

PINO BIO

Pinosylvins as novel Bioactive Agents for Food Applications

Pinosilvini kot novi bioaktivni agensi za uporabo v prehrani

WoodWisdom-Net project

7 FP ERA NET

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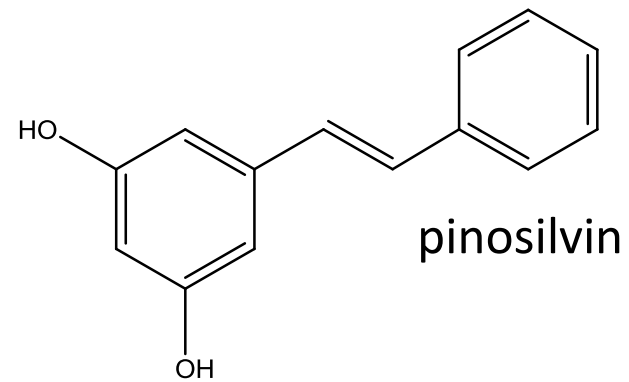
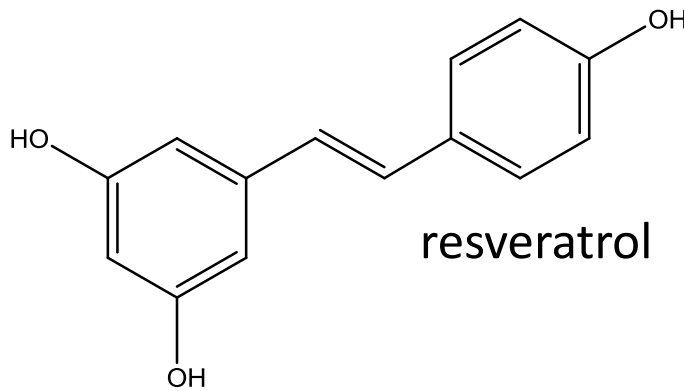
Univerza v Ljubljani, Biotehniška fakulteta,

Oddelek za lesarstvo



Ozadje projektne ideje

- Les sestavljajo makromolekule celičnih sten in spojine z majhno molekulsko maso, ki jih običajno imenujemo ekstraktivi
- Dragoceno skupino ekstraktivov predstavljajo fenolne spojine kot so npr. tanini, flavonoidi, lignani in **stilbeni**



- Resveratrol - preprečuje kardoivaskularne bolezni, poveča občutljivost za inzulin, zmanjšuje nivo glukoze v krvi, deluje antimikrobno na nekatere bakterije in dermatofitske glive itd
- Pinosilvin – spojina v lesu borov, ki izkazuje primerljive lastno



Namen in cilji projekta

Namen projekta je ovrednotiti in razviti uporabo pinosilvina kot bioaktivne, antimikrobne in/ali antidiabetične spojine za uporabo v različnih izdelkih prehranske industrije:

- Raziskati najboljše surovinske vire in načine za njegovo pridobivanje iz lesa borov
- Raziskati in ovrednotiti bioaktivnost pinosilvinov in njegovih derivatov (*Listeria*)
- Proučiti učinkovitost spojin *in vivo* in jih primerjeti z lastnostmi resveratrola
- Oceniti industrijski potencial pinosilvinov za morebitni razvoj komercialnih proizvodov



Koordinator in partnerji

- **Koordinator:** prof. dr. Atte von Wright, **University of Eastern Finland**, Finska
- **University of Vigo**, Španjia, prof. dr. Juan Carlos Parajo
- **Latvian State Institute of Wood Chemistry**, Latvija, prof. dr. Galina Telysheva
- **Univerza v Ljubljani**, Slovenija, prof. dr. Primož Oven, doc. dr. Ida Poljanšek, Viljem Vek, NN
- **Åbo University**, Finska, prof. dr. Stefan Willför





