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## The Tenderisation of Shin Beef Using a Citrus Juice Marinade

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### Abstract

The effectiveness of organic acids (acetic, citric, lactic) and a citrus juice marinade as tenderising agents in shin beef muscle was investigated. At 0.2 M, citric acid was more effective as a tenderising agent than acetic or lactic acid. Immersion of shin beef strips in citric acid (0–0.05 M) showed that a significant tenderising effect was obtained above a concentration of 0.013 M. When shin beef strips were immersed in the citrus juice marinade (31% orange juice, 31% lemon juice, 38% distilled water) mean pH decreased from 5.7 to 3.1 and mean sample weight increased by ~65%. The mean Warner–Bratzler shear force value decreased from 178 to 44 N cm<sup>-2</sup> following marination while mean sensory analysis scores for tenderness and juiciness increased following marination. A mean total collagen content of 1.4 g/100 g was recorded in shin beef of which 9% was soluble in unmarinated samples and 29% was soluble in marinated samples. The results indicated that the tenderisation of beef samples using a citrus juice marinade could be attributed to marinade uptake by muscle proteins and also to solubilisation of collagen.