

Quantitative analysis of tannins in some herbs of Latvian flora

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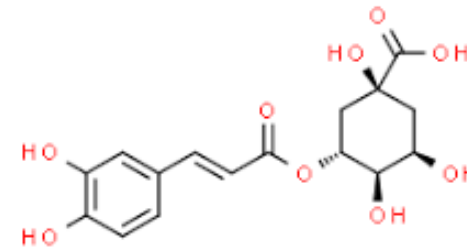
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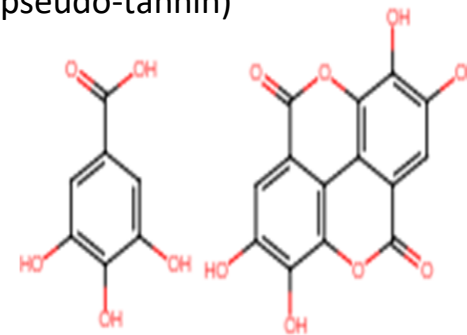


Introduction

- Tannins are phenolic compounds of high molecular weight (500-3000 g/mol).
- They are divided into hydrolysable tannins and condensed tannins. Pseudo - tannins have smaller molecular weight.
- Tannins have antibacterial effects, anthelmintic effects, and antioxidant effects.
- **Aim of this research was to analyze quantitative amounts of tannins in some Latvian flora herbs.**



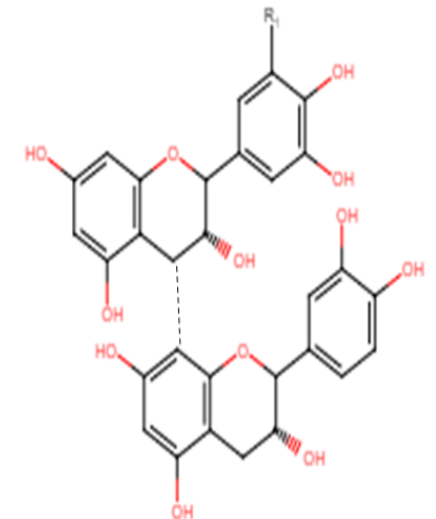
Chlorogenic acid
(pseudo-tannin)



Gallic acid

Ellagic acid

Hydrolysable tannins
(hydrolysis products)



