Study visit to The National Institute of Horticultural Research

Welcome to Fruit and Vegetables Storage and Processing Department

Skierniewice, Poland 26th May, 2021

This presentation is provided within a study visit organized by InHort "The same but different" project funded by the European Union's Consumer Programme under grant agreement No 951689





Agenda

9.30-9.45 Welcome the participants and introduce the National Institute of Horticultural Research – D. Konopacka

9.45-10.20 Presentation of Fruit and Vegetables Storage and Processing Department

9.45-10.05 Food processing and chemical properties of fruit and vegetable (health aspect and contamination aspect) – M. Mieszczakowska-Frąc

10.05-10.20 Sensory testing and consumer evaluation – A. Wrzodak

10.20-10.30 Break

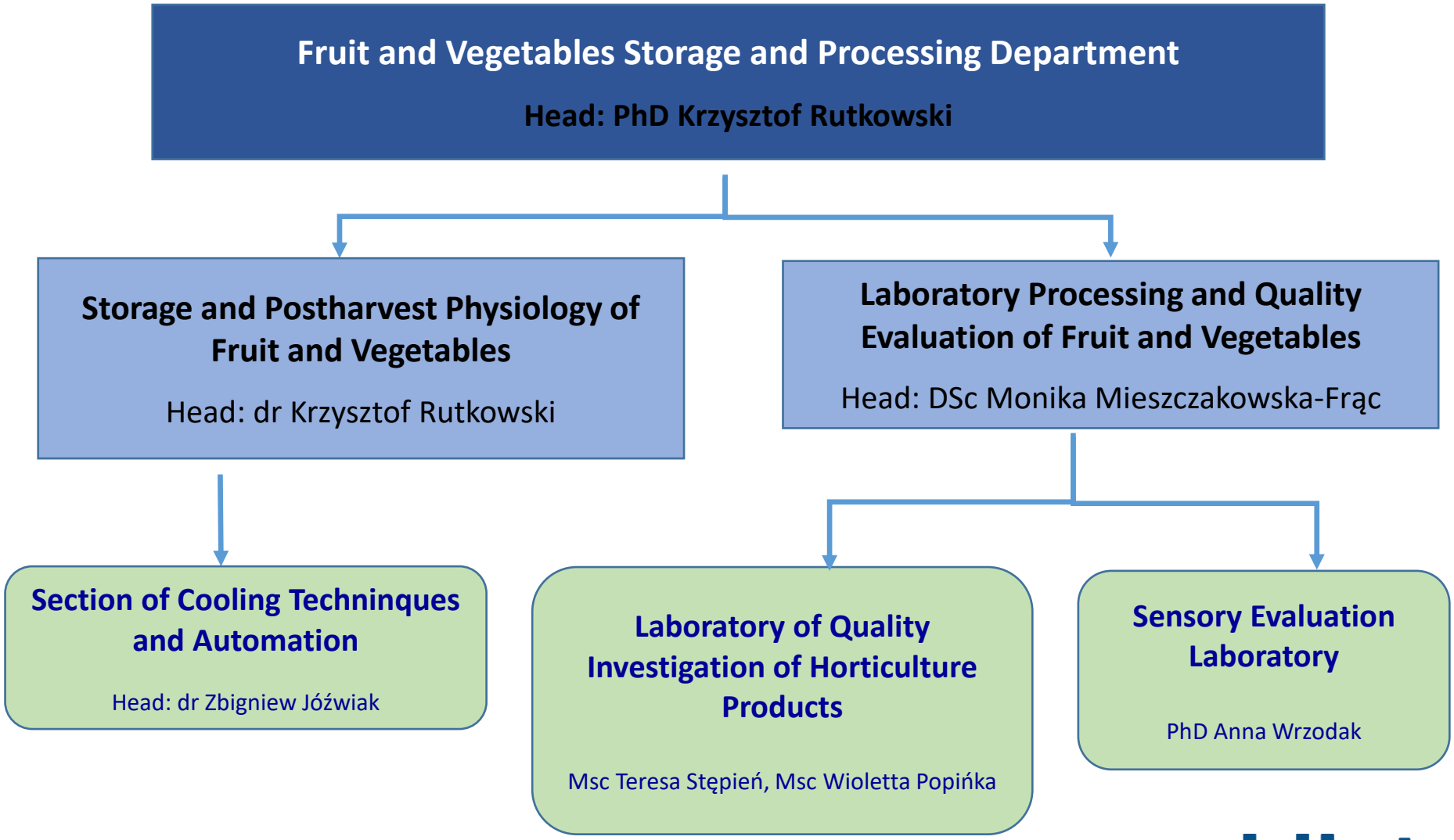
10.30-10.50 Presentation Food Safety Laboratory, pesticide residues in food – A.Miszczak

10.50-11.00 Skierniewice Capital of Horticulture Science – J. Piecko

11.00-11.15 Innovative Fruit & Vegetables Processing in Skierniewice is coming soon - Horti Food Processing Centre – D. Konopacka

11.15-11.30 Questions and discussion

Short information about the Department of Fruit and Vegetables Storage and Processing



InHort
INSTYTUT OGRODNICTWA

Innovative processing technologies - beverages

Diversified equipment for the production of juices from a wide range of raw materials, including puree juice and juice concentrates

