

Abstract

Cultivar-Driven Variations in the Production of Apple Cider Vinegar [†]

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[†] Presented at the 3rd International Electronic Conference on Processes—Green and Sustainable Process Engineering and Process Systems Engineering (ECP 2024), 29–31 May 2024; Available online: <https://sciforum.net/event/ECP2024>.

Keywords: apple cider vinegar; apple; fermentation; monitoring; HPLC

Apple cider vinegar has gained widespread popularity for its numerous health benefits and versatile applications in human consumption. Beyond its distinct organoleptic properties, which render it invaluable in numerous ways, alongside acetic acid, it contains trace amounts of various minerals and numerous biologically active compounds. Many researchers have outlined its positive impact on digestive health, blood sugar regulation, body weight management, and heart health, as well as its antioxidant properties and antimicrobial effects, making it beneficial in detoxification processes and even in certain skin care procedures when diluted and applied topically. Apple vinegar production emerges as a valuable strategy for valorizing apple raw materials, transforming them into a product with diverse applications, health benefits, and a positive impact on sustainability. By integrating apple vinegar into their product portfolio, producers contribute to the economic, environmental, and culinary facets of the apple industry; this approach also addresses the effective utilization of blemished and bruised surplus apples, which otherwise go to waste, concurrently fostering waste reduction and aligning with sustainable practices. This research seeks to explore the lab-scale production of apple vinegar using a traditional batch fermentation process, using different apple cultivars. The fermentation process was monitored by measuring refractive index, pH, conductivity, acidity (via titration with NaOH), and carbohydrate degradation (via high-performance liquid chromatography) at predefined intervals. An empirical mathematical model was developed to enhance process understanding and to potentially serve as a cost-effective tool for controlling the fermentation process.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Not applicable.

Conflicts of Interest: The author declares no conflict of interest.

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Citation: Muntean, E. Cultivar-Driven Variations in the Production of Apple Cider Vinegar. *Proceedings* **2024**, *105*, 33. <https://doi.org/10.3390/proceedings2024105033>

Academic Editor: Dariusz Dziki

Published: 28 May 2024



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