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Assessment of *Citrus medica* and *Cinnamomum zeylanicum* Essential Oils as Biopreservatives Against Spoilage Microbes in Low Alcohol Wine Products

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Abstract

Low alcohol wines represent a new fast-growing sector due to major awareness about serious long-term effects of alcohol consumption, together with consumer's preferences. Since low alcohol products are sensitive to spoilage, the use of natural agents with antimicrobial activity as alternative biopreservatives presents an intriguing case. Thus, the aim of the present study was to investigate possible antimicrobial action of *Citrus medica* and *Cinnamomum zeylanicum* essential oils (EOs) and assess their commercial potential in the wine industry. The main constituents identified by GC/MS were limonene (38.46%) and linalool (35.44%) in *C. medica* EO, whereas trans-cinnamic-aldehyde (63.58%) was the dominant compound in *C. zeylanicum* EO. The antimicrobial properties were assayed and the minimum inhibitory, non-inhibitory and minimum bactericidal concentration values against common wine spoilage microbes were determined using a previously published model. Their efficiency was further validated in low alcohol wine products containing 0.010 (v/v) *C. medica* or 0.010 (v/v) *C. zeylanicum* EOs deliberately inoculated with *Gluconobacter cereinus*, *Oenococcus oeni*, *Pediococcus pentosaceus*, *Dekkera bruxellensis*, *Candida zemplinina*, *Hanseniaspora uvarum*, *Pichia guilliermondii* and *Zygosaccharomyces bailii*, separately, and stored at room temperature. Noticeably, EO supplementation resulted in significant spoilage and microbial growth delay, suggesting that both oils represent effective antimicrobial sources with a high potential in the wine industry.

Keywords: Biopreservatives, essential oils, *Citrus medica*, *Cinnamomum zeylanicum*, wine, low alcohol, spoilage, pathogens

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