InHort
INSTYTUT OGRODNICTWA

Hydraulic press– HP-14

Packing press

Juice production – red fruit









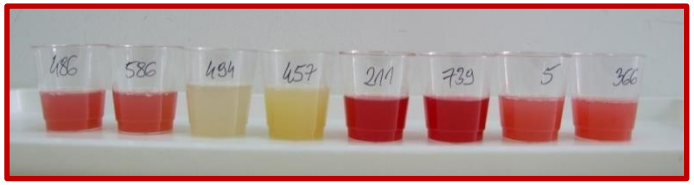

InHort
INSTYTUT OGRODNICTWA

Innovative processing technologies – fruit juice

Cloudy juice – high content of fibre

Sea buckthorn

Red-fleshed apple



InHort
INSTYTUT OGRODNICTWA

Innovative processing technologies – vegetable beverages

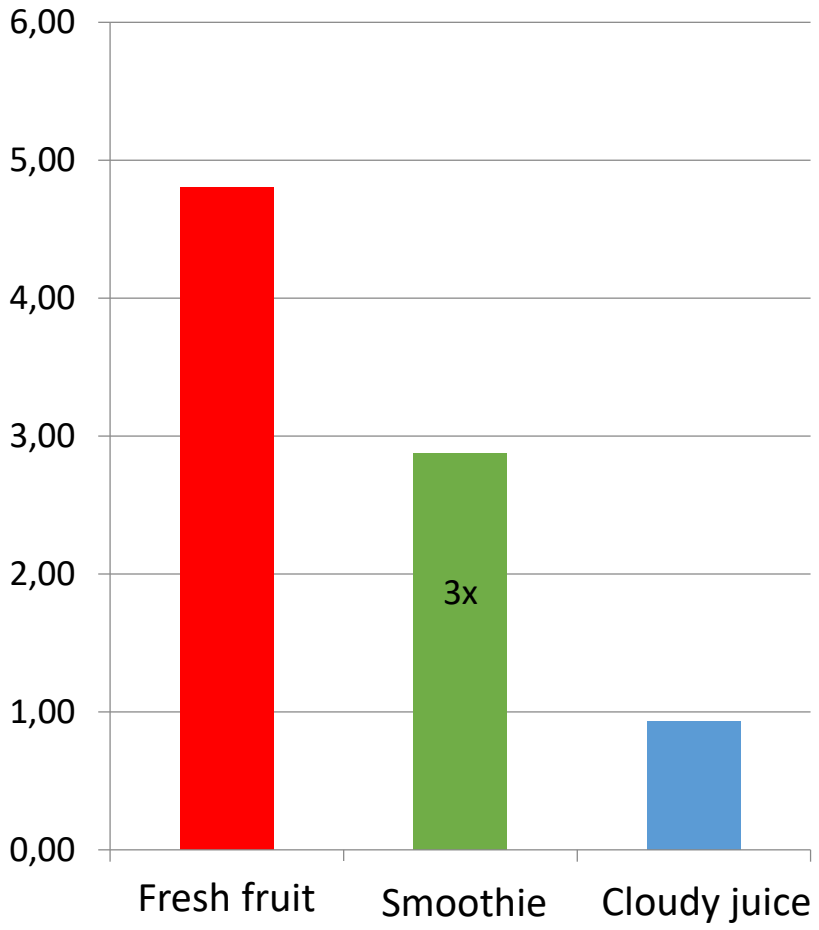
Smoothies = cloudy juice with puree

InHort
INSTYTUT OGRODNICTWA

Cloudy juice and smoothie – source of pectin

Clear juices are almost completely devoid of a valuable ingredient, which is **pectin**.

It is an ingredient that plays an important role in the proper functioning of the digestive system.



InHort
INSTYTUT OGRODNICTWA

Cloudy juice and smoothie production = Technological challenges

! problem with juice separation

Modern F&V processing technologies –
High pressure homogenization (100-400 Mpa)

HP – Homogenizer Atomo 3.0

The effect of high-pressure homogenization of sea buckthorn juice

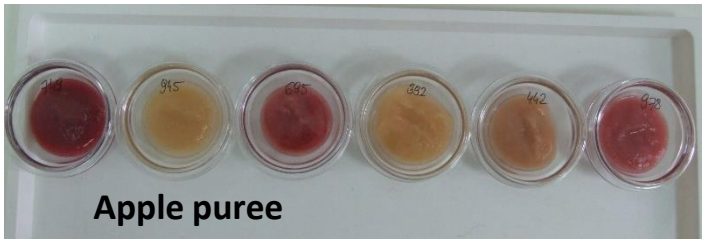
InHort
INSTYTUT OGRODNICTWA

Puree production

Blackberry puree

Pumpkin puree

Quince puree



Apple puree

Amelanchier puree

InHort
INSTYTUT OGRODNICTWA

Modern F&V processing, toward more healthy products developed in InHORT

- **Enrichment in valuable juices**
- **Addition of minerals and vitamins**

- **Fiber addition**
- **Addition of minerals and vitamins**
- **Natural colouring as e.g. black carrot juice**

