**OBJECTIVE**

To determine the relationships of the concentrations and yields of isoflavones, oil, and protein with seed yield of soybean simultaneously across a wide variety of production environments.

---

**RESULTS AND DISCUSSION**

**Oil, Protein, and Isoflavone Concentrations**

- **Isoflavones**
  - Yield levels of individual and total isoflavones increased significantly as seed yield rating increased from low up to very high level (%). The increases were 203%, 104%, 151%, and 169% for daidzein, glycitein, genistein, and total isoflavone yields, respectively.
  - Use R values for these regression equations were probably due to the fact that only a single seed (yield) was used in these analyses. There is likely to be other factors contributing to the changes in these seed quality components.

- **Protein**
  - Concentrations of dalzein, glycitein, genistein, and total isoflavone were all positively and linearly related with yield (Fig. 6). The isoflavone concentration increases were much larger than the oil concentration increment when seed yield increased by 1.1 Mg ha⁻¹.
  - One R² values for these regression equations were probably due to the fact that only a single seed (yield) was used in these analyses.

**Oil, Protein, and Isoflavone Yields**

- Although seed oil concentration was negatively and linearly related to seed yield when the data were combined across locations and years (Fig. 5), this decrease was quite small (about 1.4%) when seed yield increased by over 1.1 Mg ha⁻¹.
  - The relationship between protein concentration and seed yield was not significant (Fig. 5).
  - Concentrations of dalzein, glycitein, genistein, and total isoflavone were all positively and linearly related with yield (Fig. 6). The isoflavone concentration increases were much larger than the oil concentration increment when seed yield increased by 1.1 Mg ha⁻¹.
  - Use R² values for these regression equations were probably due to the fact that only a single seed (yield) was used in these analyses.

---

**CONCLUSIONS**

- Oil concentration is considerably decreased very slowly, and protein concentration remained almost constant, as soybean yield increases.
- Seed concentrations and yields of individual and total isoflavones, and yields of oil and protein, were all positively related to seed yield.
- Genistein was the most variable, and glycitein was the most stable isoflavone component.
- Our results suggest that even when soybean farmers plant cultivars that were not selected based on having high isoflavone concentration (i.e., low isoflavone concentrations for the pedigrees are influenced by yield level, high soybean seed oil concentration, and high isoflavone concentration, respectively), they can be accompanied by high seed isoalvone concentration.

---

**ACKNOWLEDGMENTS**

Research was supported by Purdue Research Foundation, Agricultural Adaptation Council of Ontario, Ontario Soybean Growers’ Marketing Board, Potash and Phosphate Institute of Canada, and Ontario Ministry of Agriculture, Food, and Rural Affairs.

---

**REFERENCES**


Hasler, D. M. 1998. Soybean is traditionally produced for oil and protein in the seed, which are the economically important seed quality components. Adv. Agron. 61:241-295.


Helms, J. B., and H. Orf. 1998. Soybean is traditionally produced for oil and protein in the seed, which are the economically important seed quality components. Adv. Agron. 61:241-295.

