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Women's health and dietary intake of polyphenols: Electro-spinning and electro-spraying as innovative approaches in developing of a suitable food vehicle for polyphenols-based functional ingredients

Women and men share similar diseases; however, there are a number of illnesses and injuries that exclusively associated with women, including gynecologic diseases and diseases related to menstruation, menopause and post menopause. These women and girls suffer from high rates of maternal mortality, obstetric fistulas, female genital cutting, pregnancy, menopause, breast cancer, cervical cancer and diseases related with function of reproductive systems such as endometriosis, dysmenorrhea or polycystic ovary syndrome. Also, Menopausal women have an increased risk of developing non-communicable diseases (NCDs), most notably cardiovascular diseases, cancers, respiratory diseases, diabetes, dementia, depression and musculoskeletal disorders due to hormonal dysregulation and the ongoing aging process. Basic researches and epidemiological studies have shown the inverse association between the risk of a wide range of diseases which include gynecologic diseases and diseases related to menstruation, menopause and post menopause and the intake of a diet rich in polyphenols. From a health perspective, tremendous attention has been given to functional foods and nutraceuticals fortified with natural polyphenols due to their good tolerability and effectiveness in the prevention, management and treatment of NCDs in women and improving sexual and reproductive health. Despite their abundance and well-documented physiological effects, there are several hurdles to applications of polyphenols in the food system. The most critical hurdle includes polyphenols' tendency to lose their anti-oxidative properties or bioactive functionalities during food processing, due to their sensitivity to oxygen, temperature, light, gastrointestinal pH and digestive enzymes as well as inclusion of polyphenolics may impart an astringent or bitter taste, or introduce a degree of brown coloring causing serious sensorial impacts on foods. On this basis, interest has increased in understanding the development of new and efficient food vehicles as delivery systems for polyphenols-based functional ingredients. In this context, one approach that could augment the growth of polyphenols-based functional food is the electro-spinning and electro-spraying techniques as the most versatile methods to produce nanoscale fibers or particulates suitable for application in food technology by encapsulation to form nanoscale delivery systems. Electro-spun/electro-sprayed structures can be used as the delivery system in foods for polyphenols to protect them during the processing and storage and transfer these health-promoting components to the target site in the body as well enhance their bioactive functionalities and mask unpleasant taste, such as astringency, of some polyphenols.

Recent Publications

1. Ghorbani M, Aleman R.S. Electro-Spinning and Electro-Spraying as Innovative Approaches in Developing of a Suitable Food Vehicle for Polyphenols-Based Functional Ingredients. In: Zepka L.Q, do Nascimento T.C, Jacob-Lopes E, editors. Bioactive Compounds: Biosynthesis, Characterization and Applications, IntechOpen; 2021.p.169-205. DOI:10.5772/intechopen.98626.
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3. Shahidi F, Senadheera R. Encyclopedia of Food Chemistry: Protein-Phenol Interactions. In: Melton L, Shahidi F, Varelis P. editors. ENCYCLOPEDIA OF FOOD CHEMISTRY. Volume2. Elsevier; 2019.p.532-538.DOI:10.1016/B978-0-08-100596 5.21485-6.

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Biography

Mahmoud Ghorbani is currently Product/Process Development Scientist, as well as the founder of the Partak Food Innovation Group, Esfahan, Iran. In his current position, he has developed understanding and technical skills in relation to product formulation. He completed his B.A in Food Science & Technology at Gorgan University of Agricultural Sciences & Natural Resources, IRAN in 2023. In his current position, he has developed understanding and technical skills in relation to product formulation.

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