OPTIFEL
food for elderly

InHort
INSTYTUT OGRODNICTWA

Modern F&V processing, toward more healthy products developed in InHORT

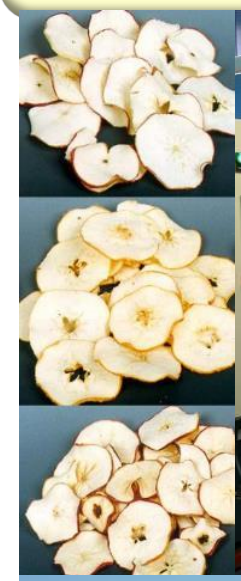
Baby Food

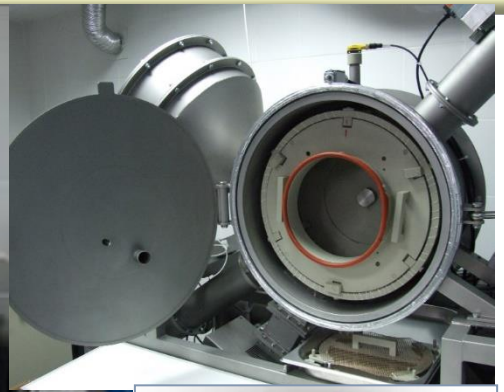
naturally colorful and healthy

InHort
INSTYTUT OGRODNICTWA

Innovative processing technologies - drying

The most advanced drying equipment along with innovative technologies to enable experimentation on crunchy fruit and vegetable snacks for direct consumption

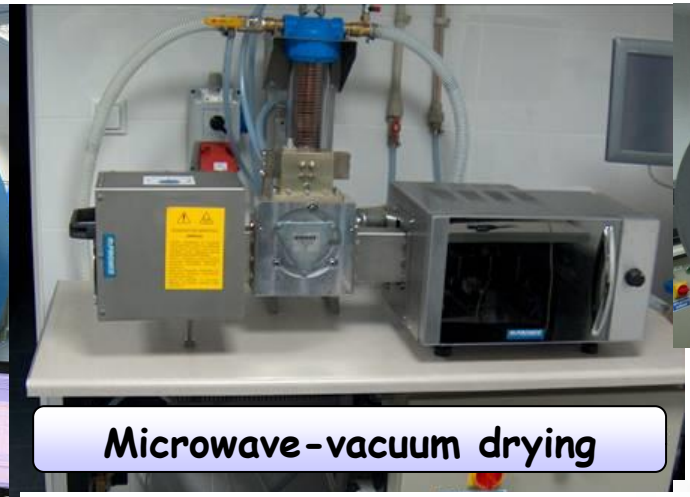


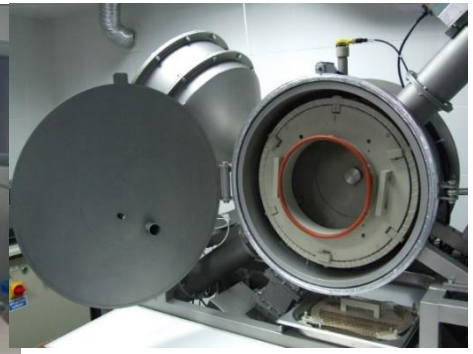






InHort
INSTYTUT OGRODNICTWA

Dried products with functional properties –preserving bioactive compounds





Microwave-ultrasound

InHort
INSTYTUT OGRODNICTWA

Dried products with functional properties –preserving bioactive compounds

InHort
INSTYTUT OGRODNICTWA

Section II. Analytical activity - evaluation of the quality of fruit and vegetables and their products, including chemical and physical analyzes, sensory and consumer evaluation.

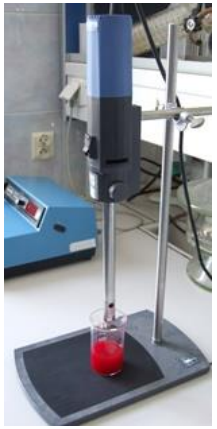
InHort
INSTYTUT OGRODNICTWA

1. Laboratory Processing and Quality Evaluation of Fruit and Vegetables

Main analytical methods:

