Volatile Phytochemicals: Potential Role in Food Safety and Preservation

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Editorial

The antimicrobial activity of various volatile phytochemicals has been studied against different food-borne microbes. In some of our studies essential oils were also tested as food additives or antimicrobial agents using, the actual food model systems. No doubt, the essential oils have high efficiency against the food-borne pathogen and spoilage microorganisms in food matrix however, a higher concentration of essential oil is still needed. Unfortunately, this higher dose may imply an organoleptic impact, caused by altering the natural taste of the food by exceeding the acceptable flavor thresholds. Therefore, some alternative approaches are required to minimize essential oil concentrations. Antimicrobial potential of the essential oil in vapour phase was evaluated as an alternative technique beyond the year 2000, which entailed the development of advanced antimicrobial systems. The concept of integrating upcoming technologies with conventional food preservation methods is also being increasingly explored. These studies are concerning about antimicrobial efficacy of essential oils in vapour phase along with its application potential in combination with another hurdle technology including thermal treatment, high pressure, packaging material and air ions for food preservation [1-3].

One of the most widely used methods for screening the antimicrobial potential of essential oils in vapour phase is the disc volatilization test. Alternatively, some studies have used “kill time assays” [4,5] wherein the microbes are exposed to certain concentrations of essential oil vapours in time as well as dose dependent manner and plates are incubated to determine the microbial growth inhibition. Recently, an innovative methodology has been adopted where several plates can be exposed to essential oil vapours at a time in multiple petriplate exposure chambers. This multiple petriplate exposure chambers are also used for the integration of other air disinfection techniques along with natural volatiles. Initially, Prof Nerin group established the vapour phase antimicrobial activity of clove, cinnamon, thyme and oregano oils against a number of bacterial, fungal and yeast strains. These authors also concluded that vapours from other essential oils such as ginger and rosemary are not

Since food matrices are more complex than culture media, customized or ad hoc solutions need to be applied to specific foodstuffs, depending on their natural microbiota, composition, and capacity to absorb candidate antimicrobial agents. The use of essential oils or their volatile compounds in combination with modified atmospheric packaging has been demonstrated for organoleptic, sensory, nutritive and functional properties of food materials. Essential oil can also used as an air disinfectant in a close chamber or in room because of their volatile nature. These natural volatiles can treat large areas/products without requiring direct contacts with surfaces. This quality can make the essential oils suitable for the exposure of perishable harvested/ processed food commodities. It some studies, it is also reported that fruits exposure to eucalyptus/cinnamon oil vapour enrichment improves antimicrobial protection during fresh produce storage and aroma fruit quality-related attributes.

References

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