

大氣常壓電漿處理蘋果及其製品之物化分析與品質的影響

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12/02/2020

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一、前言

1. 蘋果汁加工現況
2. 大氣常壓電漿

二、電漿處理蘋果及其製品之物化分析與品質的測定

1. 以電漿處理蘋果之接觸面積對其抑制褐變的影響
2. 電漿不同處理時間對蘋果汁保存品質之探討
3. 以電漿處理不同濃度之蘋果汁對其品質之分析

三、結論

摘要

蘋果加工製成果汁時為抑制褐變性酵素如多酚氧化酶 (Polyphenol oxidase enzyme, PPO) 與過氧化酶 (Peroxidase enzyme, POD)，通常採熱加工方式導致果汁的色澤、風味、營養等流失，進而影響消費者購買意願。蘋果汁與蘋果塊經由介電質放電之電漿 (Dielectric barrier discharge, DBD) 搭配頻率 50 Hz 處理 15 min 後，蘋果汁具有抑制 PPO 和 POD 活性達 50 與 52%，而蘋果塊較厚，導致電漿穿透效率低，僅表面 POD 被電漿活失活。同時蘋果塊經電漿處理後，其水份會解離出高濃度的 $\cdot\text{OH}$ 自由基，反而增加其 POD 活性 607%。另外，蘋果汁經由大氣常壓噴射電漿 (Atmospheric pressure plasma jet, APPJ) 電壓 10.5 kV 處理 5 min 後，其 PPO 活性降低約 75%，並於儲存期間其 pH 值變化不超過 0.05、混濁度降低 60%，且多酚化合物含量與 DPPH 自由基消除能力分別增加 66 和 19%。最後使用 12 °Brix 蘋果汁經 APPJ 電漿處理 30 min 後其酵母菌數減少 5.60 個 log 值，亮度提升 12%，並可維持蘋果汁酸度、糖度及揮發性風味物的效果。電漿應用於食品非熱加工有極大的發展潛力，並可搭配不同電漿參數來製作出更符合消費者購買意願的產品。

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