- spectrophotometric methods
- high performance liquid chromatography methods

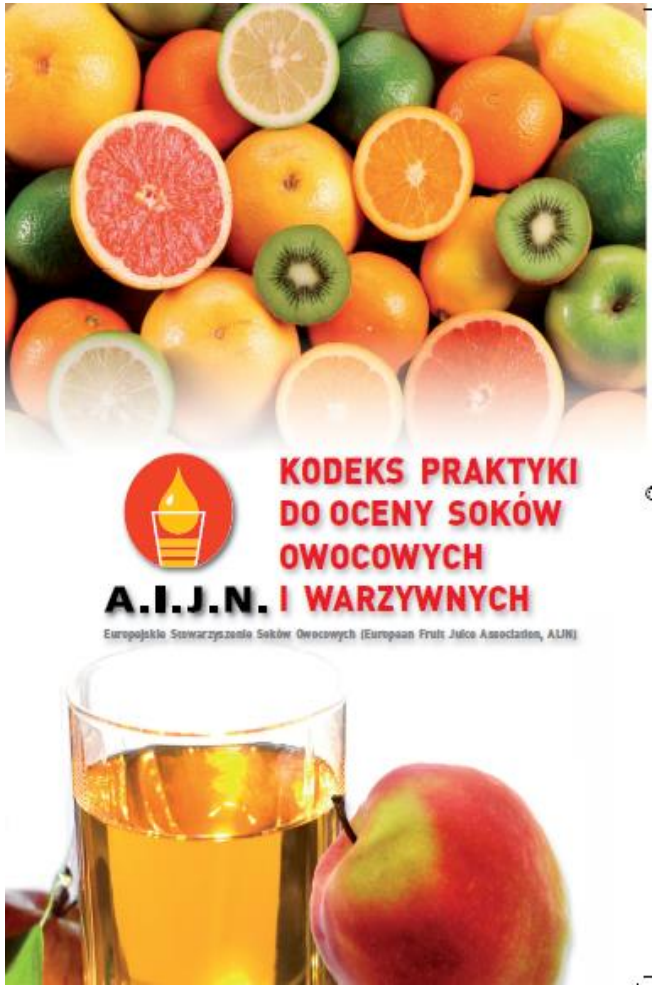
- **Analysis of physicochemical quality**
- **Content of bioactive compounds:**
  - ✓Phenolic acid
  - ✓Carotenoids
  - ✓Witamin C
  - ✓Anthocyanins
- **Antioxidant activities**



InHort
INSTYTUT OGRODNICTWA

Examination of the authenticity of fruit juices

AIJN Code of Practice



Orange juice	Cherry juice
Grapefruit juice	Raspberry juice
Apple Juice	Strawberry juice
Grape juice	Peach juice
Pineapple juice	Mango juice
Lemon juice	Guava juice
Passion flower juice	Banana juice
Pear juice	Tangerine juice
Apricot juice	Carrot juice
Tomato juice	Pomegranate juice
Blackcurrant juice	Acerola juice

InHort
INSTYTUT OGRODNICTWA

I invite you to take a virtual walk around Laboratory Processing and Quality Evaluation of Fruit and Vegetables

2. Laboratory of Quality Investigation of Horticulture Products

In 2001, the Laboratory obtained the Accreditation Certificate

POLSKIE CENTRUM AKREDYTACJI
POLISH CENTRE FOR ACCREDITATION

PCA

Sygnatariusz EA MLA
EA MLA Signatory

CERTYFIKAT AKREDYTACJI
LABORATORIUM BADAWCZEGO
ACCREDITATION CERTIFICATE OF TESTING LABORATORY
Nr AB 1688

Potwierdza się, że: / This is to confirm that:

INSTYTUT OGRODNICTWA -
PAŃSTWOWY INSTYTUT BADAWCZY
ul. Konstytucji 3 Maja 1/3, 96-100 Skierniewice
LABORATORIUM BADANIA JAKOŚCI PRODUKTÓW OGRODNICZYCH
ul. Pomologiczna 18, 96-100 Skierniewice

spełnia wymagania normy PN-EN ISO/IEC 17025:2018-02
meets requirements of the PN-EN ISO/IEC 17025:2018-02 standard

Akredytowana działalność jest określona w Zakresie Akredytacji Nr AB 1688
Accredited activity is defined in the Scope of Accreditation No AB 1688

Akredytacja pozostaje w mocy pod warunkiem przestrzegania wymagań jednostki akredytującej określonych w kontrakcie Nr AB 1688
This accreditation remains in force provided the Laboratory observes the requirements of Accreditation Body defined in the Contract No AB 1688

Akredytacji udzielono dnia 25.06.2018 r.
Accreditation was granted on 25.06.2018

DYREKTOR
POLSKIEGO CENTRUM AKREDYTACJI
LUCYNA OLBORSKA

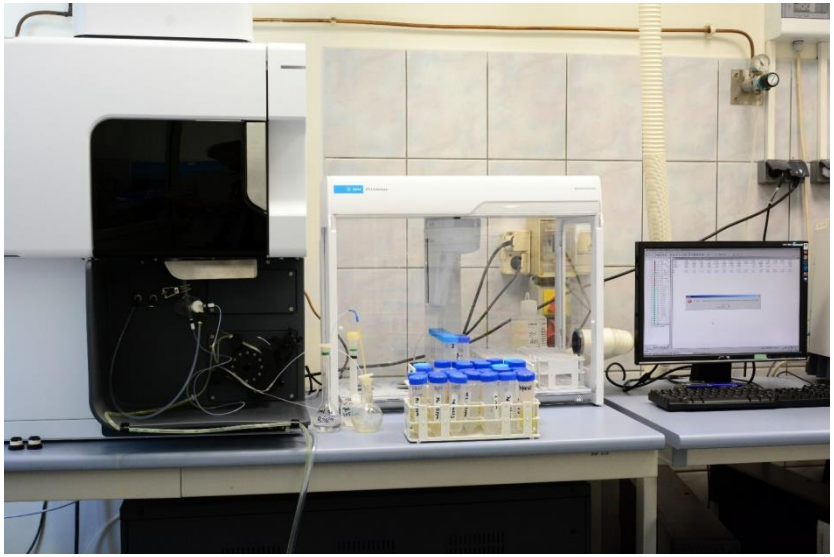
Warszawa, dnia 15 lutego 2021 roku

Every year, the laboratory participates in the program of external quality control of laboratory analyzes, e.g.:

- "Wageningen Evaluating Programs for Analytical Laboratories" organized by the Wageningen University in the field of determination of mineral substances in plant material.
- Proficiency tests organized by: LGC Quality Food Chemistry for the determination of fiber and mineral content in food product, as well as ash, protein, and sugar content.

