126	Seeds and Nutrition	Warkentin, T.D.	Towards biofortification of pea

Towards biofortification of pea

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Field pea seeds, like those of other pulse crops, are rich in protein, slowly digestible carbohydrates, and fiber. To further enhance nutritional value, biofortification efforts are underway. Phytate is often considered an antinutrient in crop seeds; although it is the major storage form of phosphorus, it is relatively indigestible by humans and chelates minerals including iron. Field pea lines were identified with a 60% reduction in phytate-phosphorus concentration in seeds, while the inorganic (available) phosphorus concentration increased by a similar amount. These lines were relatively sound agronomically, but with a 15% yield penalty compared to their progenitor, and breeding efforts are in progress to overcome this deficit. A single recessive gene controls the low phytate trait and it is being mapped on the pea genome. Iron bioavailability of seed of the low phytate lines was 30-100% greater than those of their progenitor depending on their location of production. Green cotyledon field pea lines had approximately 2-fold greater concentration of total carotenoids than yellow cotyledon lines. Experiments are in progress to assess potential additive effects of carotenoid and phytate concentration on iron bioavailability.