TECHNISCHE UNIVERSITÄT DRESDEN

**Faculty of Mechanical Engineering** Institute of Food Technology and Bioprocess Engineering

# Phytochemical study of plants and plant cell cultures of three Salvia species

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## Introduction and Aims

The genus *Salvia L.* is widely distributed cultivated because of its numerous secondary metabolites with biological and pharmacological properties. Besides traditional production plant *in-vitro* cultures reveal a potential alternative source of selected secondary metabolites (see poster 1052, C. Haas).

For the screening of secondary metabolite production ethanolic callus extracts of three *Salvia* species (*S. triloba*, *S. officinalis* and *S. virgata*) have been analysed by GC-MS.

**Fig. 1 *S. officinalis***

**Fig. 2 callus of *S. officinalis***

## GC-MS Analysis

Agilent GC 7890 MSD 5975C inert (EI 70eV)
HP-5ms column (30m x 250µm x 0.25µm)
He-Flow 1ml/min, injection 1µl, split: 1:50
Oven: 80°C (1min) with 10°C/min to 250°C then 2°C/min to 300°C (15min)
Internal standard cholesterole (c=104 µg/ml)
MSD simultanous sim-scan-mode Scan 50-550m/z
Data analysis:
Comparision of measured mass spectra and RI-indices (C7-C40-Standard) after deconvolution with AMDIS 2.69 Software with Wiley 08, CSB DB Golm and GMD Golm Metabolome Database

**Tab. 1 Detected metabolites and their biological and pharmaceutical properties**

| No. | Compound | Some biological and pharmacological properties |
|---|---|---|
| **1** | Trans-ferulic acid | antioxidative, anti-carcinogenic, antimicrobial |
| **2** | Trans-caffeic acid | antioxidative, anti-inflammatory, anti-carcinogenic |
| **3** | Stigmastan-3,5-diene | antioxidative, inhibits cholesterol absorption |
| **4** | β-Sitosterol | antioxidative, inhibits cholesterol absorption and proliferation of human leukemia cells |
| **5** | Rosmarinic acid | adstringent, antioxidative, antiplatelet, antibacterial, antiviral, antimutagen |
| **6** | Oleanolic acid (OA) | anti-inflammatory, antibacterial, hepatoprotective |
| **7** | Ursolic acid (UA) | anti-inflammatory, antibacterial, anticancerogen, antifungal, anti-tumor |
| **8** | 3β-Acetoxy-oleanolic acid | anti-carcinogenic |

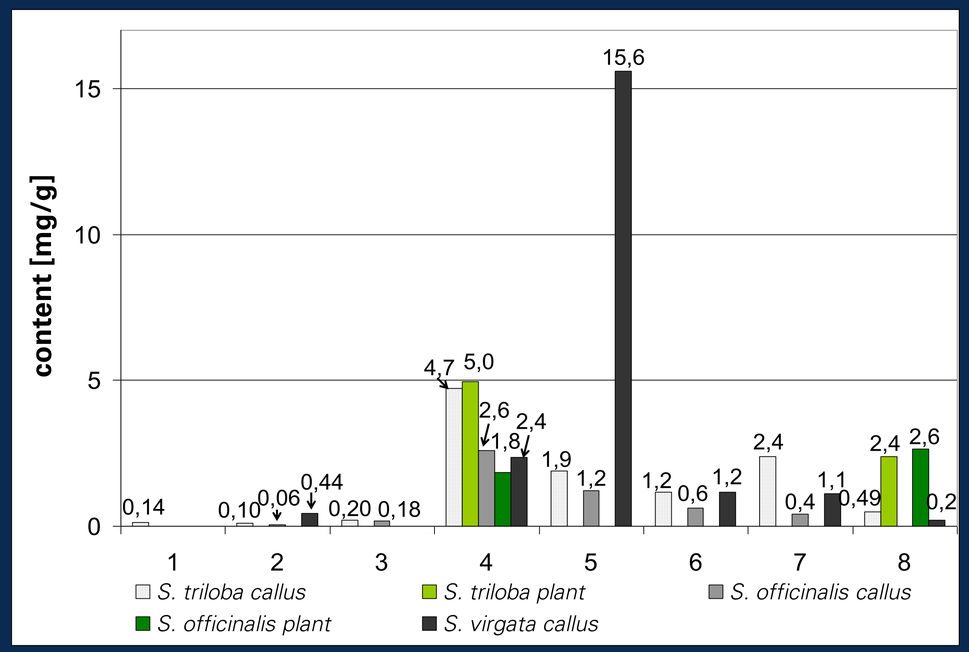


**Fig. 3 Results of GC-MS screening of suspension cultures of *Salvia* sp., different cultivation phases and metabolites determined in plant material (numbering of the compounds see Tab. 1)**

Determination of OA and UA in plant material by anionexchange chromatography as reference (recovery about 100%):

**Tab. 2 Determined amount of OA and UA in plant material of *Salvia* sp.**

| Species | OA [mg/gDW] | UA [mg/gDW] |
|---|---|---|
| **S. triloba** | 10.8 | 31.1 |
| **S. officinalis** | 7.5 | 22.4 |
| **S. virgata** | 5.5 | 2.8 |

## Conclusion and future prospects

The analysed callus extracts of the three *Salvia* species indicated the productivity of further pharmaceutical relevant metabolites: beside OA and UA also β-Sitosterol and Rosmarinic acid in high amounts, which deviates from the plants.

The productivity of OA and UA in *Salvia* suspension cultures (see poster 1052, C. Haas) is about 10% less compared with the plants and should be enhanced by cultivation optimisation and elicitation.

Further experiments for the isolation of OA and UA from the *in-vitro* cultures will be performed.

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