

IMPLICATIONS OF ULTRA-LOW GOSSYPOL COTTONSEED

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Abstract

Historically, cottonseed has not been a viable source of protein for any animals other than those with mature rumens due to gossypol. Consequently, approximately 70% of the cottonseed produced in the U.S. is fed to the dairy industry, with the other 30% sent to cottonseed oil mills for processing into oil, hulls, and meal. Gossypol is a natural toxin the plant uses for defense against insect predation. The gossypol-pigment glands can be visually seen primarily in the leaves and cottonseed kernel. Even though a natural genetic mutant, not containing the gossypol-pigment, was discovered in the 1950's by S.C. McMichael, recent work from a researcher at Texas A&M University resulted in a genetically modified organism (GMO) where gossypol was suppressed in the cottonseed kernel but remained throughout the plant. This GMO, known as event TAM66274, is commonly referred to as Ultra-Low Gossypol Cottonseed (ULGCS). Conversations surrounding ULGCS seemed to be mired in conflicting ideas and opinions about its availability, impact on fiber quality and yield, and perceived value. This work focused on addressing the most common concerns, questions and issues encountered by the authors regarding ULGCS. The concerns, questions and issues addressed were:

1. Natural defense of the plant is compromised.
2. ULGCS not available for use – Intellectual Property issues
3. Not approved/ Time to Market –APHIS/FDA
4. If ULGCS technology is so good why aren't seed companies putting it into their seed?
5. ULGCS technology hurts yield and is only for use in conventional cottonseed
6. Cross-contamination
7. ULGCS will negatively impact the value of existing cottonseed/other vegetable proteins.
8. Gossypol still remains so doesn't that prevent using for human consumption?

Responses to the items listed above were summarized as:

1. The natural defense of the plant is not compromised, sometimes individuals are confusing the natural mutant and subsequent work by McMichael and others with ULGCS.
2. Cotton Incorporated has exclusive rights for licensing and sublicensing of the technology. Conventional varieties will be in the field on an experimental basis in 2019.
3. Anticipated deregulation and FDA approval by December, 2018. Currently, there is a Federal Register notice (APHIS) requesting deregulation with the comment period open until February 5, 2018.
4. Current market structure would indicate the primary beneficiary as oil mills since the mills need to 1) either gain more value for the products produced, or 2) reduce processing costs, this technology would require less caustic in processing crude cottonseed oil to Prime Bleachable Summer Yellow (PBSY). Also, the current market structure would not add value at the producer level until new markets are establish for ULGCS.
5. Twelve studies, over a three year period, across four geographical locations has shown the technology does not negatively impact fiber properties, fiber yield, and/or oil and protein content of the seed.
6. The material would need to be handled in the same manner as seed cotton is handled at cotton gins processing both organic and conventional cotton. ULGCS would not be a problem in conventional cottonseed but conventional would need to stay separated from ULGCS.
7. An economic impact study is needed and would help provide additional data. The authors are not aware of economic models where increasing your customer base results in a negative economic impact.
8. No, the amount of gossypol reduced in ULGCS could allow for a significantly more cottonseed to be used as a protein source in markets previously not accessible such as aquaculture and consumer snacks/food.