

Pharmacognosy (2) – Summer Term 2025/2026

Syllabus of the laboratory practice

Phytochemical analysis of herbal drugs

Lecturer: prof. Ing. Milan **Nagy**, CSc.

Teachers: Mgr. Jaroslav **Tóth**, PhD.

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Schedule:

Schedule												
FaF.KFB/05-Mgr-A/22 - Pharmacognosy (2), 2025/2026, Summer semester												
Day	6:00-7:00	7:00-8:00	8:00-9:00	9:00-10:00	10:00-11:00	11:00-12:00	12:00-13:00	13:00-14:00	14:00-15:00	15:00-16:00	16:00-17:00	17:00-18:00
Mon										14:50-16:30 WKL (16.02.2026) FaF O419 Nagy 3FA/A*(A)		
Tue												
Wed										13:55-18:05 WKL (16.02.2026) FaF O427 Tóth, Forman 3FA/A*(A)		
Thu												
Fri												
Day	6:00-7:00	7:00-8:00	8:00-9:00	9:00-10:00	10:00-11:00	11:00-12:00	12:00-13:00	13:00-14:00	14:00-15:00	15:00-16:00	16:00-17:00	17:00-18:00

* **Pharmacognosy lecture** takes place in the **lecture room 419/O**.

** **Laboratory practice** takes place in the **lab. 427/O, 423/O**.

Syllabus:

(numbers in brackets refer to textbook pages);

TLC – thin-layer chromatography

Practice 1: Pharmacognosy / Analytical and chromatographic practice of selected secondary metabolites
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Practice 2: Bitter compounds. Mucilages. Saponins.		
Bitter compounds (69-74)	Bitterness value (71-73)	Gentianae radix (69-70), Absinthii herba (70-71), Centaurii herba (70), Condurango cortex
Mucilages (74)	Swelling index of mucilages (74)	Althaeae folium/Althaeae radix (68), Farfarae folium (68), Lini semen (68-9), Tiliae flos (18)
Saponins (21-5)	Foaming value of saponins (23-24)	Liquiritiae radix, Primulae radix/rhizoma (21), Saponariae radix, Solidaginis herba

Practice 3: The Lamiaceae family. Essential oils. Hydroxycinnamic derivatives.		
Essential oils (32-35)	Determination (34-35)	Menthae piperitae folium/herba (32)
	TLC (35)	Menthae piperitae aetheroleum
Hydroxycinnamic derivatives (36)	Colorimetric determination	Melissae folium/herba (32), Salviae officinalis folium/herba (32)
	(36)	

Practice 4: Tannins.		
Tannins (26-31)	Identity tests (29-30)	Ratanhiae radix (26), Bistortae rhizoma (26), Tormantillae rhizoma (26), Quercus cortex (26-27), Agrimoniae herba (27)
	Colorimetric determination A (28-29)	Bistortae rhizoma, Tormantillae rhizoma, Quercus cortex, Agrimoniae herba, Hamamelidis folium
	Colorimetric determination B (31)	Quercus cortex, Tormantillae radix, Bistortae rhizoma, Agrimoniae herba
	Loss on drying (30-31)	

Practice 5: Flavonoids.		
Flavonoids (17-20)	Identity tests (20)	Sambuci flos (18), Crataegi flos (17) Aurantii dulce pericarpium (18)
	TLC (20)	Verbasci flos (17-18), Tiliae flos (18), Rutae herba
	Colorimetric determination (19-20)	Crataegi folium cum flore (17), Betulae folium (17), Equiseti herba (18)

Practice 6: Plant pigments (anthocyanins, carotenoids).		
Anthocyanins, carotenoids (37-40)	Identity tests (39)	Malvae sylvestris flos (39) Paeoniae flos (39) Sambuci fructus (39)
	Identity tests – TLC (40)	Malvae sylvestris flos (40) Paeoniae flos (40) Sambuci fructus (40)
	Colorimetric determination anthocyanins (38)	Malvae sylvestris flos (38) Paeoniae flos (38) Sambuci fructus (38)
	Colorimetric determination carotenoids (39)	Aurantii amari epicarpium et mesocarpium (39) Capsici fructus (39) Calendulae flos sine calyce (39) Rosae pseudo-fructus (39)

Practice 7: Phenolic glycosides.		
Phenolic glycosides (13-16)	Identity tests (16)	Salicis cortex (16) Uvae ursi folium (16)
	Identity tests – TLC (14)	Uvae ursi folium (14)
	Colorimetric determination of phenolic glycosides (14)	Uvae ursi folium (14)

Week 7: TEST I. – topics related to Practices 2 – 7

Practice 8: Cardioglycosides.		
Cardioglycosides (61-64)	Identity tests (64)	Digitalis purpureae folium (64) Digitalis lanatae folium (64) Convallariae folium (64)
	Colorimetric determination of cardioglycosides (62,64)	Digitalis purpureae folium (64) Digitalis lanatae folium (62)

Practice 9: Anthranoids (anthraquinones, anthraglycosides).		
Anthraglycosides (7-12)	Isolation and identification (65-66)	Frangulae cortex (6) Rhei radix/rhizoma (8-9)
	Test of identity (65-66)	Frangulae cortex (6) Rhei radix/rhizoma (8-9)

Practice 10: Coumarins.		
Coumarins (53-56)	Identity tests (54)	Angelicae archangelicae radix (54)
	Colorimetric determination of coumarins (54)	Matricariae flos (54)

Practice 11: Alkaloids I. (Cinchona alkaloids)		
Alkaloids (41-52)	Identity tests (44-46)	Cinchonae cortex (41)
	Volumetric determination (43)	Cinchonae cortex

Practice 12: Alkaloids II. (Papaveris fructus maturus).		
Alkaloids (41-52)	Identity tests (52)	Papaveris fructus maturus (51)
Opium alkaloids	TLC (52)	Tinctura opii methanolica
	Colorimetric determination (51-52)	Papaveris fructus maturus

Practice 13: Methylxantines.		
(41-52)	Identity tests (44-45)	Theae folium (41)
	TLC (44)	Theae folium, Coffeae semen
	Gravimetric determination (48)	Theae folium, Coffeae semen

Week 13: TEST II. – topics related to Practices 8 – 13

Week 14: REPARATIVE TESTS, Conclusions

Literature:

1. Mučaji, P., Nagy, M.: Pharmacognosy. Analytical and chromatographic practice. Comenius University in Bratislava, 2011, 75 pp. [The textbook is available as an electronic file (PDF) at the faculty webpage and in MS Teams.]
2. Evans, W. Ch., Evans, D., Trease, G. E.: Trease and Evans Pharmacognosy, Edinburgh, Saunders 2002, 585 pp.
3. Community herbal monographs, HMPC/EMA (*Committee on Herbal Medicinal Products / European Medicinal Agency*) www.ema.europa.eu
4. European Pharmacopoeia, Council of Europe, Strasbourg. (Ph. Eur.) [current version] <https://pheur-online.edqm.eu/>
5. CAS SciFinder
6. www.pubmed.gov
7. www.pubchem.gov
8. Scientific periodicals: e.g., *Planta Medica*, *Phytochemistry*, *J. Nat. Prod.*, *Fitoterapia*, *Phytother. Res.*, *J. Ethnopharmacology*

Bratislava, January 10, 2026

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