



Thesis Abstract

Pure and Crude Papain and Bromelain as Carabeef Tenderizers

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Three studies were conducted to determine the cooking values, sensory qualities, and tenderness of loin muscles from eleven female carabaos of mixed breeds with an average age of 11 yrs old and body weight of 466 kg.

In study 1, the carabeef was injected with either 0.1g/kg or 0.3g/kg of pure papain or bromelain solutions to determine cooking and shear force values and either 0.01g/kg or 0.03g/kg of pure papain or bromelain solutions for the sensory quality determination. Crude papain and bromelain extracted from papaya and pineapple, respectively, were used in study 2. The crude papain or bromelain and their mixture were injected into the meat at the rate of 10% of the fresh weight. In study 3, the carabeef was injected with either 0.1g/kg or 0.3g/kg of pure papain or bromelain solutions and either crude papain or bromelain extracts or their mixture to study the histological changes of muscle fiber.

Cooking loss, cooking recovery and shear force value (lbs/in²) were significantly ($P < 0.05$) affected by pure and crude papain and bromelain treatments. The shear force values were reduced by as much as 38% to 63% in the enzyme-treated carabeef compared to the control. There was a 13.42% to 37.96% improvement in the tenderness score of carabeef treated with the enzymes.

An inverse relationship between the shear force value and the tenderness score were observed. An equations was developed to predict tenderness score (y) as the shear force value is given (x). The simple linear regression model developed is: $y = 7.38 - 2.54x$.

The muscle fiber treated with the pure and crude enzymes under the Scanning Electron Microscopy (SEM) showed partly or completely degraded connective tissues and fragmented myofibrils.

The results of the three studies show that either pure or crude papain or bromelain were both very effective as meat tenderizers. Furthermore, carabeef treated with these enzymes were all acceptable to the sensory panel.