Introduction

- Estrogen dependent breast cancer risk continues to rise post menopause.1
- Increased estrogen production in the breast through the enhanced aromatase activity, fueled by inflammation, is implicated.2, 3
- Concerted disruption of these pathways could be protective against breast cancer.
- Popular botanicals used for menopausal symptom relief such as hops and three licorice species (GG, GU, GG) and their bioactive compounds might have chemopreventive effects.4, 5

Objective

To evaluate hops, three species of licorice, and their bioactive compounds for their breast cancer chemoprevention potential through the inhibition/suppression of aromatase and lowering inflammation, leading to locally reduced estrogen exposure.

Results

A) hops and licorice extracts, B) hops compounds: 8-prenylnaringenin (8-PN), 6-prenylnaringenin (6-PN), xanthohumol (XH). C) licorice compounds: liquiritigenin (LigF), 8-prenylapigenin (8-PA), licochalcone A (LicA), isoliquiritigenin (LigC). Aromatase supersomes were incubated with treatments for 40 min at 37 °C. Formation of a fluorescent metabolite was measured at Ex/Em of 409 nm/530 nm. Data represents mean ± SD of at least three independent measurements.

Conclusions

- Phytoestrogens from hops and licorice species are potent aromatase inhibitors.
- Phytoestrogens bind the aromatase binding pocket similar to the non-steroidal aromatase inhibitor, letrozole.
- Hops and its phytoestrogen 8-PN suppress aromatase mRNA expression in breast microstructures of menopausal women.
- Hops and licorice extracts suppress inflammatory response through NF-κB, in MCF-7 cells.
- These observations suggest that hops, licorice, and their bioactive compounds might have chemoprevention effects through limiting estrogen production and inflammation in the breast. Future RNA profiling studies are warranted.

Figure 1. Hops and licorice extracts and their bioactive compounds inhibit aromatase.

Figure 2. Phytoestrogens bind to aromatase like letrozole.

Figure 3. Hops its phytoestrogen 8-PN suppress aromatase expression in human breast microstructures.

Figure 4. Hops and licorice extracts suppress inflammatory response in breast cancer cells.