Proanthocyanidins

Condensed tannins

Some Basic Structures of Tannins

Materials and Methods

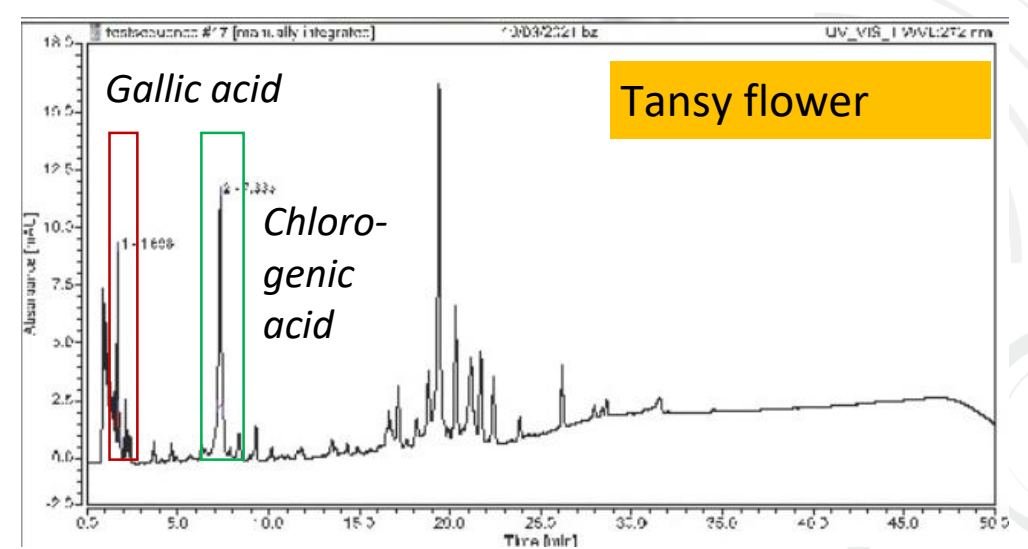
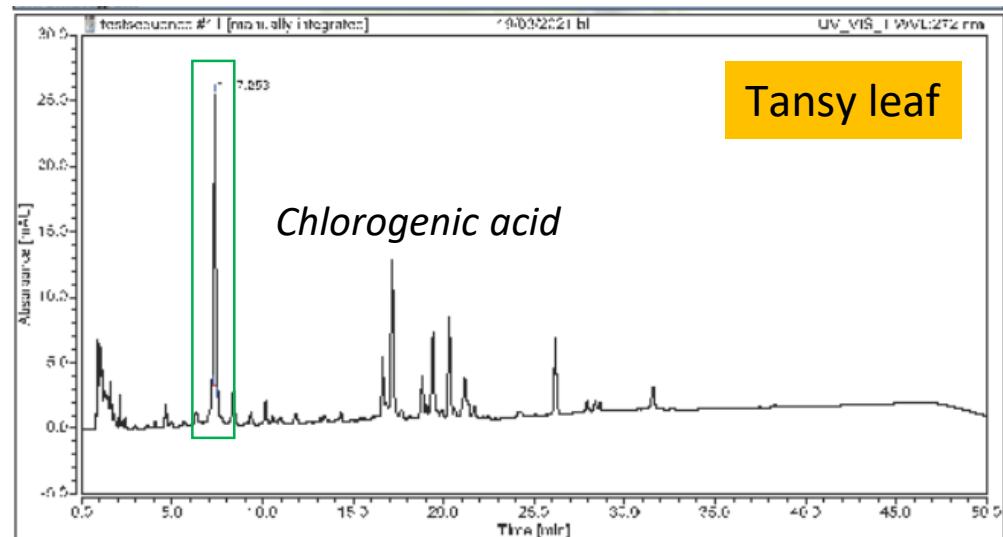
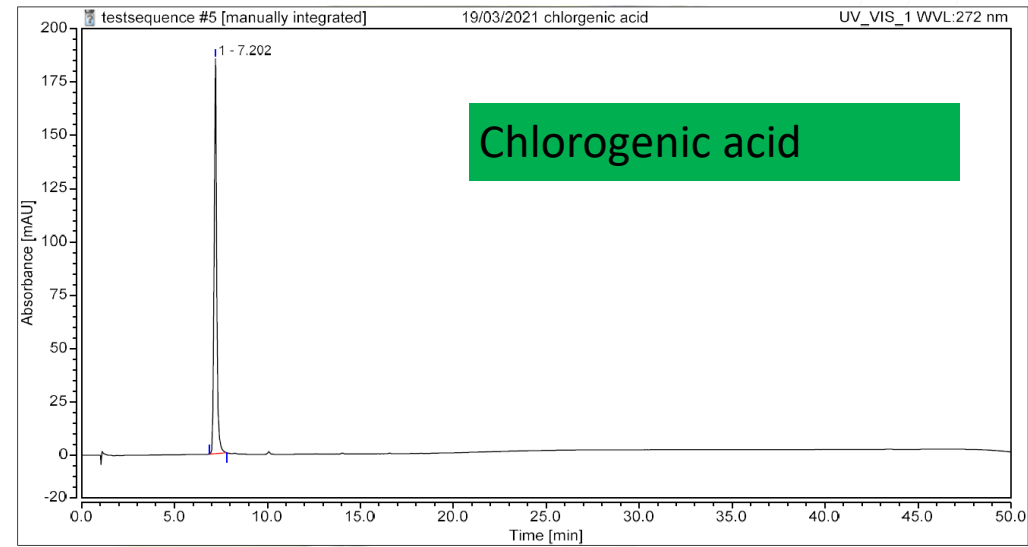
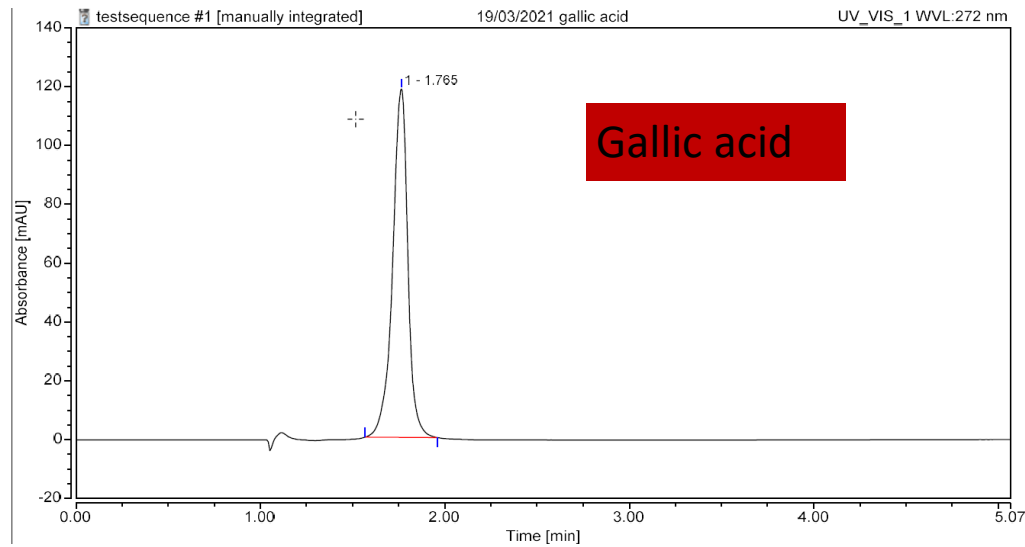
- Wormwood herb, Mugwort herb, Heather herb, Tansy flower and leaf, and were collected in Latvia cultural district of Vidzeme during blooming in July and August (2019), but Oak bark collected in April (2019). Then dried in the shade ambient temperature, then grinded in mill 1-2mm particles. We used 1g of herbal material to make decoctions.
- Tannin (polyphenols) identification test with FeCl_3
- High-performance liquid chromatography (HPLC) was used to identify gallic acid and chlorogenic acid
- Tannin amounts were analyzed as described in European Pharmacopoeia 9 using Hide powder at 760nm (METTLER TOLEDO UV7 spectrophotometer) protected from light. Calculated as percentage content of tannins expressed as pyrogallol in dried herb. Each experiment was done in triplets. Statistical analysis Microsoft Excel



