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USING GARLIC OLEORESIN TO MODIFY THE FLAVOUR OF PORK - FROM THE PERSPECTIVE OF SINGAPORE AND NEW ZEALAND CONSUMERS

Leong J^{1,2}, Purchas RW², Morel PCH², Wilkinson BHP²

¹Singapore Polytechnic, School of Chemical and Life Sciences, 500, Dover Road, Singapore 139651, Singapore Polytechnic

²Massey University, Institute of Food, Nutrition and Human Health, PN 452, Private Bag 11 222, Palmerston North, New Zealand

Sensory quality is an important consideration when Singapore consumers purchase pork. They often associate non-Indonesian pork with the presence of an unpleasant off-flavour described as a mutton-like flavour. Some evidence indicates that the intensity of undesirable flavours in meat can be reduced by herbs and spices. The current experiments assessed the possibility of reducing mutton flavour in pork and improving its acceptability by adding garlic oleoresin. The threshold level for aroma of garlic oleoresin when added to rice bran oil or minced pork was determined. For cooked pork mince the threshold for garlic taste was also assessed, along with levels of mutton aroma and taste, and acceptability. Singapore and New Zealand panellists were used.

The concentration at which aroma of garlic oleoresin could be detected by Singaporean (n=50) and New Zealand (n=49) consumers in rice-bran oil, and in either raw or cooked pork mince (n=30 for Singaporean consumers and n=50 for New Zealand consumers) was assessed using a threshold test protocol. Most panellists in Singapore (80%) and New Zealand (75%) could detect garlic aroma in rice bran oil at a concentration at 75 ppm. Increased garlic oleoresin concentration in rice bran oil had a positive influence on garlic aroma intensity (p<0.05) for Singapore and New Zealand panellists, and also on garlic aroma hedonic scores for Singapore consumers only (p<0.05). For cooked pork mince, panellists detected significant differences in garlic (p<0.0001) and mutton (p<0.0001) aroma intensity with increasing levels of garlic oleoresin (0 to 175 ppm), but the degree of liking of garlic aroma did not change significantly. A garlic oleoresin concentration of 100 ppm in pork mince significantly increased the intensity of garlic aroma and reduced the mutton aroma in raw and cooked pork samples. To significantly reduce mutton taste in pork mince, a garlic oleoresin concentration of 125 ppm was needed. Increases in the intensity of garlic aroma and taste were associated with increases in acceptability of cooked-mince garlic taste to a greater extent for Singapore panellists than New Zealand panellists. It is concluded that undesirable mutton-like flavour notes in pork mince may be reduced by adding garlic oleoresin.

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GROWTH RESPONSES OF LACTATING FIRST-PARITY DAIRY COWS TO CANOLA AND LUPIN SUPPLEMENTATION

Chiu YF¹, Jones D², Nichols P³, Malau-Aduli AEO¹

¹University of Tasmania, Hobart, Australia

²Willowdene Dairy Farm, Hamilton, Tasmania, Australia

³CSIRO Marine and Atmospheric Research, Hobart, Tasmania, Australia

The effect of supplementing young, first-parity dairy heifers in mid-lactation with canola meal and cracked lupins on growth traits was investigated. The objective was to evaluate body condition scores (BCS), liveweight (LWT) and average daily gain (ADG) responses in purebred Holstein-Friesian and Holstein-Friesian x Jersey crossbreds and to ascertain variation due to breed, supplement and feeding level. A 2 x 2 x 2 balanced factorial experimental design representing 2 breeds, 2 supplements and 2 feeding levels (1 or 2 kg/cow/day) was utilized in randomly allocating fifty (10 unsupplemented control and

40 supplemented) cows to treatment groups after balancing for LWT, BCS and days in milk. All cows had *ad libitum* access to ryegrass pasture and barley and had a 3-week adjustment period to the supplements. The feeding trial lasted for 12 weeks commencing from October 2008 and ending in February 2009. LWT and BCS measurements were taken monthly. Average daily gain was computed and all data statistically analysed using mixed models procedure in SAS. Our results demonstrated that Holstein-Friesian cows gained 10kg more LWT than Holstein-Friesian x Jersey crossbreds and 20kg more than the unsupplemented cows at the end of the experiment. In all breeds, liveweight increased from 352kg in October, reached a peak in January and began to decline in February. BCS followed a similar pattern rising from an initial score of 2.5 to 3.5 in all breeds with the Holstein-Friesian in better condition than the crosses and control group. In contrast to LWT, ADG declined from an initial 0.6kg/day in October to 0.0kg/d in February in Holstein-Friesian while the unsupplemented cows lost weight as the feeding trial progressed. It was clearly demonstrated that the highest responses in ADG and LWT were in cows fed canola at 1kg/cow/day closely followed by 2kg/cow/day of lupins. In conclusion, supplementing mid-lactation dairy cows with canola elicits a better LWT and ADG response than lupins. Also, supplementing at 1kg/cow/day is cheaper and triggers the same response as 2kg/cow/day. Supplementation would be beneficial in maintaining liveweight and good body condition for better conception rates in young breeding cows.

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MILK YIELD OF HOLSTEIN-FRIESIAN AND JERSEY X HOLSTEIN-FRIESIAN COWS SUPPLEMENTED WITH CANOLA MEAL AND CRACKED LUPINS

Malau-Aduli AEO¹, Chiu YF¹, Jones D², Nichols PA³

¹University of Tasmania, Hobart, Australia

²Willowdene Dairy Farm, Hamilton, Tasmania, Australia

³CSIRO Marine and Atmospheric Research, Hobart, Tasmania, Australia

Milk yield is a key selection trait in dairy cows. During the course of lactation, milk yield follows a typical curvilinear pattern characterized by an initial increase immediately after calving, a rise to peak before an eventual decline. Cows in mid-lactation are typically in the decline phase and would require supplementation to ensure persistency in milk yield, particularly during summer when pasture availability is limited. This study evaluated the milk yield responses of purebred and crossbred dairy cows to two levels (1 or 2 kg/cow/day) of canola meal or cracked lupins supplementation in a pasture-based production system. Fifty Holstein-Friesian (HF) and Jersey x Holstein-Friesian (JHF) dairy cows (10 unsupplemented control and 40 supplemented) were randomly assigned to treatment groups after balancing for initial milk yield, BCS and days in milk (mean initial milk yield, body weight and body condition scores were 122.5 ± 12.1 litres/d, 352.6 ± 31 kg, and 2.5 respectively). A 2 x 2 x 2 balanced factorial experimental design representing 2 breeds, 2 supplements and 2 feeding levels was utilized. All cows had *ad libitum* access to the basal diet of barley and ryegrass while supplemented cows had three weeks of adjustment before the 12 weeks of feeding trial commenced. All cows were milked twice daily and milk yield individually recorded automatically at milking. Data were tested for significance by fitting the fixed effects of breed, supplement, feeding level and their first order interactions using mixed model procedures in SAS with cow and days in milk as random effects. Overall differences between treatment means were declared significant at P<0.05. Milk yield at all times was significantly higher in supplemented than unsupplemented cows with the rate of decline in milk yield faster in unsupplemented cows. For ten consecutive weeks, supplementing with lupins elicited a better milk yield response than with canola but breed differences between purebred and crossbred cows were not significant (P>0.26).