperature. There were not any additives in the drink and it had natural fruit juice (Jung *et al.,* 2020).

Carbonated beverages preapared from pineapple juice produced eye catching goods and got excellent feedback. Carbonation contains increased benefits as it has improved the

deliciousness during storage period. Carbonation technology can produce value added beverages from fruit juices which can be commercialized. It can address the issues faced by food industries by minimalizing the food losses due to spoilage. Carbonation can reduce the fruit excess in the market. It can efficiently use nutritious fruits by processing them into fruit soft drinks and preserve their nutritional characteristics for as long as 3 months (Jori *et al.*, 2013).

Antimicrobial and anti-diabetic activity of Falsa

Antimicrobial and anti-diabetic activity of Falsa has been reported by recent advancements. Since ancient times, remedial properties of plants are harnessed for treating various diseases. Occurrence of numerous bioactive compounds in falsa has been revealed by different pharmacological investigations (Shukla *et al.,* 2016).

Carbonated drinks developed from certain varieties of guava fruit received a positive feedback in the form of good sensory points. This indicates that they could be a favorable substitute to other synthetic soft drinks. Some varieties of guava, i.e. BAARI Payara-4 are fit for developing carbonated fruit drinks and can be used as an alternate to other carbonated drinks (Wazed *et al.,* 2021).

There is an increase in demand of carbonated beverages on account of their fizziness. These drinks also have other nourishing and sensory characteristics of the fruit pulp and fruit juice (Kaushal *et al.*, 2004).

Carbonated juices have high aesthetic value and have been found to have longer shelf lives. By adjustment of carbonation and juice concentration, delicious and longer shelf life drinks can be made from guava juice. Carbonated guava drink can be used for transportation of added nutrients to target populations for use in eradicating the nutrient deficiency disorder. Carbonated fruit beverages can help to resolve the problem of food loss by converting excess fruit into valuable products. These drinks can act as a best and nutritious substitute to other soft drinks (Rammiya *et al.*, 2019).

The optimal level of carbonation was 50 psi for 30 seconds for the drink filled in 200 ml glass bottle in production of carbonated fermented dairy beverage. Storage temperature for the prepared drink sample was 7°C and weekly evaluation was carried out to assess the quality on the basis of microbial, chemical and sensory parameters. As fas as shelf stability is concerned, the non-carbonated control beverage samples were found acceptable till a storage of 5 weeks.

The carbonated beverages remained shelf-stable till 12 weeks. There was a negligible increase in titratable acidity. There was a negligible increase in titratable acidity and carbonation had not any substantial effect on pH of carbonated beverage. Development of proteolysis and lipolysis was halted by carbonation process during storage. By microbiological inquiries, yeast and mold growth was found to be inhibited because of presence of desolved CO_2 (Jooyandeh, 2015).

Patil *et al.,* (2011) prepared a carbonated beverage from custard apple. Nutritional analysis revealed that the developed drink was a better source of important nutrients such as protein (0.8%), carbohydrates (13%) and fat (0.19%). This beverage was found to be a better alternative to popular soft drinks. Naturally carbonated plum fruit beverage was prepared using fermentation technique. The beverages had adequate sensory quality and physico-chemical properties at the end of 90th day of storage under refrigerated condition.

Tamarind juice, when processed into tamarind carbonated drink, exhibited a 35 day storage stability with an intact flavor. Fruit juices can be efficiently value added by the carbonation process. Carbonated drinks prepared from will be gainful for consumers attributable to presence of vital nutrients. Moreover, they will become a best substitute to other beverages such as known soft drinks and cola drinks. Value added nutritious beverages can be manufactured as the fruit juice carbonated drinks seem to have a promising potential. These drinks are widely consumable as fresh fruit flavored drinks. Easy, appropriate and cost-effective procedures are used for the development of carbonated drinks (Jadhav *et al.,* 2002).