InHort
INSTYTUT OGRODNICTWA

ACCREDITED ANALITICAL METHODS

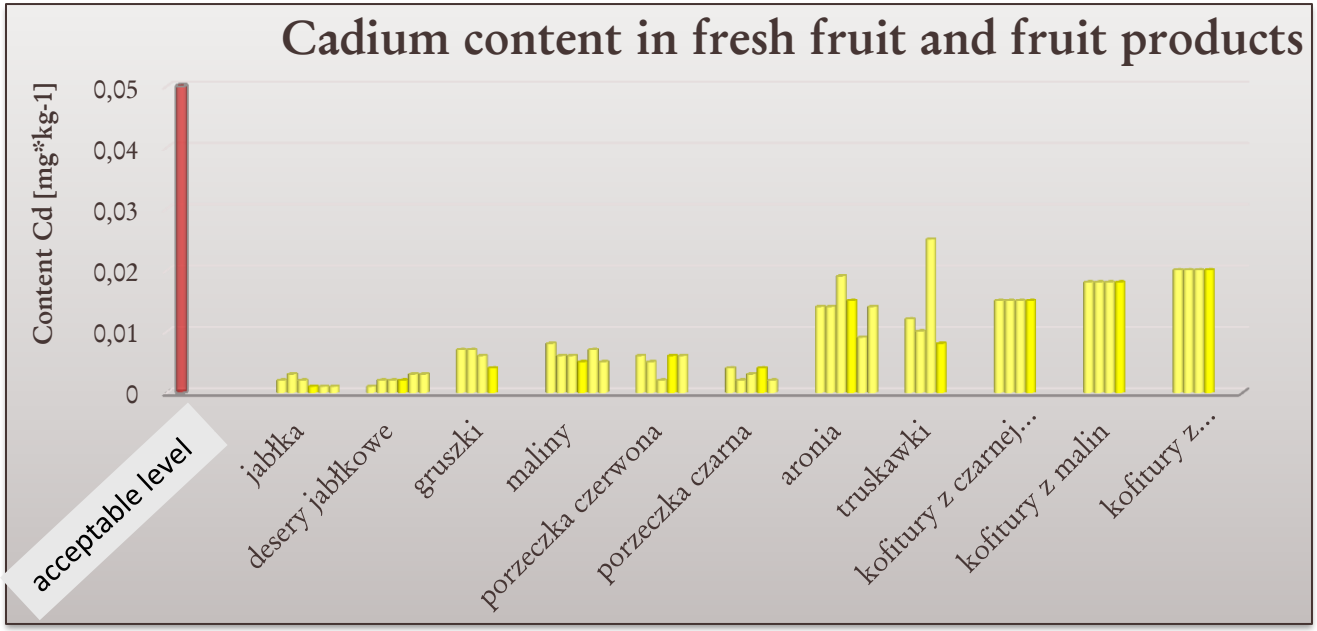


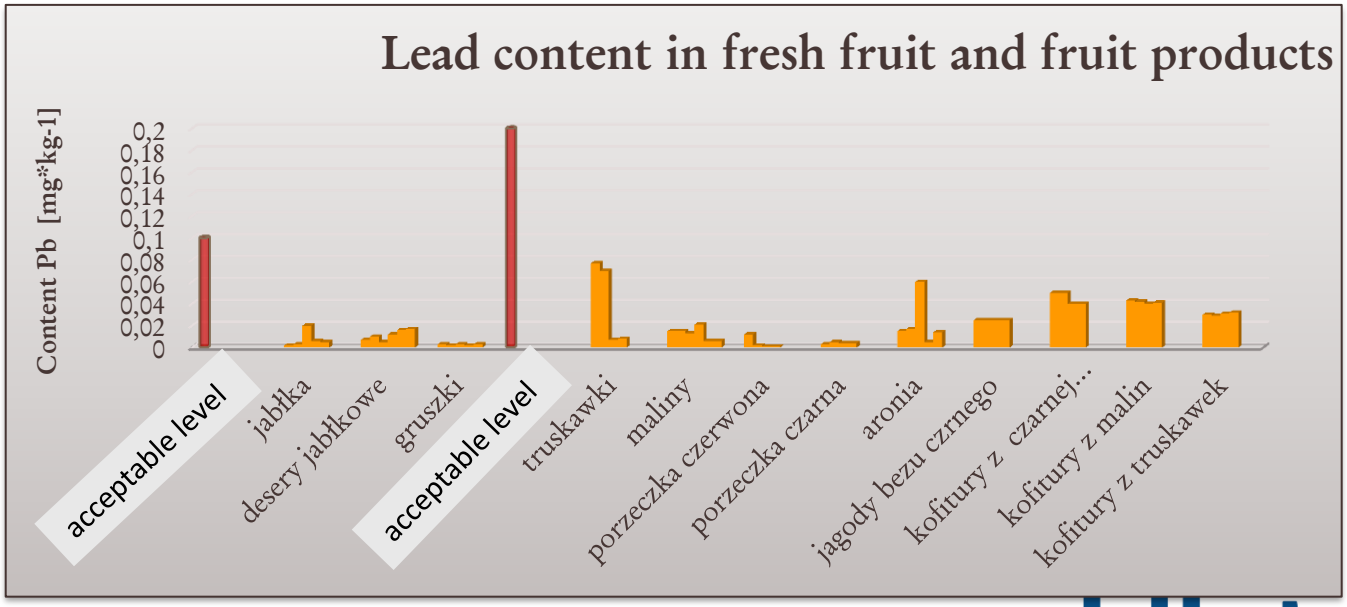
Emission spectrometer ICAP 6000 Series

Determination of the content of minerals in fresh and dry plant material, and E&V products, using the ICP-OES method

