

TASTE AND RHEOLOGICAL QUALITIES OF PORTION BEEF CUTS AS AFFECTED BY COOKING METHOD

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Introduction

Beef noodle, a common nosh combined by beef and noodles is part of life and culture for us. Taipei Beef Noodle festival was held for past two years in order to promote business opportunities and also to refresh the impression of traditional fine food for all consumers. However, studies related to beef noodle are still insufficient. More recent research has demonstrated muscles of the beef forequarter to be extremely variable in palatability (Johnson *et al.*, 1988). Tenderness has been cited as the most significant factor affecting consumer satisfaction (Savell *et al.*, 1987, 1989; Smith *et al.*, 1992). Therefore, the four different parts of meat (intercostals, fore-shank, knuckle and oyster blade) and two cooking methods (braising and stewing) was studied the affects on the taste quality by sensory evaluation and rheological shear value detection.

Materials and methods

- A. Materials: Beef (from Australia、purchased from Kepper international corporation) intercostals(intercosales externi et Interni), fore-shank(Flexor/Eetersor), oyster blade(triceps brachii (long head), infraspinatus), knuckle(Vastus lateralis). Four parts of beef for the experiment are from Australia which are chopped into 5×5×3cm cube and boiled for 5 minutes then discard the dregs. Chopped and sliced ingredients such as onion, carrot, red pepper, garlic, ginger, shallot and hot been sauce et al., are cooked with beef. Four parts of beef (intercostals, fore-shank, knuckle and oyster blade) are chopped and cooked with the ingredients. The cooking method of braising or stewing were used. Two measurements were detected as follow.
- B. Method: Shear value was measured by rheological equipment (SMS-TA.XT2i、England) with probe of Warner-Bratzler Blade (HDP/BS). Speed : 4.2 cm/sec. Measurement and data are collected for statistical analysis by Obuz *et al.* (2004). Ten trained faculties and students from Chinese Culture University participated this sensory evaluation. The 9-point hedonic scale test was used for evaluation. Each sample chopped into 3×3×1cm cube was tested for 3 times.
- C. Statistical analysis: Data was analyzed using one-way ANOVA procedure of SAS (SAS, 9.0) for differences among 4 portions cuts and two cooking methods. Means were compared for significant differences within groups by the Duncan's test.

Results and Discussion

Braised intercostals showed the highest overall score 7.23 among four different parts of beef. The flowery flavor parts for panelist are oyster blade and fore-shank. Knuckle received the lowest overall score 4.97. In stewed group, oyster blade was highest 7.17. Knuckle received the lowest overall score 4.60 which is significant. The overall acceptability for stewed beef did not significantly differ among groups. The results indicate that intercostals are the most suitable for braising but knuckle is not. Intercostals, fore-shank, and oyster blade are all suitable for stewing (Table. 1).

The shear value of the most favor items, are braised and stewed intercostals are 6182.15g and 6629.50g respectively. These data are located between fore-shank (4059.42g, 3778.09g) and knuckle (12196.11g, 13403.33g). In addition, all means in the tenderness、juiciness、flavor、color、overall parts of row compared with two cooked method for each portion cut are not significantly different($p>0.05$) (Figure 1). The reason of better in tenderness for the fore shank and intercostals than that of knuckle could be due to that the previous two parts have more collagen especially in 2.5 hours wet cooking methods of braised and stewed. The less connective tissue of knuckle, however, is suggested better for dry heating in order to have good quality. This result is similar to that Obuza, *et al.*, (2003) indicated the changes in meat tenderness with cooking result from alterations in connective tissue and myofibrillar proteins. The heat solubilized collagen (connective tissue) will improve the tenderness, but proteins denatured will results in toughening. In the mean time, Caine *et al.* (2003) also showed the WBS had negative correlation with amount of perceptible connective tissue.

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Table 1. Taste qualities of the four different parts of meat cooked with braising and stewing method.

Portion cuts	Trait									
	tenderness		juiciness		flavor		color		overall	
	cooked method									
	braising	stewing	braising	stewing	braising	stewing	braising	stewing	braising	stewing
intercostals	7.47 ^a	6.67 ^a	7.00 ^a	6.73 ^a	7.00 ^a	6.8 ^a	6.63 ^a	7.07 ^a	7.23 ^a	7.17 ^a
fore shank	5.87 ^c	6.80 ^a	5.77 ^b	6.60 ^a	5.90 ^b	6.10 ^a	6.77 ^a	6.57 ^{ab}	6.03 ^b	6.70 ^a
knuckle	5.07 ^d	4.30 ^b	5.03 ^c	4.43 ^b	5.40 ^b	4.63 ^b	5.77 ^b	5.57 ^c	4.97 ^c	4.60 ^b
oyster blade	6.63 ^b	6.73 ^a	6.53 ^a	6.50 ^a	6.73 ^a	6.67 ^a	6.80 ^a	6.43 ^b	6.80 ^a	6.63 ^a

abcd Means in the same column followed by the different superscripts are significantly different ($p < 0.05$).

All means in the tenderness, juiciness, flavor, color, overall parts of row compared with two cooked method for each portion cut are not significantly different ($p > 0.05$).

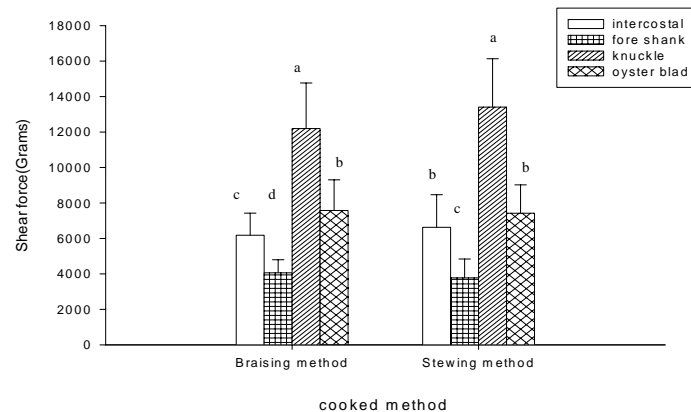


Figure 1. Shear force of four different parts of meat and two cooked method.

abcd Bars of the same cooking method with different letters among four parts' meat are significantly different ($p < 0.05$). All shear value for the same portion cut at the different cooked method are not significantly different

Conclusions

The results indicated that intercostals are the most suitable ingredients for braising. Intercostals, fore shank, and oyster blade are all suitable for stewing. The braising and stewing method both are well accepted by the consumers. The shear value of intercostals are 6182.15g and 6629.50g respectively for both cooking method.

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