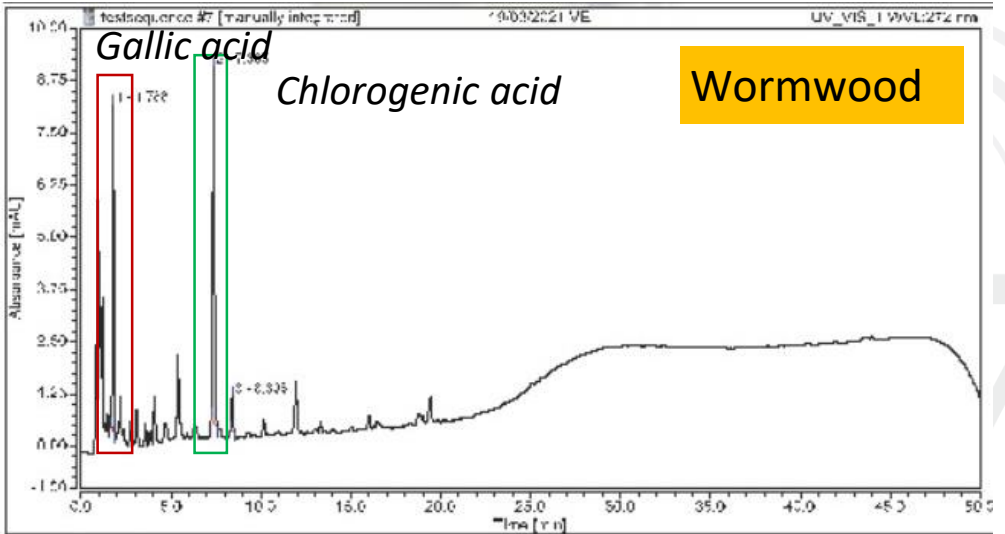
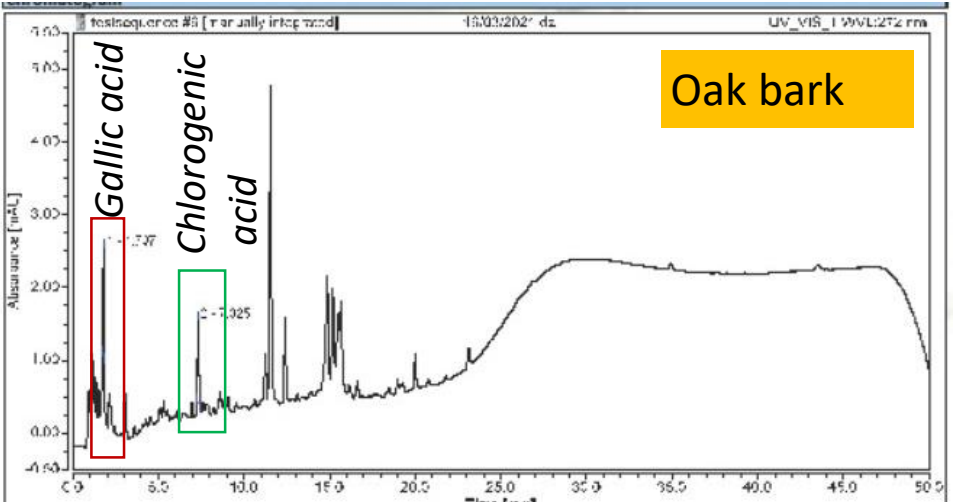
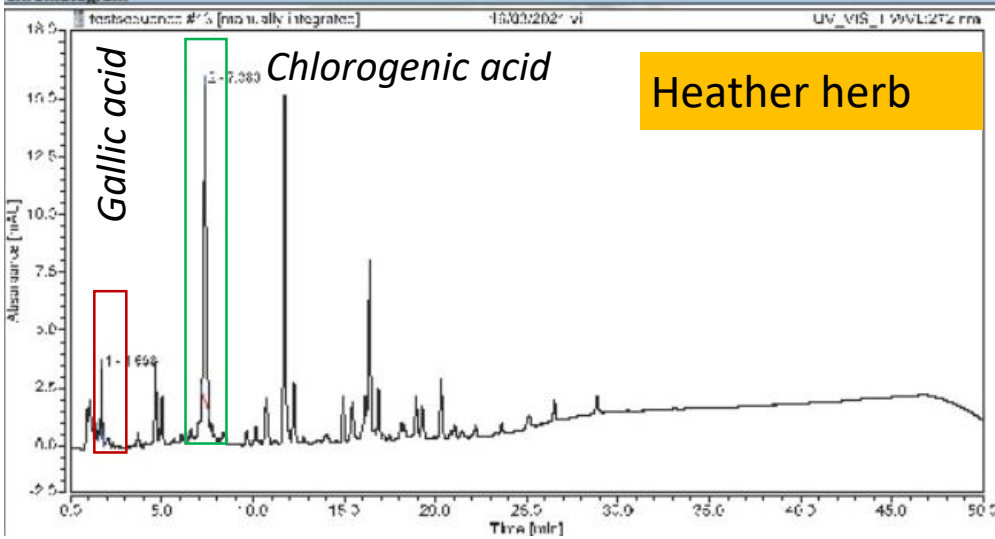
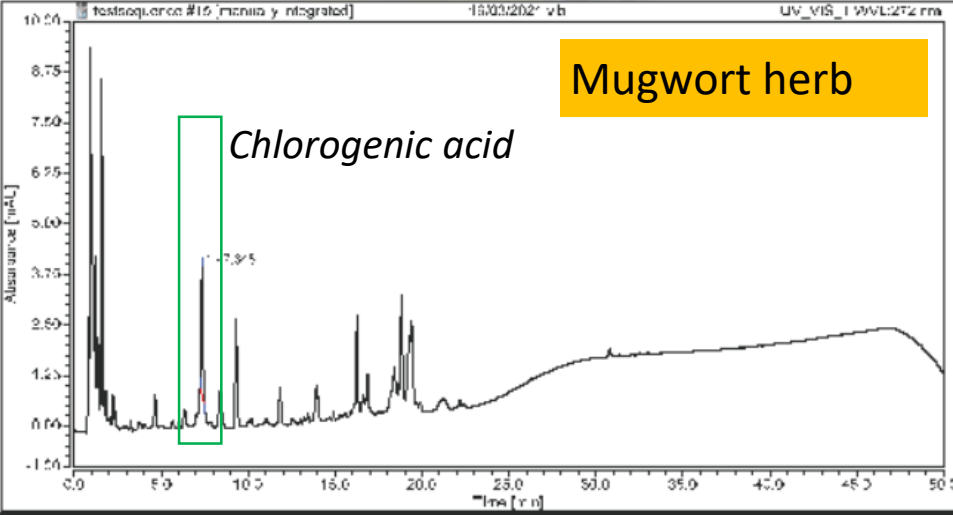
Screening of tannins with FeCl₃

