BIogenic AMINES IN MEAT MEALS

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Biogenic amines are found at low concentrations in all cells and are required for normal metabolic functions (Bryden et al., 1996). In processed meat meals high concentrations of biogenic amines may be present due to the action of microorganisms containing enzymes which decarboxylate free amino acids to their corresponding amines. The concentrations of the amines produced are dependent upon the availability of free amino acids, the presence of decarboxylase enzymes and conditions favouring bacterial growth (Halasz et al., 1994). High concentrations of biogenic amines in rendered products are an indication of raw material spoilage. The raw material is vulnerable to bacterial decay when left at high temperatures for long periods prior to rendering. Research studies have shown that biogenic amines in animal protein meals may be responsible for toxic effects in poultry. Enlarged proventriculus, gizzard lining erosion, undigested feed in excreta and pathological changes in the gut mucosa, kidneys and liver have been observed in birds fed diets containing high concentrations of biogenic amines (Dudley-Cash, 1993). Limited information is available concerning the concentrations of biogenic amines in Australian meat meals and the concentrations that are considered safe for consumption by poultry.

In a study commissioned by the Meat Research Council 81 samples of meat meals collected from rendering plants throughout Australia were analysed to determine the concentrations of putrescine, cadaverine and histamine. The amines were determined by HPLC using a C18 reverse phase column and UV detection. Samples analysed contained concentrations of putrescine, cadaverine and histamine ranging from 2-35, 6-329 and 6-58 mg/kg, respectively. In a second study companies provided weekly samples to establish the extent of batch to batch variation. In one case total amine values varied from 83 to 558 mg/kg over a six week period.

Results from the investigation have shown that meat meals can contain varying concentrations of putrescine, cadaverine and histamine which may indicate microbial degradation of the raw material prior to processing. These variable biogenic amine concentrations may also reflect the temperatures at which the raw material was kept, the composition of raw products, rendering temperatures and the time delay between slaughter and rendering. Further studies are required to determine the acceptable concentrations of biogenic amines in animal protein meals used as poultry feeds.


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