University of South Bohemia
Faculty of Agriculture
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Faculty of Agriculture

Plant production

Livestock breeding and genetics

Agroecology

Quality of feedstocks (for food industry)
Selected topics of interest

- Biogenic amines and polyamines
- Sulfur-containing secondary metabolites
- Patatin, the major potato tuber protein
- Flavonoids
- Processing of phytomass, „green refinery“
Biogenic amines are determined for two reasons:

**Toxicological importance:** Aromatic amines (e.g. histamine, tyramine) are allergy-like substances, causative factors of migraine. Polyamines support the proliferation of tissues. Polyamine rich diet is unsuitable for cancer patients. On the other hand, polyamine rich diet is required for patients after surgery, injuries.

**Food quality markers:** In non-fermented foods, biogenic amines can serve as food quality markers, because their content is related to decomposition of proteins.

**Results:**
The team from Faculty of Agriculture successfully solved Czech Science Foundation (GAČR) projects and participated in two European COST projects aimed at Biogenic amines and Polyamines. Critical levels of amines were found for many feedstocks (mainly fresh water fish flesh). Polyamines content was determined in beef, pork, chicken and pluck after slaughter and after various storage conditions and cooking treatments.
Sulfur-containing secondary metabolites

- important flavor precursors of alliaceous plants (garlic, onion etc.)
- precursors of many health-beneficial compounds

**We focus on:**

- development of analytical methods (CE, HPLC)
- studying their biogenetic pathways
- their changes during growth cycle and subsequent storage
- their role in formation of sensory-active compounds
Patatin, the major potato tuber protein

Complex of patatin glycoproteins (39-43 kDa)

- major glycoprotein complex of potato tubers
- protein with high nutritive value and interesting biochemical and functional properties

We focus on:

- development of methods for patatin detection, purification and analysis (LC, FPLC, SDS-PAGE, chip electrophoresis etc.)
- patatin cultivar/genotype variability – content, isoforms, biochemical properties
- effect of agro-ecological factors on patatin characteristics
- patatin industrial isolation from waste potato juice
Flavonoids

- secondary metabolites of plants
- compounds with strong antioxidation and free radical scavenging activity
- protection against atherosclerotic and cancer

We are interested in:

- CZE/MECC and HPLC methods for analysis of quercetin glycosides and other flavonoids
- determination of total quercetin and rutin content in fruits and vegetables, tea, beer and wine, buckwheat, amaranth and medicinal plants
Processing of phytomass according to the principle of „green biorefinery“

Standard processing of agricultural raw materials is mostly intended to get one final product, e.g. sugar beet – sugar, wheat – flour and starch, energetic crops – energy from phytomass. Modern approach - green biorefineries, on the contrary, works towards a complex and full use of a plant raw material including all production wastes. It is concerned with waste-free technologies.

The working group from Faculty of Agriculture presented technological projects in form of patents and utility patterns for 22 final products from oats (Avena sativa), 6 products from clover (Trifolium pratense) and 8 products from sea-buckthorn (Hippophae rhamnoides) and 4 products from purple coneflower (Echinacea purpurea) with processing of all wastes by anaerobic digestion to biogas, fuel pellets and cheap organic-mineral fertilizers. At present we work on a complex use of sunflower (Helianthus annuus), melilot (Melilotus albus) and barley (Hordeum vulgare).
Thank you for your attention