

康普茶發酵期間微生物菌群及物化特性之變化

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摘要

傳統康普茶是紅茶外加蔗糖，接種細菌酵母菌共生菌群 (Symbiotic colony of bacteria and yeast, SCOBY) 進行發酵得到的微甜微酸氣泡飲料。其微生物主要可分為酵母菌、醋酸菌及少量乳酸菌。目前，康普茶因其潛在有益健康的特性被廣泛於家庭內手工生產。然而複雜的微生物組成、生物活性波動幾乎讓最終產品的質量不可控，使康普茶於商業大量生產上受到限制。本報告目的在於利用次世代基因定序觀察發酵過程中樣品之微生物菌群種類及數量變化、風味化合物含量及物化特性，藉由觀察康普茶於發酵過程中微生物與化合物變化，期望能作為康普茶於商業標準化生產之可行性參考。次世代基因定序結果顯示康普茶不同來源的康普茶有不同的微生物相，於本篇整理之文獻中主要真菌為 *Zygosaccharomyces* 或 *Saccharomyces*；細菌主要為 *Acetobacter* spp.、*Gluconacetobactor* spp.、*Komagataeibacter* spp. 等。物化特性結果顯示隨著發酵時間延長，pH 值下降，總滴定酸度上升，PCA 指出總還原糖與總滴定酸度呈負相關；綠原酸與咖啡因呈負相關。相關係數熱地圖顯示 *Komagataeibacter* 存在與乙醇和兒茶素呈正相關 ($p < 0.05$)；*Zygosaccharomyces* 對所有化學變量無顯著性相關 ($p > 0.05$)，但與 *Malassezia*、*Rhodotorula* 和其他真菌存在競爭關係。風味化合物變化方面，發酵初期化合物主要為普洱茶的醛類，之後主要揮發性化合物為醇與酸，至發酵終了酸類為康普茶主要揮發性成分佔 57.62%，其中含量多的酸前五分別為醋酸、檸檬酸、丁酸、琥珀酸和 L-乳酸。利用簡化的合成菌群替代傳統康普茶啟動液，結果顯示總酚和總類黃酮含量最高落於發酵第八天，分別為 13.8 mg/L 及 2.5 mg/L。高於過去文獻中對傳統康普茶總酚及總類黃酮的含量：1.5–2.3 和 0.12–0.14 mg/L。感官品評結果顯示合成菌群康普茶之多數感官與整體品質和傳統康普茶差異不大，在酸味上弱一些，可能是因為 SMC 康普茶醋酸含量較少。這可能表示透過調整添加菌株及比例有機會改善康普茶品質不一的狀況，然而商業生產上的擴大發酵並未被討論到，且目前仍然沒有最好的配方被確定，因此必須有更多研究以證實其可行性。

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