oxygen. Some isoflavones, in particular soy isoflavones, when studied in populations eating the soy protein, have indicated that there is a lower incidence of breast cancer and other common cancers because of its role in influencing sex hormone metabolism and biological activity through intracellular enzymes, protein synthesis, growth factor actions, malignant cell proliferations, differentation and angiogenesis. However some critics claim that isoflavones can increase the incidence of epithelial hyperplasia and cause goitre and hyperthyroidism. Isoflavones remain the subject of many scientific studies, as illustrated by the more than 1700 scientific publications mentioning isoflavones in their title or abstract. Most of these studies show that isoflavones may have some health benefit.

Materials and methods: bibliographic study of plants producing isoflavones - soybean (Glycine max L.), green bean (Phaseolus vulgaris L.), alfalfa sprout (Medicago sativa L.), mung bean sprout (Vigna radiata L.), cowpea (Vigna unguiculata L.), kudzu root (Pueraria lobata L.). The analysis of methods used for the separation and standartization of isoflavones: Nuclear Magnetic Resonance (NMR), UV-VIS, MS, high-performance liquid chromatography (HPLC).

Results: Most protocols of the sample preparation for isoflavone determination in soymilk and other liquid soybean products involves tedious freeze-drying and time-consuming extraction procedures. Were report a facile and rapid magnetic solid-phase extraction (MSPE) of isoflavones from soymilk for subsequent high-performance liquid chromatography electrospray ionization tandem mass spectrometry (HPLC-ESI-MS/MS) analysis. The extraction was based on the selective binding of the isoflavones to baicalin-functionalized core–shell magnetic nanoparticles (BMNPs). The HPLC method is the most suitable choice for the identification of flavonoids as separation methods are well established and coupling with the MS is easy. For the isolation of flavonoids from liquid samples (drinks) or of physiological fluids typically are addressed in two ways: the first one is based on liquid-liquid extraction, and the second SPE. An interlaboratory study was conducted to evaluate a method for determining total soy isoflavones in dietary supplements, dietary supplement ingredients, and soy foods. Isoflavones were extracted using aqueous acetonitrile containing a small amount of dimethylsulfoxide (DMSO) and all 12 of the naturally occuring isoflavones in soy were determined by HPLC with UV detection using apigenin as an internal standard.

Conclusions: Isoflavones are found in high concentrations in the vegetable, fruit and vegetable flavonols in most of the human diet.

Keywords: isoflavones, soybean, antioxidants

31. PHARMACEUTICAL QUALITY OF *TILIAE FLOS* COMMERCIAL SAMPLES: CHEMICAL COMPOSITION - BIOLOGICAL ACTIVITY CORRELATION

Moroşan Adrian Gabriel, 3rd year Pharmacy

Academic advisers: **Cioancă Oana** PhD, Professor Hăncianu Monica PhD, Discipline of Pharmacognosy, Faculty of Pharmacy, „Gr. T. Popa" University of Medicine and Pharmacy, Iaşi, Romania

Introduction. *Tiliae flos* represents flowers and bracts harvested from *Tilia sp.*, well-known medicinal species widely used in traditional medicine. Sedative, immunomodulatory, antispasmodic and carminative properties represent the premises of usage also in modern therapy. Currently, most of the scientific data for linden chemical composition comes from Mexico, whereas Romanian endemic species have scarce studies. **The main objective** of the present study was to asses the pharmaceutical quality of five linden tea commercial samples according with Pharmacopoeial provisions. Also, we intended to prove a direct correlation between the chemical composition of the plant material and the biological properties.

Material and methods. The samples were bought from different pharmacies from Iasi and they were given numbers from 1 to 5; samples 1 and 2 were packed as 50 g bags and 3-5 were sachets (1.5g) packages. In order to identify the plant species we started with macroscopic and microscopic analysis. To assess the chemical composition we extracted 5g of each sample with

100mL of water and separately with ethanol 60 %. The lyophilized infusions and the dried alcoholic extracts were used for the phytochemical study. TLC and spectrophotometry means were used for the quantification of the active compound. The biological activity was expressed as DPPH scavenger potential.

Results. From macroscopic point of view we noted important differences between the samples. TLC analysis revealed that there is a similar chemical spectra for all samples, with rutin and hyperoside as common compounds for all samples. Chlorogenic acid was present only in samples 3 and 4. The highest quantities of polyphenols were found for bulk samples 1 and 2. All sachets samples had lower quantities of polyphenols than the bulk, moreover sample 5 had the lowest value. In direct correlation to its chemical composition sample 2 had the best antioxidant potential. Also, from the same producer sample 4 (as sachets) had the second best activity, thus proving that the source of the plant material is important to obtain bioactive extracts.

Conclusions. All in all, regarding Pharmacopoeial provisions some of the samples can't be identified macroscopically due to intensive grounding. Also the type of extract and the extraction methods influence greatly the final chemical composition and consequently the pharmacological activity. Therefore, the pharmacist should advice the patients in regards to how one can obtain the best extract useful for therapeutic purposes in their own home.

Key words. Linden, antioxidant, phenolic content