Determination of cadmium and lead content by the ICP-OES method

InHort
INSTYTUT OGRODNICTWA





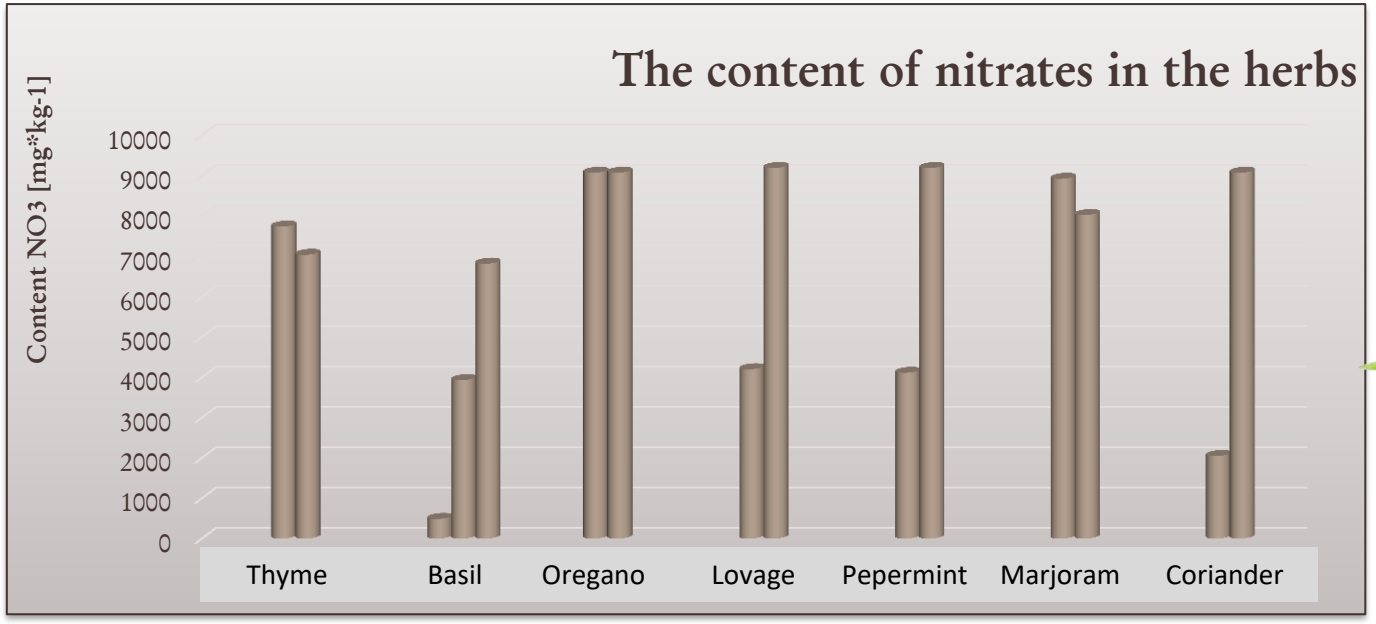
InHort
INSTYTUT OGRODNICTWA

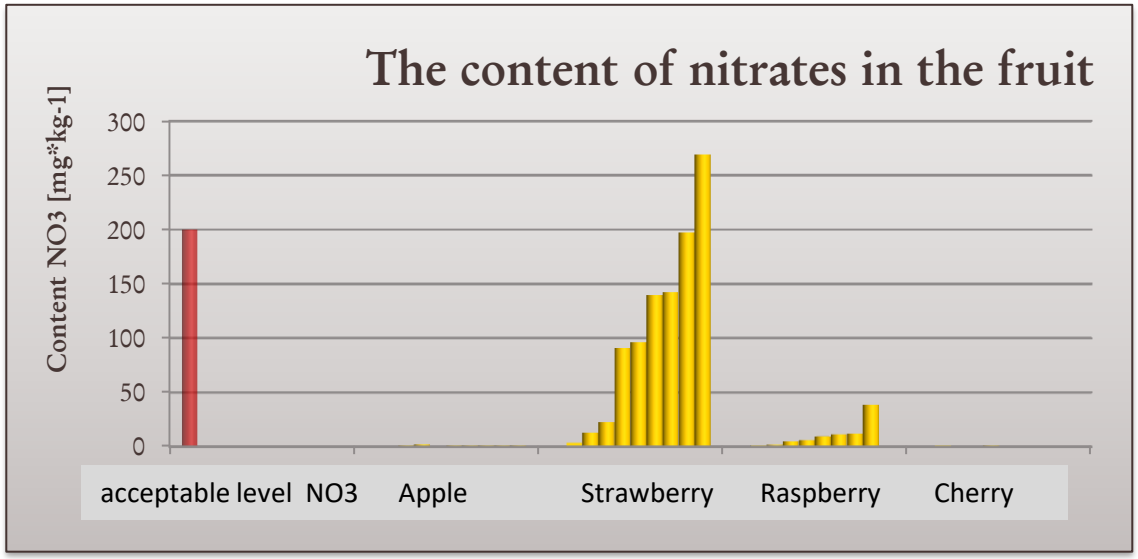
ACCREDITED ANALITICAL METHODS

Ion chromatograph with a conductometric detector DIONEX ICS-3000

