

INTISARI

Whey fermentasi diproduksi menggunakan probiotik *Lactiplantibacillus plantarum* subsp. *plantarum* Dad-13 baik sebagai *starter* tunggal maupun campuran dengan kultur lokal atau komersial. Penelitian ini bertujuan untuk mengevaluasi metabolit ekstraseluler, senyawa volatil, dan aktivitas antioksidan yang dihasilkan selama fermentasi whey. Whey keju yang diperoleh dari industri pengolahan susu difermentasi pada 37°C selama 24 jam. Jumlah sel, pH, dan keasaman tertitrasi ditentukan sebelum dan setelah fermentasi. Whey fermentasi selanjutnya dianalisis untuk aktivitas antioksidan, metabolit ekstraseluler, dan profil senyawa volatil. Hasil menunjukkan bahwa populasi bakteri asam laktat meningkat sebesar 2-3 siklus log, mencapai tingkat probiotik sebesar 8,74 log CFU/mL, disertai penurunan pH menjadi 4,61-4,18 dan peningkatan keasaman tertitrasi menjadi 0,50-0,796%. Whey yang difermentasi dengan *Lactiplantibacillus plantarum* subsp. *plantarum* Dad-13 menunjukkan aktivitas antioksidan lebih tinggi dibanding whey yang difermentasi dengan kultur *starter* komersial. Senyawa volatil, seperti asam dan ester yang berkontribusi pada rasa produk fermentasi meningkat secara signifikan selama fermentasi whey pada semua kultur *starter*. Selain itu, beberapa metabolit fungsional, termasuk γ -aminobutyric acid (GABA) dan asetilkolin, dihasilkan selama fermentasi. Temuan ini menunjukkan bahwa fermentasi whey menggunakan strain probiotik *Lactiplantibacillus plantarum* subsp. *plantarum* Dad-13 tidak hanya menghasilkan minuman probiotik tetapi juga menunjukkan potensi fungsional karena metabolit bioaktif yang dihasilkan selama fermentasi.

Kata kunci: aktivitas antioksidan, whey terfermentasi, probiotik, senyawa volatil, GABA

ABSTRACT

Fermented whey was produced using probiotic *Lactiplantibacillus plantarum* subsp. *plantarum* Dad-13 either as a single or in combination with a local or a commercial culture. This study aimed to evaluate extracellular metabolites, volatile compounds, and antioxidant activity produced during whey fermentation. Cheese whey obtained from a dairy processing industry was fermented at 37°C for 24 h. Total lactic acid bacteria (LAB) and probiotic viable counts, as well as pH and titratable acidity, were determined before and after fermentation. The fermented whey was further analyzed for antioxidant activity, extracellular metabolites, and volatile compound profiles. The results demonstrated that lactic acid bacteria and probiotic populations increased by 2–3 log cycles, reaching the maximum of 8.97 and 8.74 log CFU/mL for LAB and probiotic counts respectively. This increase was accompanied by a decrease in pH to 4.61–4.18 and an increase in titratable acidity to 0.50–0.796%. Whey fermented with *Lactiplantibacillus plantarum* subsp. *plantarum* Dad-13 exhibited higher antioxidant activity than whey fermented with commercial *starter* cultures. Volatile compounds, such as acids and esters that contribute to fermented dairy flavour, increased significantly during whey fermentation across all *starter* cultures. Furthermore, several functional metabolites, including γ -aminobutyric acid (GABA) and acetylcholine, were produced during fermentation. These findings indicated that whey fermentation using the probiotic strain *Lactiplantibacillus plantarum* subsp. *plantarum* Dad-13 did not only produced a probiotic beverage but also demonstrated functional potential due to the bioactive metabolites generated during fermentation.

Keywords: antioxidant activity, fermented whey, probiotic, volatile compounds, GABA