UTILIZATION OF COTTONSEED WITH LOW LEVELS OF (-)-GOSSYPOL AS A FEED FOR CHICKENS

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Abstract

Because of the presence of gossypol, cottonseed is underutilized as a feed for non-ruminants such as chickens. However, gossypol occurs in two forms referred to as (+)- and (-)-gossypol; the latter is significantly more toxic than the former. Recent research indicates that cottonseed with low levels of (-)-gossypol, the toxic form, can be safely fed to chickens. We are currently developing plants that have a low percentage of (-)-gossypol (~6%). To understand the disposition of gossypol in chicken tissues, we have initiated a study to determine the amount of gossypol in different animal tissues in chickens fed cottonseed. We introduced 20% of either a commercial or a low (-)-gossypol cottonseed into the feed of one week-old chickens and held them on this diet for three weeks; the birds were returned to a normal diet after this time and euthanized after seven weeks. Tissue samples were collected during this period and analyzed for total gossypol and (+)- and (-)-gossypol. We found that (+)-gossypol levels were higher than (-)-gossypol. However, once cottonseed was removed from the diet, the levels of total gossypol diminish rapidly. This study, which was designed to challenge chickens with very high levels of gossypol, indicates that there is the potential to incorporate cottonseed meal into the diets of chickens at low levels. If successful, the feed for broilers represents a very large market for cottonseed that could consume the entire U.S. cottonseed production.