# Comparing the water holding capacity of pork *Biceps femoris*, Longissimus lumborum and Triceps brachii using different methods

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**Objectives:** Determining the water holding capacity (WHC) of different pig muscles is important for yield and eating quality. Yet methods for measuring WHC often vary in precision. This study aims to compare and evaluate the suitability of different methods for measuring WHC of three pig muscles.

**Materials and Methods:** *Biceps femoris* (BF), *Longissimus lumborum* (LL) and *Triceps brachii* (TB) muscles were collected from 10 carcases at 24-48 h post-slaughter. WHC methods investigated include Honikel-drip, EZ-drip, purge, FPweight (FP, filter paper), cooking-loss, press-weight and press-area. Honikel-drip method (Honikel, 1998) required a sample suspended by a plastic mesh in a container whereas EZ-drip (Rasmussen & Andersson, 1996) required a sample container consisting of a sealable cup and an elon- gated tube in which the loss of fluid was collected. Samples from both methods were stored at -0.5°C for 48 h and the weight difference of samples was measured. FP-weight (Kauffman et al., 1986) required a filter paper disc to absorb the moisture on the cut surface of a sample that was exposed to air for 10-15 min and then the weight difference in the filter paper was measured. Purge refers to the weight loss of sample stored in a vacuum package after 12 days storage at -0.5°C, whereas cooking-loss measured the weight loss of sample after cooking to the internal temperature of 71°C. Press-weight and press-area (Grau & Hamm, 1957) in- volved 25 N force applied to a sample for 30 s and fluid released from sample was absorbed by a filter paper. Press-weight refers to the weight difference of filter paper whereas press-area refers to the wet area of filter paper after the force application. The data was analysed by one-way ANOVA with muscle as treatment and batch as blocking factor.

**Results and Discussion:** The results showed that the muscles (BF, LL and TB) differed ($P < 0.05$) in WHC for all methods except for the press-area, demonstrating the press-area method did not have enough sensitivity to detect the WHC differences between muscles. For the methods applied to raw meat, the measurements from Honikel-drip showed that LL had the highest WHC value, BF was intermediate, and TB was the lowest (5.39%, 3.53%, 1.32% respectively; SED = 0.531; $P < 0.001$) and there was a similar pat- tern for EZ-drip (6.30%, 3.70%, 1.60% respectively; SED = 0.701; $P < 0.001$). Whereas for purge, FP-weight and press-weight, TB also had the lowest fluid loss relative to BF and LL (purge: 5.26%, 6.61%, 6.80% respectively, SED = 0.604, $P < 0.05$; FP-weight: 20.89 mg, 37.87 mg, 37.22 mg respectively, SED = 5.681, $P < 0.05$; press-weight: 0.23 g, 0.26 g, 0.36 g, SED = 0.042, $P < 0.05$). Interestingly, the cooking-loss method showed the opposite results such that TB had lower WHC than BF and LL (33.28%, 29.10%, 27.58% respectively, SED = 0.967, $P < 0.001$), suggesting TB was more susceptible to lose water under thermal force. In addition, the correlation matrix showed that Honikel-drip, EZ-drip, purge, FP-weight and press-weight were highly correlated ($r = 0.60$-$0.90$; $P < 0.001$ for all). Press-area had lower correlations with other WHC measurements ($r = 0.32$- $0.55$; $P < 0.05$ for all). However, cooking-loss, the only WHC method applied to cooked meat, was not correlated to any other WHC measurements ($P >$ 0.05 for all). Hence, the cooking-loss should not be compared with other methods applied to raw muscles.

**Conclusions: :** Overall, this study demonstrated the marked difference of WHC on three pig muscles in both raw and cooked state and the variations between different WHC methods and their suitability for determining WHC in raw and cooked muscles.

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**Key words:** Water holding capacity, Method, Fluid loss, Meat quality, Correlation