

Phytochemical Content of Buckwheat Throughout the Growing Season

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- › **Nine-week study**
- › **Evaluated lutein, rutin, beta carotene, and anthocyanins**



Optimal harvest time for multiple phytonutrient collection is four to five weeks after planting.

Introduction:

Buckwheat is a rich source of nutrients and other plant components. For example, buckwheat leaves and stems contain rutin, caretenoids, vitamin E, and anthocyanins. Buckwheat seed supplies protein, carbohydrates, and phytochemicals like quercetin and fagopyritols.

These nutrients and phytochemicals vary greatly over the life cycle of the plant, and while rutin concentrations are well studied, little attention has been paid to the activity of other compounds.

At Standard Process we value the synergistic array of compounds in the plant as a whole over any one phytochemical. For this reason, Standard Process researchers designed a study to evaluate the chemical changes in buckwheat over a growing season.

Design:

In May 2007, seeds were sown in seven locations on the Standard Process certified organic farm. Soil samples were taken for nitrogen and mineral analysis.

Plant samples were harvested weekly. These samples were frozen, freeze-dried, and then ground into a fine powder for testing. Plant material was evaluated for the presence of lutein, rutin, beta carotene, and anthocyanins.

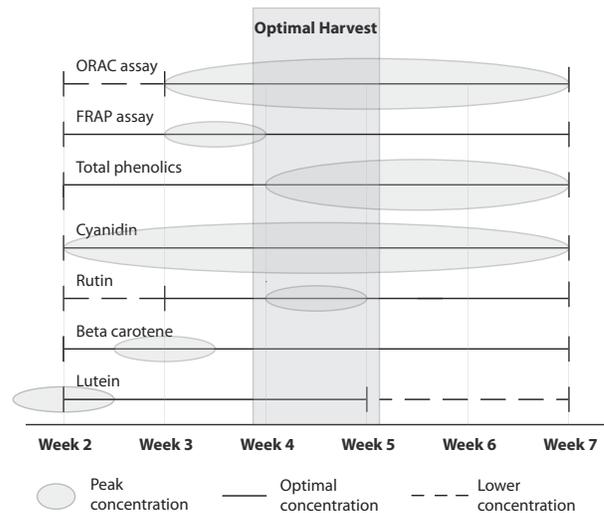
Because these compounds are used by plants as protection from oxidation and other damage, antioxidant activity was measured with the ferric reducing ability of plasma (FRAP) and oxygen radical absorbance capacity (ORAC) assays.



Samples were taken starting two weeks after planting (sprouts) and continuing through the end of the growing season (week nine, seed darkening). Buckwheat began flowering around week three, and the earliest seeds appeared six weeks after sowing. After week eight, the distinctive triangular seeds dried out and changed color.

Results:

- › Buckwheat growth was highly variable depending on the time of year and field location.
- › ORAC values were highest between weeks three and seven.
- › FRAP values trended higher in weeks three to four but were not significantly different throughout the study.
- › Vitamin E and anthocyanin (measured by cyanidin) concentrations were stable throughout the study.
- › Rutin concentration peaked between weeks four and five.
- › The carotenoids lutein and beta carotene were measured throughout the growing season. Beta carotene topped out at week three and steadily declined, while lutein concentration peaked at week two and steadily declined.



Conclusion:

The scientists concluded, based on the results and with consideration given to plant size and yield, that optimal harvest time is four to five weeks after sowing.

“This is consistent with our current farm practices,” said Brandon Metzger, PhD, Standard Process manager of research and development innovation. “Harvesting just prior to seed appearance in the late stage of growth, when environmental conditions allow, maximizes the whole plant as a raw ingredient.”

Dr. Metzger cautioned, however, that this is only one year of data collection.

“Because this project is ongoing, we will revisit this recommendation to verify that it remains accurate even among other buckwheat varieties,” he said.

Dr. Metzger’s current research builds on his previous studies examining the effect of buckwheat protein on cholesterol uptake in a cell model that represents human intestinal cells.