

PHYTOESTROGENS

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OTHER CLASSES OF PHYTOESTROGENS

Although not common dietary components, several other compounds with estrogenic activity are consumed by humans in herbal remedies. These include isoflavonoids and chalcone (isoliquiritigenin) from licorice root (discussed above). Rhubarb contains the phenylbutanone glucoside lindleyin, which binds to ER α and may be responsible for the biological effects of rhubarb extracts (184). Deoxymiroestrol is a potent phytoestrogen from the “rejuvenating” folk medicine Kwao Keur produced in Thailand from *Pueraria mirifica* (27). Ginseng contains several bioactive triterpenoid compounds, among which the glycoside ginsenoside stimulates proliferation of human breast cancer cell lines in an ER-dependent manner, and can activate ER element reporter gene constructs in transfected HeLa cells (26). The corresponding aglycone exhibited no significant activity. Extracts from *Polygonum*, *Cassia*, *Aloe*, and *Rheum* species enhance cell proliferation in estrogen-sensitive human breast cancer cell lines (128), and this is due to the

activity of anthraquinones. Emodin and 2,6-dihydroxyanthraquinone were among the most potent, and also inhibited 17 β -estradiol binding to human ER α and ER β (128).