Selection of growth sites and trees, felling

Dissection and preparation for extraction

Preparation of pinosylvin

Extraction

Optimization of extraction

Referent extr. procedure
Solvent 1
Solvent 2

Solvent 1

Solvent 2

Solvent 3

S1,2,3

S1,2,3

TLC

Flash chromatography

Content of lipophylic and hydrophilic extractives

Efficiency against:
• wood decay fungi
• bacteria

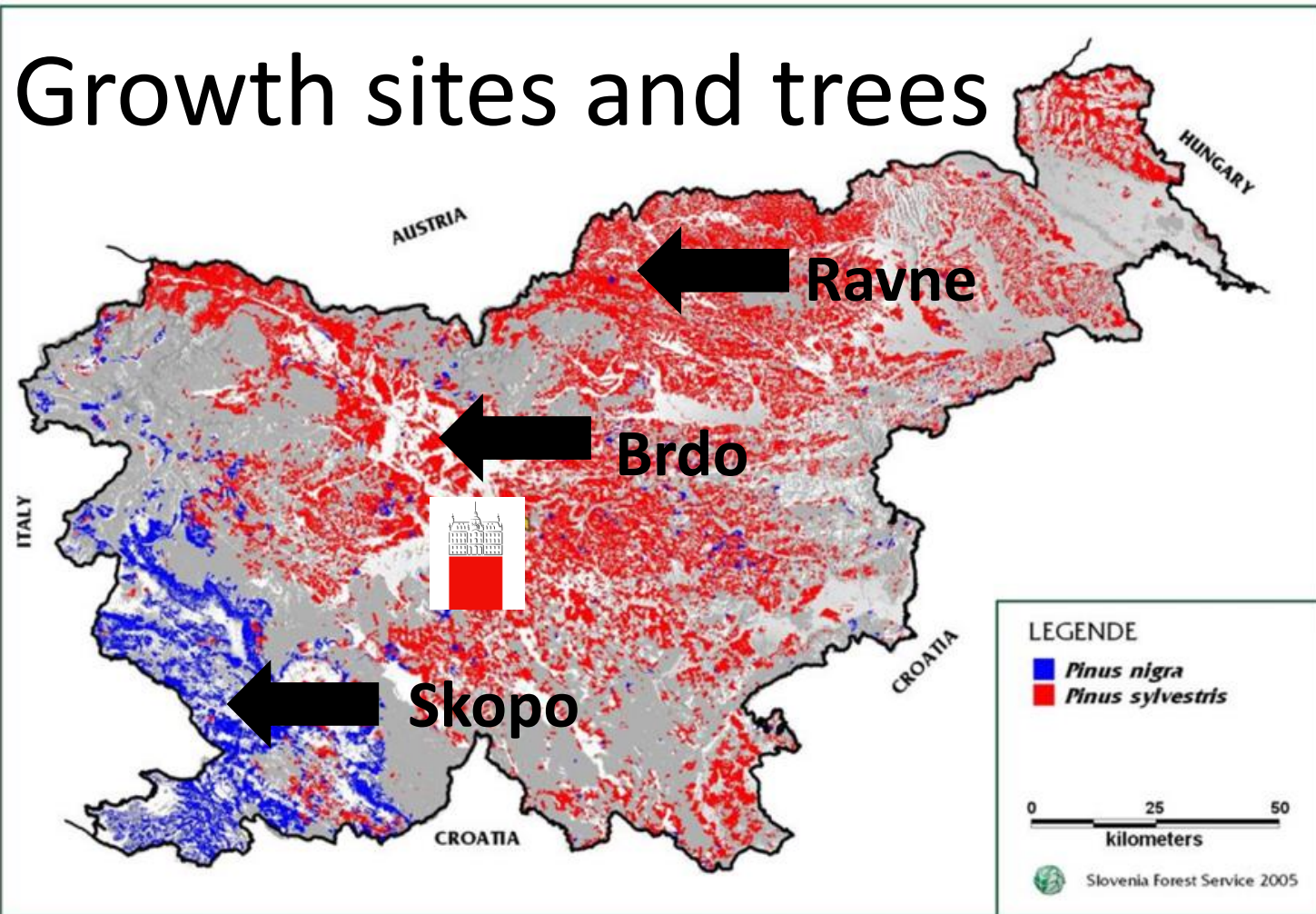
Content of total phenols

PS and PSMME

Content of PS and PSMME

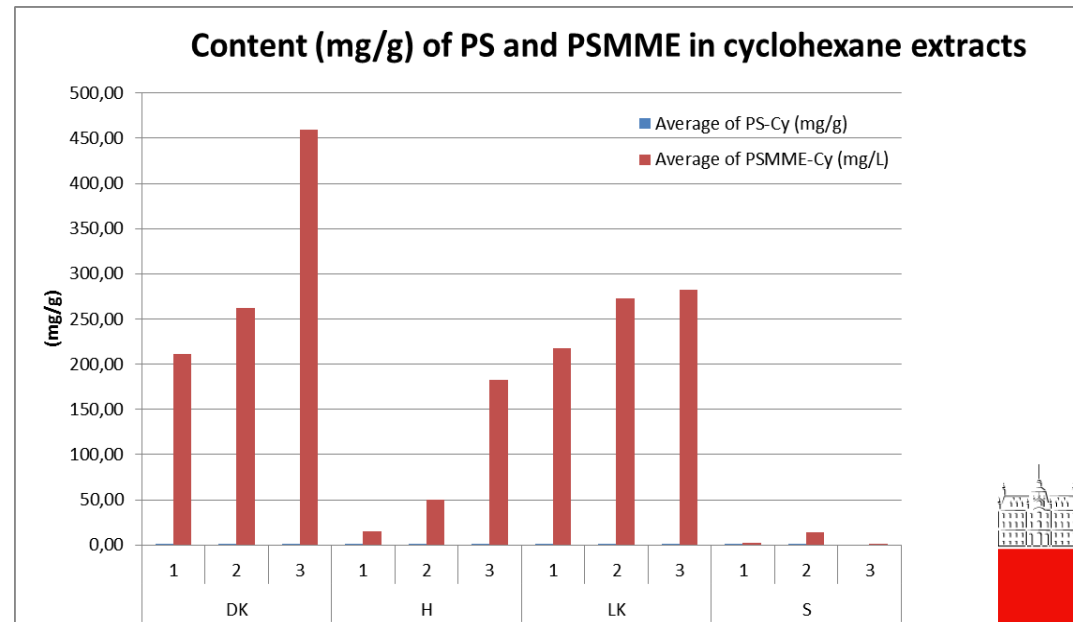
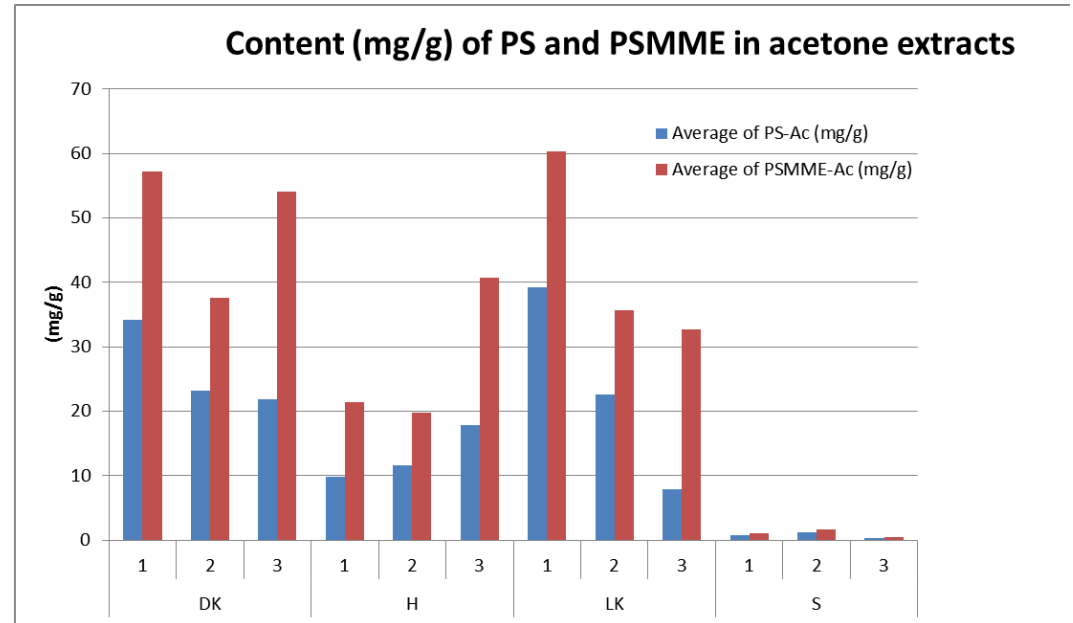
Overlook of activities

Growth sites and trees



Summative results

- Living and dead knots, which are considered as waste material of wood industry contain highest concentrations of valuable compounds.
- PS is efficiently extracted with polar solvents.



Dissemination

Published work

- FANG, Wenwen, HEMMING, Jarl, REUNANEN, Markku, EKLUND, Patrik, PINEIRO, Enma Conde, POLJANŠEK, Ida, OVEN, Primož, WILLFÖR, Stefan. Evaluation of selective extraction methods for recovery of polyphenols from pine. *Holzforschung*, ISSN 0018-3830. Tiskana izdaja, 2013, vol. 67, no. 8, str. 843-851
- VEK, Viljem, OVEN, Primož, POLJANŠEK, Ida, WILLFÖR, Stefan. Compartmentalization of wounds made by resin tapping in European black pine (*Pinus nigra*). V: *Abstracts*. Nanjing: Nanjing Forestry University, 2013,
