

Determination of myo-inositol phosphates in tree nuts and grain fractions by HPLC–ESI–MS.

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Abstract:

High-performance liquid chromatography coupled with electrospray ionization mass spectrometry (HPLC–ESI–MS) was utilized for the rapid, on-line detection of all six forms of inositol phosphate (InsP) in seven major tree nuts (i.e., cashews, Brazil nuts, macadamias, walnuts, pecans, pistachios, hazelnuts) and three grain components that are allegedly rich in phosphorus (wheat aleurone, rice bran, corn germ). The total InsP levels ranged from 3 to 20 mmol/g in the tree nuts and from 10 to 97 mmol/g in the grain components. While inositol hexakisphosphate was the predominant form in all samples, at least 20% of the InsP molar concentration comprised lower forms of InsPs. In tree nuts, InsPs accounted for 18–59% of the organic phosphorus content and 12–46% of the total phosphorus content. For grain samples, these values ranged from 66–97% and 58–80%, respectively. Significant differences in InsP levels among tree nuts underline the need for further investigation of InsPs in this food group, particularly with regard to different cultivars, growing conditions, and processing conditions. HPLC–ESI–MS offered a sensitive and time-efficient detection approach for InsPs in various complex nut and grain matrices, highlighting its potential application for many other sample types.