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## Performance of microbial transglutaminase and buttermilk powder on functional properties of free-fat set yoghurt

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ree-fat yoghurt manufactured from skim milk treated with transglutaminase (TG; 1 Ug-1milk protein) and buttermilk powder (BMP; 1% and 2%); either individually or in combination, was investigated. For comparison, the full-fat and free-fat variants without TG or BMP addition were also studied. The results reveal that TG did not interfered with the pH reduction during fermentation progress, while BMP addition had fairly accelerated the pH drop during incubation time. Although TG treatment or BMP addition has significantly (P<0.05) improved the yoghurt gel strength by means of improving the water holding capacity functionality, the free-fat yoghurts made from TG-treated milk in combination with BMP addition obtained the highest values which were similar to that of full-fat control yoghurt. Furthermore, addition of BMP enhanced the reactivity of TG as indicated by the extended and excessive appearance of high molecular weight protein polymers bands in electrophoreses patterns. This result was confirmed by scanning electron microscope (SEM) analysis as a more compact and dense structure accompanied by tortuous clusters of protein aggregates were observed within micrographs of free-fat yoghurt made with combination of TG and BMP. Addition of TG or BMP individually had a marked affirmative impact on free-fat gel network, represented in a denser and more homogeneous systematic protein aggregate network characterised by a finer-meshed network. It is worthwhile to state that this impact was more pronounced within BMP addition (either 1% or 2%) than for TG treatment. Free-fat yoghurts of individually BMP addition exhibited the most desirable organoleptic attributes as indicated by the assessors and were similar to the full-fat yoghurt perception, whereas, the combined TG-BMP treatments received fairly criticized scores due to its firmer and crumbly mouth-feel. Overall, addition of TG or BMP appears to be a valuable alternative in free-fat yoghurt production, and BMP can be worthy considered as a source of extra protein level, which in-turn offers a promising option to develop innovative functional free-fat yoghurt.

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