- POLJANŠEK, Ida, VEK, Viljem, WILLFÖR, Stefan, OVEN, Primož. Content of pinosylvins in wood of scots pine from two sites in Slovenia. V: *Biorefinery analytics - outcomes from COST Action FP0901 : final meeting : September, 17-18, 2013, Åbo/Turku, Finland*. Åbo: Åbo Akademi University, 2013, str. 47-48.
- POLJANŠEK, Ida, OVEN, Primož, FANG, Wenwen, HEMMING, Jarl, WILLFÖR, Stefan. Extraction and isolation of pinosylvin from wood of conifers. V: *Round Robin follow-up and related methods : COST Action FP 0901 : March, 25, 2013, Tulln, Austria : program and book of abstracts*. Vienna: University of natural resources and life science, Department of chemistry, 2013, str. 7-8.

Knowledge is directly used in study program at Department of wood science and technology Of University of Ljubljana

BSc and MSc thesis

- JAKOFČIČ, David. *Vsebnost lipofilnih in hidrofiličnih ekstraktivov v grčah rdečega bora : diplomsko delo - visokošolski strokovni študij = Contents of lipophilic and hydrophilic extractives in knots of Scots pine : graduation thesis - higher professional studies*. Ljubljana: [D. Jakofčič], 2013.
- Two in preparation



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