Plant part tested	Color	Group of compounds
<i>Artemisa vulgaris</i> Common Wormwood or Mugwort herb	Greenish blue	Polyphenols (tannins, condensed tannins)
<i>Artemisa absinthium</i> Wormwood herb	Greenish blue	Polyphenols (tannins, condensed tannins)
<i>Calluna Vulgaris</i> Heather herb	Greenish blue	Polyphenols (tannins, condensed tannins)
<i>Tanacetum vulgaris</i> Tansy leaf and flower	Greenish blue	Polyphenols (tannins, condensed tannins)
<i>Quercus robur</i> English Oak	Dark Blue	Tannins

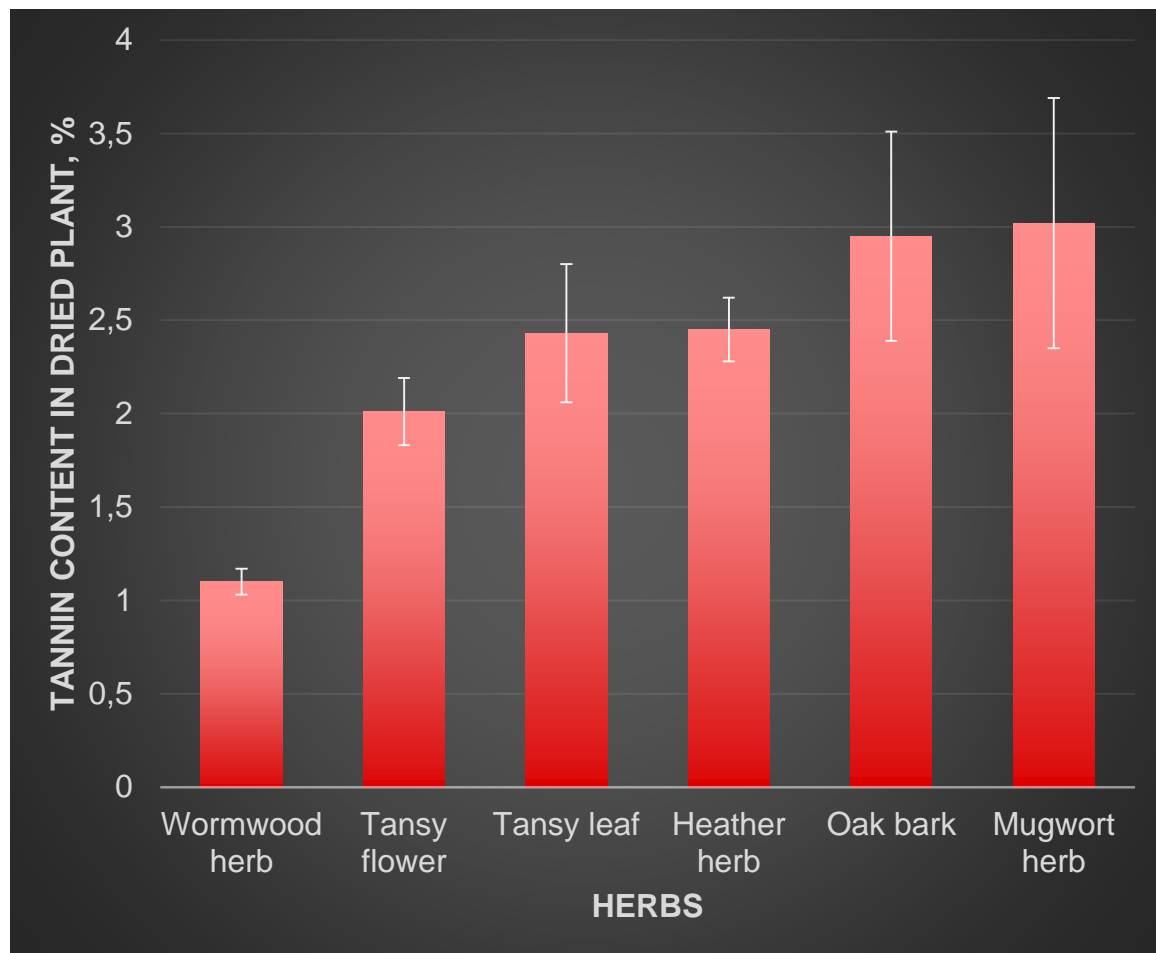
Gallic acid and Chlorogenic acid screening in herbal decoction using HPLC



Gallic acid and Chlorogenic acid screening in herbal decoction using HPLC



Tannin content in herbs



Mugwort herb contained the most tannins 3.02% (SD = 0.67). Oak bark had 2.95% (SD= 0.56) Heather herb and Tansy leaf contained approximately equal amounts of tannins of 2.45% (SD=0.17) and 2.43% (SD=0.37), respectively. Less tannin is found in Tansy flower 2.01% (SD=0.18) and Wormwood herb 1.10% (SD=0.07).

Conclusions

- Experimental data show that analyzed herbs have tannins.
- All decoctions had chlorogenic acid, but Gallic acid was traced in decoctions of Oak bark, Tansy flower, Wormwood herb and Heather herb.
- Further research is necessary to identify other types of polyphenolic compounds.
- Obtained data can be used to determine medicinal effects: antihelmetic, antibacterial, antioxidant and its correlation to tannins.

Thank you for Your attention!

