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Exploring the potential of dragon fruit (*Hylocereus* spp.): A review of its nutraceutical properties, processing methods and its waste utilization

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Abstract

Dragon fruit (*Hylocereus* spp.), an exotic fruit from the *Cactaceae* family, has attracted considerable attention due to its rich nutraceutical composition, functional properties and diverse health benefits. Native to Central and South America, it is now widely cultivated in tropical and subtropical regions including India, because of its adaptability to arid conditions, early fruiting nature and increasing market demand. Nutritionally, dragon fruit is low in calories and rich in dietary fiber, vitamins, minerals, essential fatty acids and several bioactive compounds such as betalains, polyphenols, flavonoids, tannins, phytosterols and pectin. These constituents contribute to its antioxidant, anti-inflammatory, antimicrobial, anticancer and wound healing activities. However, the fruit is highly perishable, necessitating the development of value added products and preservation techniques. Various processing approaches including the production of beverages, powders, fermented products, dairy based foods, jams, jellies, wines and minimally processed fresh cuts, have been explored to improve shelf life and utilization. In addition, dragon fruit peels and seeds possess significant potential as sources of natural colorants, dietary fiber, pectin, seed oil and other bioactive compounds with applications in food, pharmaceutical and biorefinery industries. This review highlights the nutritional composition, phytochemical constituents, processing technologies, health promoting properties and waste valorization potential of dragon fruit, emphasizing its importance as a functional food and sustainable industrial resource.

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