Effect of non-thermal processing on the aromatic profile of Cantaloupe melon juice

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Abstract

Consumers demand for fresh-like and nutritious food products have launched research to alternative and milder non-thermal processes, which have gained particular importance in fruit juice segments. Aroma plays a dominant role in flavor and can be considered a key indicator for evaluating juices quality. Ultraviolet-C (UV-C) radiation and ozone-based treatments are alternatives to the conventional thermal pasteurization, avoiding the negative impact of high temperatures on flavor characteristics.
The objective was to apply those treatments to melon (*Cucumis melo* var. *reticulatus*) juice and assess 34 key aroma volatiles (acetate and non-acetate esters, aldehydes, alcohols, and sulfur compounds).
UV-C radiation (13.4 W/m^2) was applied for 5 and 20 minutes (UV_5, UV_{20}), gaseous ozone treatments (~7.0 g/L) for 10, 30 and 60 minutes ($O_{3\text{-}10}$, $O_{3\text{-}30}$, $O_{3\text{-}60}$) and pasteurization (72 ºC) for 15 seconds. Aroma volatiles were evaluated by gas chromatography-mass spectroscopy.
Fresh juice had mainly non-acetate volatiles (70%), alcohols (25%) and acetates (5%). Remaining volatiles were detected as residual traces. Non-acetate volatiles were dramatically reduced after all treatments applied. Alcohols content was detected in considerable amounts after all treatments exposure, higher than in fresh juice. Aldehyde volatiles increased significantly with $O_{3\text{-}30}$ and $O_{3\text{-}60}$ (43% and 65%). Acetates increased 9 times with pasteurization and UV_5, and 7 times with $O_{3\text{-}10}$, and, as the treatment time increased, the values were similar to the ones detected in fresh juice.
Compounds such as ethyl butanoate and ethyl 2-methyl butanoate that are important aroma contributors even in low amounts were reduced to non-detectible threshold, after all treatments applied.