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Spray Drying: An Innovative and Sustainable Method of Preserving Fruits

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Abstract : Spray drying, an innovative and sustainable preservation method, is increasingly gaining recognition for its potential to enhance food security by extending the shelf life of fruits. This technique involves the atomization of fruit pulp into fine droplets, followed by rapid drying with hot air, resulting in a powdered product that retains much of the original fruit's nutritional value, flavor, and color. By encapsulating sensitive bioactive compounds within a dry matrix, spray drying mitigates nutrient degradation and extends product usability. This technology aligns with sustainability goals by reducing post-harvest losses, minimizing the need for preservatives, and lowering energy consumption compared to conventional drying methods. Furthermore, spray drying enables the use of imperfect or surplus fruits, contributing to waste reduction and providing a continuous supply of nutritious fruit-based ingredients regardless of seasonal variations. The powdered form enhances versatility, allowing incorporation into various food products, thus broadening the scope of fruit utilization. Innovations in spray drying, such as the use of novel carrier agents and optimization of processing parameters, enhance the quality and functionality of the final product. Moreover, the scalability of spray drying makes it suitable for both industrial applications and smaller-scale operations, supporting local economies and food systems. In conclusion, spray drying stands out as a key technology in enhancing food security by ensuring a stable supply of high-quality, nutritious food ingredients while fostering sustainable agricultural practices.

Keywords : spray drying, sustainable, process parameters, carrier agents, fruits
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