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Sustaining poultry production with alternative protein sources

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Background:

Chicken-meat and eggs are reliable sources of high-quality protein – Australians consume 47.8 kg of chicken-meat and 247 eggs per person annually. Typically, soybean meal (SBM) is the principal protein source in poultry diets, representing about 60% of the total 21% crude protein in a standard broiler diet. The continued dependence of the Australian chicken-meat industry on imported SBM as its principal protein source is not economical nor sustainable. Therefore, there is an urgent need to identify alternative protein sources to secure sustainable chicken-meat and egg supply by radically reducing or even eliminating imported SBM in poultry diets.

Challenges and opportunities:

Reducing dietary crude protein by 2.8 percentage units enabled a 29.2% reduction in SBM inclusion in broiler diets, without compromising growth performance; however, further CP reductions depressed performance (Chrystal *et al.* 2021). Hence, moderate dietary CP reduction coupled with inclusions of local, alternative protein-rich feedstuffs could permit a complete replacement of soybean meal. Canola meal is strong candidate because it is readily available. However, canola meal is an inferior source of protein/amino acids for broiler chickens in comparison to SBM and the extent of this inferiority is variable and dependent on processing methods. In practice, canola meal is incorporated into most broiler diets, but inclusion levels are often limited to 100-150 g/kg due to the presence of anti-nutritional factors including fibre, oligosaccharides, phenolic substances, glucosinolates and phytate, coupled with relatively high phytate:protein ratios.

Substituting SBM with canola meal in broiler diets has been the subject of numerous papers and the outcomes are not consistent, which probably reflects inherent variability in canola and differences in processing methods. Toghyani *et al.* (2015) reported different seed conditioning temperatures and scree torques in expeller canola meals influenced amino acid digestibility. Moreover, Australia represents a distinct case because our standard feed grain bases differ from most other countries (wheat vs maize) and consequently, the challenges to manage diet interactions necessary for solutions are distinct. A recent broiler feeding study under Australian conditions demonstrated that a 15% canola meal inclusion in 19% CP broiler diets completely replaced SBM without compromising growth performance. Encouragingly, future research is required to identify more opportunity for utilising canola or rapeseed meals, refining processing methods, evaluating canola seed, meal and protein concentrate in wheat-based diets under antibiotic-free conditions.

References:

Chrystal, PV, Greenhalgh, S, McInerney, BV, McQuade, LR, Akter, Y, Dorigam, JCD, Selle, PH, Liu, SY (2021). Maize-based diets are more conducive to crude protein reductions than wheat-based diets for broiler chickens. *Animal Feed Science and Technology* 275, 114867

Toghyani, M, Rodgers, N, Iji, PA, Swick, RA (2015). Standardized ileal amino acid digestibility of expeller-extracted canola meal subjected to different processing conditions for starter and grower broiler chickens. *Poultry Science* 94, 992-1002.