Conclusion

Falsa is a tiny fruit that is only available in the summer. It is renowned for its cooling effect and acidic, sweet and sour taste. This fruit has outstanding nutritional qualities and significant antioxidant activity. Due to the product's shorter shelf life, an issue occurs when we lose the product. Falsa is a fragile fruit with a short shelf life of just one to two days. Fruit must be sold at a lower price or is frequently discarded because growers cannot afford cold storage facilities to keep it for longer periods of time. Processing different fruits has proven successful in producing useful goods including jams, jellies, and candies. Because of their deliciously effervescent flavour and high commercial appeal, carbonated beverages are very popular. Falsa also includes a range of vitamins and antioxidants. Due to the perishability of falsa, there are some difficulties in minimising losses. Sparkling drinks now often contain carbonation, which has gained popularity for its palatable flavour. Drinking a carbonated beverage results in a

pleasant and desired sensation, however for certain persons, the beverage may irritate them. Soft drinks' enhanced flavours and cooling effect are the result of the carbonation process. A carbonator or the addition of dry ice can be used to perform the carbonation process.

References

Abhinav, T. and A.P. Sonone. 2015. Development of fruit juice blended carbonated Beverages. Int. J. Manag. Bus. Res 2: 185-189.

Cheng, L. H., C. Y. Soh, S. C. Liew and F.F. Teh. 2007. Effects of sonication and carbonation on guava juice quality. Food Chemistry. 104(4): 1396-1401.

Descoins, C., M. Mathlouthi, M. Le-Moual and J. Hennequin. 2006. Carbonation monitoring of beverage in a laboratory scale unit with on-line measurement of dissolved CO_2. Food Chem. 95: 541-553.

Jadhav, H.M., P.M. Kotecha and S.S. Kadam. 2002. Studies on preparation and storage of carbonated beverage from tamarind juice. Beverage and Food World. 28: 28-32.

Jooyandeh, H. 2015. Manufacturing of a novel naturally carbonated fruit beverage. J. Appl. Environ. Biol. Sci. 4: 47-53.

Jori, D., M. Ladole, A. Gore and V. Bhand. 2013. Study on effect of carbonation on storage and stability of pineapple fruit juice. Int. J. Engg. Res. Technol. 2: 1841-1848.

Jung, Y.H., S.J. Park, I. Nurika, S. Suhartini, W.H. Cho and K.D. Moon. 2020. Carbonation of not from concentrate apple juice positively impacts shelf-life. LWT. 134: 110-128.

Jain, A., & De, S. (2019). Processing of beverages by membranes. In *Processing and sustainability of beverages* (pp. 517-560). Woodhead Publishing.

Kaushal, N.K., B.B.L. Kaushal and P.C. Sharma. 2004. Optimization of total soluble solids and carbon dioxide gas pressure for the preparation of carbonated beverages from apple and pear juices. J. Food Sci. Technol. 41: 142-149.

Khan R., W. Asghar, N. Khalid, W. Nazir, M. Farooq, I. Ahmed and A. Syed. 2019. Phalsa (*Grewia asiatica*) fruit berry a promising functional food ingredient: A comprehensive review. J. Berry Res. 9: 3233-3237.

Kumar, D.V., D. Ramasamy and J.J. Joyner. 2016. Study on effect of carbonation on storage and stability of pomegranate fruit juice. J. Nutr. Health Food Engg. 5: 679-683.

Lim, T.K. 2012. *Grewia asiatica*. In T. K. Lim (Ed.), Edible medicinal and non-medicinal

plants (pp. 184–188). Dordrecht, Netherlands: Springer.

Montgomery, D.C. 2017. Design and analysis of experiments. John wiley and sons. pp. 65-66.

Nandal, U., R.L. Bhardwaj. 2014. The role of underutilized fruits in nutritional and economic security of tribals: A review. Critical reviews in food science and nutrition. 54:880-890.

Patil, S.R., S.P. Kurhekar and R.R. Patil. 2011. Study on development of custard apple carbonated beverage. Internat. J. Proc. & Post Harvest Technol. 2: 56-58.

Rammiya, U.S., V. Hema, S. Shanmugasundaram and V.R. Sinija. 2019. Study on physiochemical properties on carbonated guava drink. Int J Chem Stud 7:958-964.

Shugar, D. H., Jacquemart, M., Shean, D., Bhushan, S., Upadhyay, K., Sattar, A., ... & Westoby, M. J. (2021). A massive rock and ice avalanche caused the 2021 disaster at Chamoli, Indian Himalaya. *Science*, *373*(6552), 300-306.

Wazed, M. A., Mozumder, N. H. M. R., & Sarker, M. S. H. (2021). Effect of two stage drying employing fluidized bed drying, tempering followed by fixed bed drying on head rice yield of BRRI Dhan28 rice variety in Bangladesh. *Sustainibility in Food and Agriculture*, *2*(2), 74-78.