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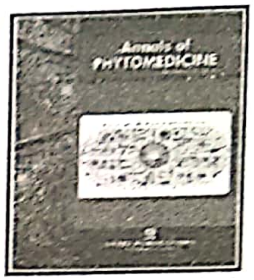
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Emerging food engineering approaches in the development of phytochemical rich functional foods with medicinal relevance

P. Srilatha*◆ and Samreen**

*Department of Food Technology, College of Food Science and Technology, PJT Agricultural University, Rudrur-503188, Nizamabad, Telangana, India

**Department of Food Engineering, College of Food Science and Technology, PJT Agricultural University, Rudrur-503188, Nizamabad, Telangana, India

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Abstract

Research into phytochemical rich functional foods with established therapeutic advantages has intensified due to the rising interest in diets that promote health. Because of their strong antioxidant, anti-inflammatory, antibacterial, and anticancer effects, phytochemicals such polyphenols, flavonoids, carotenoids, and alkaloids are crucial to phytomedicine. However, low bioavailability, instability, and processing related degradation frequently restrict their use in functional meals. Phytochemical extraction, stabilisation, and delivery have been transformed by emerging food engineering technologies such as microwave assisted extraction, ultrasound assisted extraction, pulsed electric field processing, high pressure processing, supercritical fluid extraction, and nanoencapsulation. These methods maintain bioactivity and increase bioaccessibility in addition to increasing extraction yield and efficiency. In order to create functional foods that are rich in phytochemicals, this study critically evaluates current developments in food engineering techniques, emphasising their contribution to the integration of phytomedicine and food science. Future research areas, industrial scalability, challenges, and regulatory issues are also covered. Promising prospects for next generation functional foods with increased phytomedicinal effectiveness are presented by the combination of cutting edge delivery techniques and sustainable technology.

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