Determination of the content of nitrates (V) and nitrates (III) by high performance ion chromatography (IC)

InHort
INSTYTUT OGRODNICTWA





InHort
INSTYTUT OGRODNICTWA

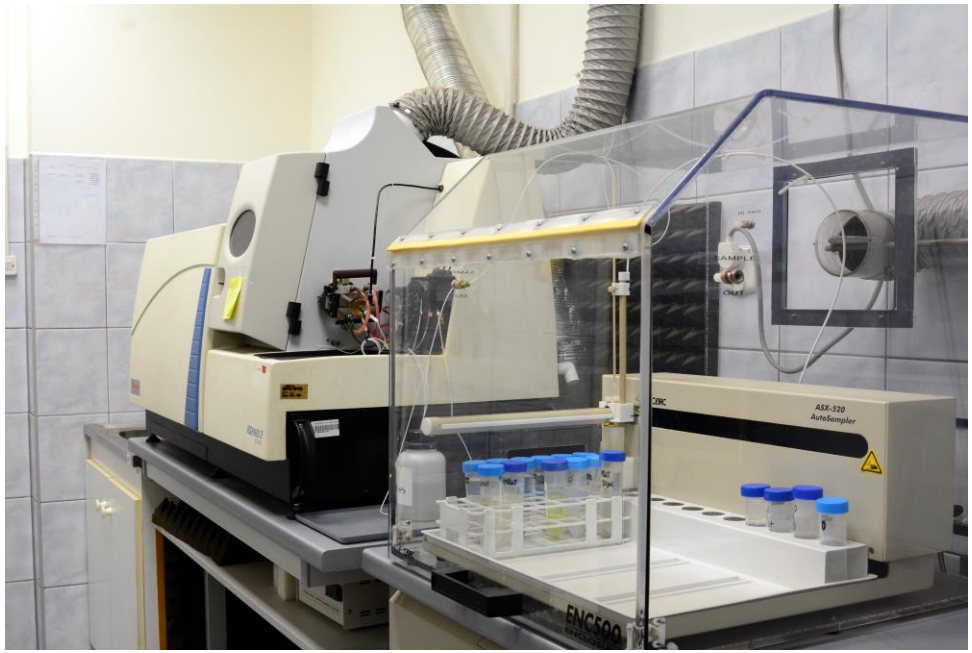
ACCREDITED ANALITICAL METHODS

Mercury analyzer AMA 254

Determination of total mercury (Hg) content by atomic absorption spectrometry (ASA), amalgamation technique

