

## Genetics of Gossypol Content and Its Racemic Forms

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Our goal is to develop elite lines with low total gossypol levels in the seed using conventional genetic techniques. There are a number of ways to reduce seed gossypol, including mechanical processes to remove gossypol from cottonseed products. However, these treatments add cost to the products and reduce the nutritional value of the resulting cottonseed meal. Another strategy has been to eliminate the gossypol containing glands, but these cultivars were susceptible to pests and were not commercially successful. The development of semi-glanded lines with 0.3% total seed gossypol represents another step forward in the development of low seed gossypol cultivars, but further improvements are possible by exploiting the considerable natural variation for total seed gossypol content within the *Gossypium hirsutum* and *G. barbadense* species. Our evaluations of progeny from crosses between high (1.8%) and low (0.9%) parents, indicate that total gossypol content in cotton seed appears to be simply inherited, with only a few genes having major effects. Gossypol exists in two isomeric forms designated plus (+) and minus (-) and *Gossypium* species produce both forms in varying proportions. Gossypols toxicity appears to be dependent upon the isomeric form with the (-) type being more toxic. The ratio of (+) to (-) gossypol in seeds is variable among species and cultivars. Our project has identified three lines with >85% (+) gossypol that will flower and produce seed in Mississippi. In addition, three photoperiod sensitive lines [95% (+)] are being converted. Preliminary genetic evaluation indicates that the inheritance of (+) and (-) gossypol enantiomers may be controlled by as few as two genes.