Physical and chemical contaminants in grains used in livestock feeds

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Abstract

This review focuses on 3 main sources of contamination of Australian grains used in livestock feeds, namely chemical residues, moulds and mycotoxins, and weed seeds, including natural toxins such as pyrrolizidine alkaloids. By evaluating the risk to livestock from chemical contaminants (pre-emergent herbicides, selective herbicides, fungicides, insecticides used during growth phases and at pre-harvest, and post harvest insecticides) and the influence of chemical contaminants on livestock production efficiency and grain nutritional quality, the relative priorities for residue management strategies can be established. The chemicals with the highest priority for inclusion in a residue management strategy include bifenthrin (synthetic pyrethroid), chlorpyrifos-methyl (organophosphate), deltamethrin (synthetic pyrethroid), endosulfan (organochlorine), and fenitrothion (organophosphate). It also appears that the Australian maximum residue limit standards do not meet the needs of the livestock industries for effective management of residues in animal feeds, and consequently, a revised approach is required. The amount of research and literature available on the effects of mould and mycotoxin contamination of grain on livestock production, and techniques available for the measurement of moulds and mycotoxins, far exceeds the potential risk these contaminants pose to the livestock industries in Australia. In addition, the effects of moulds and mycotoxins are rarely widespread, with many accounts in the literature referring to a small number of animals on individual enterprises. The actual economic impact of moulds and mycotoxin contamination is also difficult to assess due to a lack of systematic surveys and varying livestock production responses to the presence of these compounds. Finally, weed seeds and the toxic components of weed seeds are still prevalent contaminants of Australian grains used in livestock feeds, and are responsible for significant livestock losses, but there is a lack of screening methods for qualitative or quantitative identification of these contaminants and a lack of uniform standards for use of contaminated grain.

Full Text