Essential oil nano-emulsions and air ions for food preservation and safety

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Abstract (not more than 300 words)

Perishability of raw and processed food materials is a great challenge for agro based food processing industries, to combat which synthetic preservatives are widely used. However, in view of growing health problems associated with synthetic chemicals, there is a great need to replace these with natural antimicrobial agents.

In this regard, utilization of essential oils as an alternative to synthetic antimicrobials/additives has gained considerable interest. However, the antimicrobial effect in food is only achieved with higher concentration of essential oils which may cause undesirable organoleptic impact (Tyagi and Malik, 2010a;c). Hence, further work is required to minimize essential oil concentrations and reduce the sensory effect. Nano-emulsions of essential oils can enhance their functionality. Another approaches could be the use of essential oil in the vapour phase, which is relatively less investigated (Tyagi and Malik, 2011a; 2011b). Evaluation of the antimicrobial properties of essential oil vapours phase has been taken up beyond the year 2000, which entailed the development and design of innovative antimicrobial systems. The concept of integrating upcoming technologies with conventional food preservation methods is also being increasingly explored (Lacroix et al., 2009; Tyagi and Malik, 2012a,b). Similarly, the efficacy of charged air ions as novel antimicrobial agents has been investigated in the last decade.

This lecture describes evaluation of the antimicrobial efficacy of essential oil nano-emulsions and essential oils in vapour phase along with its application potential in combination with another hurdle technology i.e. air ions/UV exposure (physical treatment) for food preservation. This kind of integrated food preservation techniques can be used to treat the food commodities for reducing the food spoiling microbial load at the time of food packaging. The development of slow release formulations of the natural compounds can enhance the shelf life and retain the nutrient quality of the edible materials during the packaging.

Keywords— *Antimicrobial, essential oils, food, nano-emulsions*

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Professional Biography (100-150 words)

Anushree Malik did her Ph.D. from IIT Delhi in the year 2000 and post doc from Utsunomiya University, Japan under JSPS fellowship. She is Professor at Center for Rural Development, Indian Institute of Technology Delhi and her research areas include Food Microbiology, Algal Biofuels, and Biological Pest Control. Her team has won DST-Lockheed Martin India Innovation Growth Program award in 2015 and "Top cited paper award 2009-2013" from Elsevier. She has published more than 110 International Journal research papers, 17 book chapters and filed 3 patents. She is one of the Guest Editors of 'Emerging Technologies for Food Preservation and Safety' published by "Frontiers in Microbiology, section Food Microbiology". She has been active reviewer for over 55 reputed journals published from Elsevier, Springer, and Wiley and also serves on the Editorial Board of several prestigious journals like "The Open Microbiology Journal", Bentham Open; and "Frontiers in Food Microbiology", Switzerland. She has total 4883 citations with h-index of 33 and i-10 index of 72.



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