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Estrogenic and Antiestrogenic Activity of Legumes and Other Plants Containing Phytoestrogens

Stephen M. Boué¹, Thomas E. Wiese², Carol H. Carter-Wienjtes¹
and Thomas E. Cleveland¹

¹Southern Regional Research Center, USDA, New Orleans, LA 70124

²College of Pharmacy, Xavier University of Louisiana, New Orleans, LA 70118

Email: sboue@nola.srrc.usda.gov, Telephone: 504-286-4346, Fax: 504-286-4419

Phytoestrogens include a wide variety of plant products with weak estrogenic activity discovered after isoflavones were found to be responsible for livestock infertility. Since this discovery, more than 300 plants have been reported to cause estrogenic responses in animals, and several efforts have been undertaken to identify phytoestrogens in animal and human foods. However, phytoestrogens have recently been found to be beneficial to human health, and may even prevent certain diseases. The main legume attracting much attention recently is the soybean, which contains high concentrations of the isoflavonoids daidzein and genistein, however other legumes contain flavonoids and other phytoestrogenic components. Phytoestrogens have been divided into the hormone-like bisphenolic phytoestrogens, the flavonoids and isoflavonoids, the coumestans (coumestrol), and the lignans.

Several studies have determined the estrogenic and antiestrogenic activity of individual flavonoids, however little data exists on the estrogenic and antiestrogenic activity of legume extracts. In this report several legumes were analyzed for both estrogenic and antiestrogenic activity. Estrogenic activity was determined for each extract at a concentration of 500 µg/mL using a MCF-7 breast cancer cell proliferation assay. Antiestrogenic activity was monitored using the phytoestrogenic extracts of each legume combined with 1×10^{-11} M 17β -estradiol. The ability of each legume to inhibit the cell proliferation effects of 17β -estradiol was compared. This method was applied to more than 15 widely consumed legumes and several other plant extracts containing phytoestrogens. Of the extracts analyzed, the estrogenic ranking was soybean > green bean > alfalfa sprout > mung sprout > chick pea. Extracts derived from sunflower seed and green split pea displayed high levels of antiestrogenic activity when compared to the other legumes in this study.