

The content of phenolics in barley, oats, rye and wheat cultivars

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Cereals, such as barley, oats, rye and wheat, contain a selection of very interesting minor components, which are assumed to have a vital role in the plant's defence system against biotic and abiotic stress. Many of these compounds have been found to have antioxidative (e.g. hydroxamic acids, catechins and avenanthramides), anti-inflammatory (e.g. avenanthramides and some hydroxamic acids) or anticarcinogenic activities or have some other specific physiological activity (e.g. hordatines which may stimulate digestive tract motility). As cereals are used for food, the same compounds can act as health promoting components in the diet.

The contents of some selected phenolic and phenolic-like compounds, namely flavonoids in barley, oats, rye and wheat; alk(en)ylresorcinols in barley, rye and wheat; benzoxazinoids (DIBOA and DIMBOA and their conjugates) in rye and wheat; catechins and hordatines in barley and avenanthramides in oats, were analyzed by HPLC-DAD (Mattila *et al.* 2005, Pihlava unpublished). In the study, four cultivars of each cereal were included except in wheat, which had only three cultivars.

The max-min -ratio of total flavonoids in various cultivars was in barley 1.4, in oats 4.4, in rye 2.3 and in wheat 1.9. Interestingly, the rye cultivars contained largest number of different flavonoid conjugates (up to 16), while the other cereals contained only 5 or less (excluding the various catechins in barley).

In alk(en)ylresorcinols the ratio of maximum to minimum value was in rye 2.1, in wheat 1.5 and in barley 2.0. In rye the max-min -ratio of benzoxazinoids was 4.3 and in wheat 2.5. In barley cultivars the max-min -ratio of total catechins was 2.6 and hordatines 2.2.

In oat cultivars the max-min -ratio of avenanthramides consisting of anthranilic acid conjugates and of avenanthramides consisting of avenalamic acid conjugates was 2.0 and 2.9 respectively.

According to the results, there is a great variation in the contents of phenolic compounds between various cereal cultivars. However, to have more evidence concerning the cultivar-related differences, more harvest years should be included in the study.

References

Mattila, P., Pihlava, J.-M. & Hellström, J. 2005. Contents of Phenolic Acids, Alkyl- and Alkenylresorcinols, and Avenanthramides in Commercial Grain Products. *J. Agric. Food Chem.* 53: 8290 – 8295