InHort
INSTYTUT OGRODNICTWA

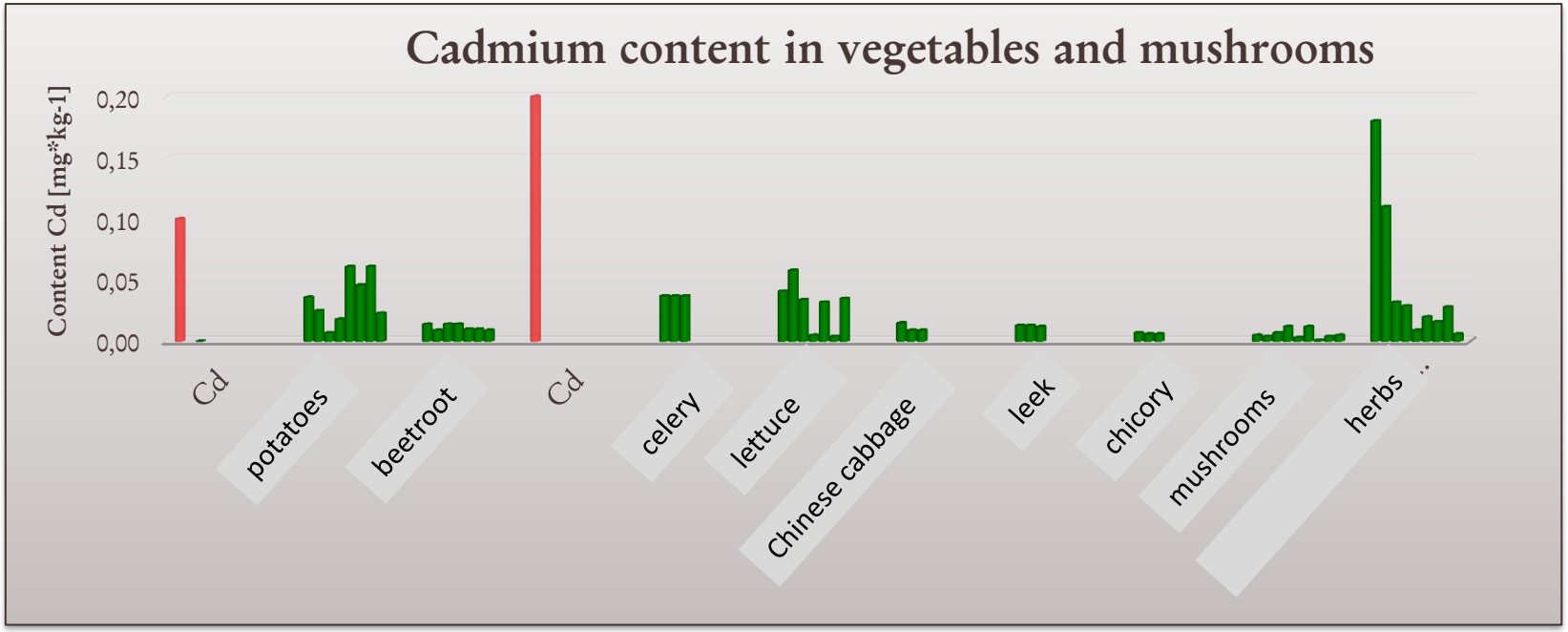
ACCREDITED ANALITICAL METHODS

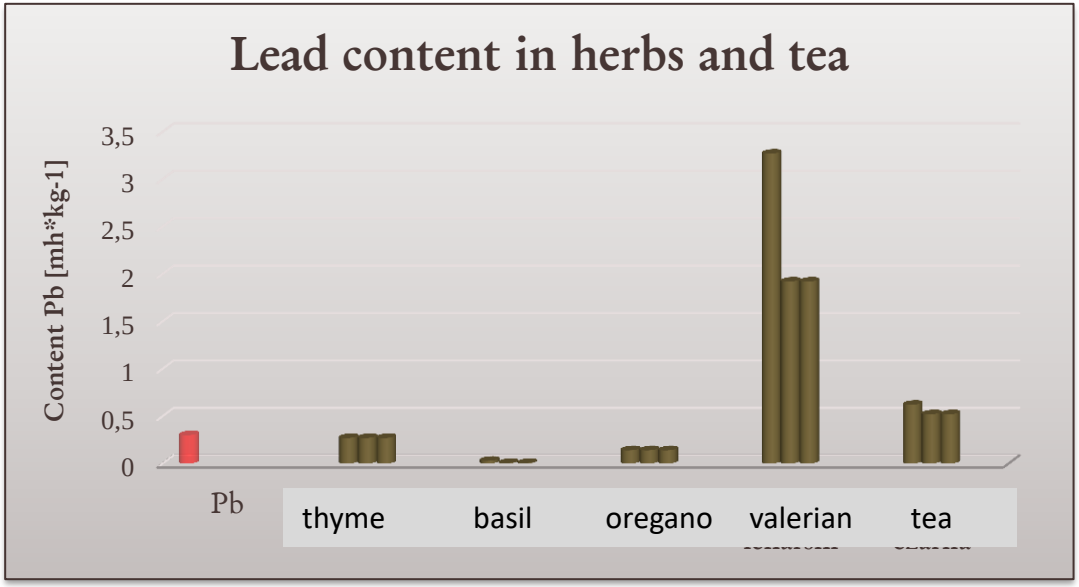


Determination of cadmium (Cd), lead (Pb) and arsenic (As) content by inductively coupled plasma mass spectrometry (ICP-MS)

Mercury analyzer AMA 254

InHort
INSTYTUT OGRODNICTWA





InHort
INSTYTUT OGRODNICTWA

ACCREDITED ANALITICAL METHODS

Fiber analyzer Foss Fibertec™ 1023

Determination of dietary fiber content (TDF) by the enzymatic-weight method with division into the insoluble fraction (IDF) and the soluble fraction (SDF)

InHort
INSTYTUT OGRODNICTWA

ACCREDITED ANALITICAL METHODS

Determination of total nitrogen by the Dumas method

TruSpec CN total nitrogen analyzer

Determination of dry matter content by weight method

Determination of total fat content by the extraction-weight method (optimization stage)

ANALYZES NOT COVERED BY THE SCOPE OF ACCREDITATION

- determination of pH, salinity, the content of available or total forms of macro and micronutrients and organic matter in mineral and organic soils, horticultural substrates intended for fruit and vegetable crops and flowers

- determination of water used for irrigation and fertigation in horticultural crops

- determination of the mineral composition of horticultural medium

- determination of the mineral composition of calcium, mineral and organic fertilizers

I invite you to take a virtual walk around Laboratory of Quality Investigation of Horticulture Products

3. Sensory Evaluation Laboratory

Presented by PhD Anna Wrzodak

THANK YOU

InHort
INSTYTUT OGRODNICTWA

Near future …

INSTYTUT OGRODNICTWA