D16
EFFECT OF STORAGE ON FLAVONOID CONTENTS OF SORGHUM GENOTYPES

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Sorghum [*Sorhgum bicolor* (L.) Moench] is an important cereal in the world, which can grow under adverse environmental conditions, such as very dryness, saline and hot areas, where the production of other cereals is uneconomical. The cereal is used for food in Africa and Asia and for animal feed in most other countries. However, there is an increased interest in using sorghum for human consumption because it is a gluten-free cereal and has high levels of phenolic compounds, such as the flavonoids flavones and flavanones, which contain health benefit properties. Flavones (luteolin and apigenin) have being related to antioxidant, anti-tumor, anti-microbial and anti-inflammatory activities and flavanones (naringenin and eriodictyol) have being associated with antioxidant properties. However, these compounds are sensitive to the physico-chemical environment, thus, the storage period and conditions may lead to their degradation with antioxidant properties alteration. Despite this, information has not been found regarding the stability of the flavones and flavanones during storage. Thus, this work aims to evaluate the flavone and flavanone contents in the sorghum genotypes SC319 (flour and grain) and TX430 (flour and bran) stored for 180 days at 4, 25 and 40°C. Analyzes were performed using a high-performance liquid chromatograph equipped with a diode array detector. There was an effect of storage time which favored the flavone and flavanone reduction in the two evaluated genotypes. The storage temperature influenced the flavones more than the flavanone contents. Although there was a storage effect on flavone and flavonone levels, it were observed retentions ranged from 70.27 to 88.72% for luteolin, 69.04 to 99.15% for apigenin, 56.92 to 88.51% for naringenin and from 77.10 to 93.42% for eriodictyol at the three temperatures at the end of 180 days. The total flavones and flavanones were better preserved at 4°C (about 88% retention). At room temperature (25°C), the retention of total flavones was at least 77% and 85% for total flavanones. The apigenin of the flour and grain of the genotype SC319 was the most preserved compound, with retentions from 92 to 99%. Naringenin presented the lowest retention (from 56.92 to 71.25%) in the same materials.

Keywords: *Sorghum bicolor (L.) Moench, storage temperature, dietary flavonoids, bioactive compounds*

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OPTIMIZATION OF ANALYTICAL STRATEGY FOR DETERMINATION OF ORGANIC SELENIUM SPECIES IN SELENIUM-ENRICHED MICROSCOPIC ALGAE

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Microscopic algae, which are exposed to selenium in the form of selenite, are able to incorporate this element to its cells thus organo-selenium compounds with higher biological availability are formed. The most common compounds are amino acids selenocysteine and selenomethionine, which are occurring in a free form or incorporated into peptides. In order to understand the biological effect of selenium and its metabolism, thorough identification of its individual chemical forms is needed. Atomic absorption spectroscopy (AAS), fluorescent spectroscopy (AFS) and induction captured plasma-mass spectrometry (ICP-MS), mainly hyphenated to liquid chromatography (LC), belong among the basic techniques for determination of selenium. Another alternative is represented by LC coupled to high resolution mass spectrometry (HRMS) which provide valuable information on the molecular structure of unknown selenium compounds.

The aim of the presented study was to develop a methodology for determination of organo-selenium compounds in microscopic algae and evaluate the potential of various strains of microscopic algae to produce these compounds. Within the first part of the study, enzymatic hydrolysis optimization using *Streptomyces griseus* protease representing a critical step ensuring cell walls disintegration, was performed. Three methods of physical cell disintegration were tested on *Vischeria helvetica* algae utilizing (i) balotina (glass beads), (ii) shock freezing and (iii) ultrasonic needle of which the third option provided the best results. Additionally, to assess the bioavailability of selenium from microscopic algae, digestion under conditions simulating human gastrointestinal tract conditions, was tested.

For the analysis of targeted organo-selenium compounds (selenomethionine, selenocysteine and Se-(Methyl)selenocysteine), two instrument types differing in ionization and mass analyser, (i) high resolution tandem mass spectrometer with hybrid quadrupole-orbital ion trap arrangement (Q-Exactive Plus, Thermo Scientific) and (ii) ICP-MS (Elan DRC-e, Perkin-Elmer), were tested. Detection parameters were optimized for both instruments.

Keywords: *microscopic algae, organoselenium compounds, mass spectrometry, cell disintegration, hydrolysis*

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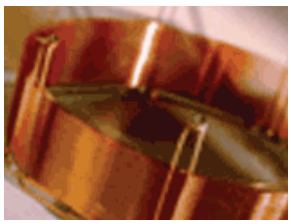

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