

Purple corn and its phytochemicals

The Missouri colored corn adaptation program, or MCCAP, presented its results on the “progression of colored corn breeding and adaptation” in an attempt to breed healthier, more effective purple corn types. When deciding what makes a sample particularly promising, the measuring of a sample’s phytochemicals is of particular importance.

What is a phytochemical?

Definition: A chemical compound or substance produced by a plant.

Phytochemicals help a plant’s:

- Protective system/immunity
- Reproduction
- Produce healthier colors and odors
- Health benefits
- Antioxidant and antimicrobial activities

Benefits of purple corn:

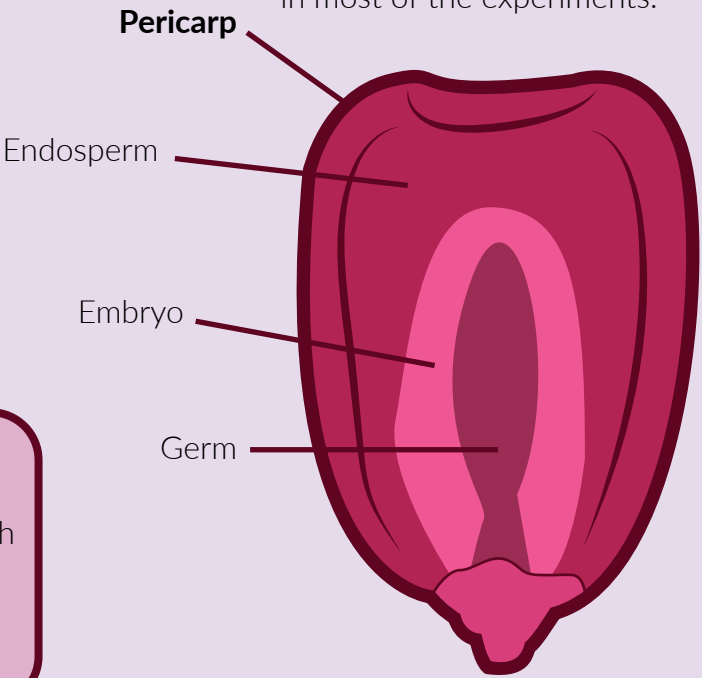
- Disease prevention
- Red dye replacement
- Longevity and yield rates of crop increased

18 different corn varieties from MCCAP

Selected for their phytochemical properties



The pericarp, the kernel’s wall or bran, has the highest rate of phytochemicals. This made the pericarp an important asset in most of the experiments.



Selected for individual tests

Varieties were selected based on bioactive phytochemicals, which include flavonoids, condensed tannins, phenolic acids and anthocyanins. These determine factors like health benefits and capabilities as a functional food ingredient.

Antioxidant assays

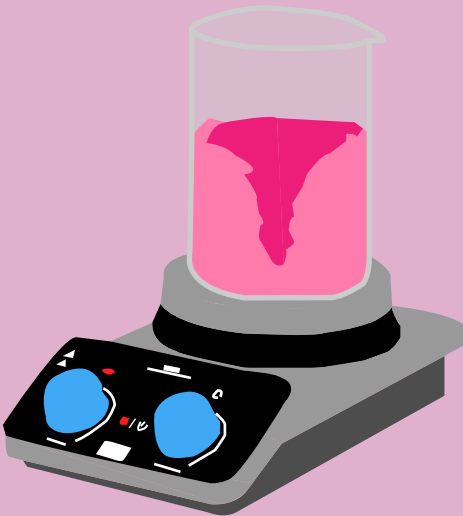
What does it analyze?

- Properties of pericarp phytochemical extracts
- Dissolved concentration of pericarp in a magnetic stirrer
- ABTS activities of extracts,

Why use the test?

Assays determine the content and quality of purple corn’s antioxidant properties

Results: Showcased the health benefits and disease prevention potential of purple corn



HPLC

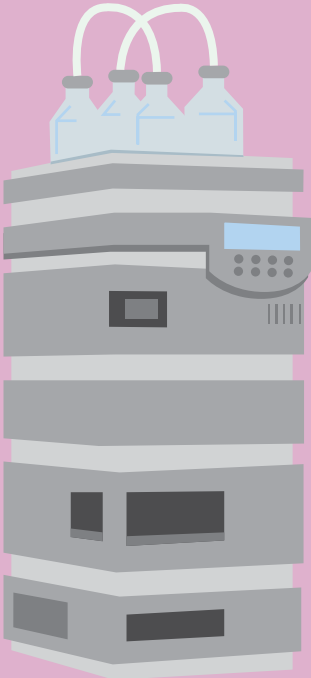
What does it analyze?

- The HPLC instrument and Diode Array Detector (DAD) are the “gold standard” for characterization
- Sieved products (sorted from coproducts)

Why use the test?

Determines and analyzes individual flavonoids and phenolic acids

Results: Showcases health benefits and best samples for breeding



Metabolomic evaluation

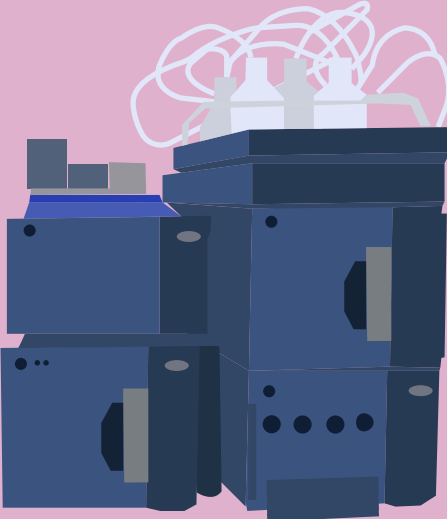
What does it analyze?

The evaluation of colored corn phytochemicals, dissolved and injected into a mass spectrometer and run through MetaboScape

Why use the test?

UHPLC-MS system detects and quantifies secondary plant metabolites

Results: Phytochemicals in selected corn “play significant roles in fighting against diseases including diabetes, cancer, obesity, inflammation, (and) cardiovascular diseases.”



Histology of pericarp

What does it analyze?

- Pericarp layers and their thickness
- Cryostat to make transverse sections
- Microscopic examination of tissue

Why use the test?

Examine kernel structure to find the phytochemical concentration

Results:

Analysis of genetic variation in phytochemicals, measure correlation between thickness and benefits, are certain genetics more worth rebreeding?

