

Application of food preservatives in food products

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Abstract

Food preservatives such as NaNO₂, which are widely used in human food products, undoubtedly affect, to some extent, human organs and health. For this reason, there is a need to reduce the hazards of these chemical preservatives, by replacing them with safe natural bio preservatives, or adding them to synthetic ones, which provides synergistic and additive effects.

The Citrus genus provides a rich source of such bio-preservatives, in addition to the availability of the genus and the low price of citrus fruit crops. In this study, we identify the most abundant flavonoids in citrus fruits (hesperidin) from the polar extract of mandarin peels (agro-waste) by using spectroscopic techniques, as well as limonene from the non-polar portion using GC techniques. Then, we explore the synergistic and additive effects of hesperidin from total mandarin extract with widely used NaNO₂ to create a chemical preservative in food products. The results are promising and show a significant synergistic and additive activity. The combination of mandarin peel extract with NaNO₂ had synergistic antibacterial activity against *B. cereus*, *Staph. aureus*, *E. coli*, and *P. aeruginosa*, while hesperidin showed a synergistic effect against *B. cereus* and *P. aeruginosa* and an additive effect against *Staph. aureus* and *E. coli*. These results refer to the ability of reducing the concentration of NaNO₂ and replacing it with a safe natural bio-preservative such as hesperidin from total mandarin extract. Moreover, this led to gaining benefits from their biological and nutritive values.