

## Chapter 13

# Feed Safety and Other Possible Contaminants in DDGS

## Introduction

Feed safety has a significant impact on our global food safety system. Feed contamination affects the entire food chain and costs millions of dollars in lost revenue and increased costs. Furthermore, it creates fear and panic among consumers, reduces the amount of food available for consumption and consumer trust in the food system. Illness, death and potential future health risks can also occur and because we now live in a global economy, use of contaminated feed can have a global impact. Feed and food safety systems and monitoring are continually improving in many countries. While the risk of hazardous contaminants in U.S. DDGS is extremely low, the U.S. has recently adopted the most rigorous feed safety regulations (including DDGS production) ever in order to further minimize the risk of food safety risks for consumers.

## U.S. Food Safety Modernization Act

In January, 2012, the Food Safety Modernization Act was signed into law in the U.S. This was the first significant update and expansion of the U.S. Food and Drug Administration's (FDA) food and feed safety regulatory powers in nearly 70 years (Brew and Toeniskoetter, 2012). Although feed production facilities (including ethanol plants) in the U.S. have been required to be registered with the FDA since 2002, this new law provides the FDA greater authority to revoke a facility's registration due to food or feed safety reasons. This new law also prohibits shipping food or feed by interstate commerce without a current registration. This means that the FDA can force stoppage of sales, and even order a mandatory recall, if it finds significant food or feed safety violations. Enactment of this new law will provide even greater insurance and confidence that U.S. DDGS will meet the most strict feed safety requirements in the world.

While this law has not been implemented, it requires ethanol plants manufacturing corn co-products (i.e. DDGS) to develop and implement a Hazard Analysis and Critical Control Point (HACCP) plan. It is expected that the FDA will release the details of this rule by June 2012. In general, the rule will require feed manufacturers to evaluate known or potential feed safety hazards, identify and implement preventative control procedures, monitor those procedures, take corrective actions when they are not working, and periodically verify that the overall system is working effectively. There will likely be a requirement of written documentation of these feed safety production procedures, and ethanol plants will be inspected by the FDA for compliance. Expected required monitoring in ethanol plants include testing incoming grains and DDGS for mycotoxins, testing DDGS for antibiotic residues and potential microbial contamination such as E coli and Salmonella, use of pest control programs and good manufacturing practices. Antibiotic residues (**Chapter 9**), mycotoxins (**Chapter 10**), sulfur (**Chapter 12**), and the risk of E. coli O157:H7 shedding in cattle fed DDGS (**Chapter 16**) are discussed in detail in other chapters of this Handbook. It is also likely that a product recall plan will be required and controls to demonstrate that unapproved food or feed additives are not found in the final co-products.

The Food Safety Modernization Act requires the FDA to inspect regulated feed production facilities on a more frequent basis, which has not been commonly performed in ethanol facilities in the past. All ethanol facilities must be inspected by 2018, and at least once every 5 years thereafter. During inspections, records showing HACCP compliance and test results will be reviewed. As a result, higher feed safety standards are being implemented in the production of U.S. DDGS. This chapter briefly discusses a few other feed contaminants and what is currently known about their risk in DDGS.

## Salmonella

No data are available nor regulations for DDGS. There has been a long-term scientific debate regarding the feasibility and likely efficacy of enforcing a Salmonella negative standard for animal feeds to reduce the incidence of human salmonellosis (Davies et al., 2004). It is difficult to assess the impact of reducing Salmonella contamination in animal feeds on the risk of human foodborne salmonellosis. Factors that may attenuate or negate the impact of regulatory interventions in commercial feed include:

- Widespread use of on-farm feed mixing
- Incomplete decontamination of feed during processing
- Post-processing feed contamination at the feed mill
- Contamination during feed transport or on-farm storage
- Numerous non-feed sources of Salmonella
- High risk of post-farm infection in lairage
- Post-harvest sources of Salmonella contamination

## Dioxins

No data are available nor regulations for DDGS. Dioxins are a group of chemicals representing over 210 different compounds and are ubiquitous to the environment. Only 17 are of toxicological concern and are not produced intentionally. Therefore, they can't be simply prohibited. Dioxins are formed as a by-product of chemical processes and are insoluble in water and soluble in fat. Since dioxins are not biodegradable, they can accumulate in the food chain. Maximum limits have been established for citrus pulp and kaolinitic clay. Fish oil and fish meal are the most heavily contaminated feedstuffs. Animal fat may contain significant but lower levels. However, cereals and seeds, milk by-products, and meat and bone meal are less important sources of dioxin.

## Genetically Modified Corn (GM)

Unlike the U.S., several countries have concerns about the safety of genetically modified (GM) crops, and as a result, legally prohibit or restrict production or imports of some, if not all GMO grains and grain co-products. This restriction continues to be controversial, particularly due to record high feed ingredient prices and limited supplies of available feedstuffs for animal production in many countries around the world. USDA's 2011 Acreage Report shows that biotech corn varieties were planted on 88% of U.S. corn acres in 2011. Stacked genes accounted for 49%, herbicide resistant traits accounted for 23%, and insect resistant traits represented 16% of the 88% of U.S. corn acres. It is not known, but assumed that the same

proportion (88%) of corn processed for ethanol and distillers grains production contained biotech traits. There is a substantial amount of scientific evidence that GMO crops are safe. The Council for Biotechnology Information has published a statement indicating that “The Food and Drug Administration (FDA) has determined that biotech foods and crops are as safe as their non-biotech counterparts. The American Medical Association, the American Dietetic Association, and the U.S. National Academy of Sciences have also declared biotech foods safe for human and animal consumption. In addition, since being introduced to U.S. markets in 1996, not a single person or animal has become sick from eating biotech foods. Other international groups that have concluded biotech foods and crops are safe are The United Nations Food and Agriculture Organization, the World Health Organization, the International Council for Science, the French Food Agency, and the British Medical Association. The European Food Safety Authority (EFSA) has also found several biotech varieties to be safe for human and animal consumption. Related links for detailed analysis of the safety of GM crops in the food chain are as follows:

Position of the American Dietetic Association: Agricultural and Food Biotechnology

<http://download.journals.elsevierhealth.com/pdfs/journals/0002-8223/PIIS0002822305021097.pdf>

World Health Organization: Modern food biotechnology, human health and development: an evidence-based study

[http://www.who.int/foodsafety/publications/biotech/biotech\\_en.pdf](http://www.who.int/foodsafety/publications/biotech/biotech_en.pdf)

United Nations: Effects on human health and the environment

<http://www.fao.org/newsroom/en/news/2004/41714/index.html>

National Academy of Sciences: Safety of Genetically Engineered Foods

[http://books.nap.edu/catalog/10977.html?onpi\\_newsdoc07272004](http://books.nap.edu/catalog/10977.html?onpi_newsdoc07272004)

## References

Brew, S. and S. Toeniskoetter. 2012. FDA Has No Jurisdiction Here – Or Does It? Ethanol Producer Magazine, April, 2012, p. 20.

Davies, P.R., H.S. Hurd, J.A. Funk, P.J. Fedorka-Cray, and F.T. Jones. 2004. Review: The role of contaminated feed in the epidemiology and control of Salmonella enteric in pork production. Foodborne Pathogens and Disease 1:202-215.