The international conference „CONTEMPORARY PHARMACY: ISSUES, CHALLENGES AND EXPECTATION“ is organized by Lithuanian University of Health Sciences, Faculty of Pharmacy, Department of Drug Technology and Social Pharmacy.

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2019, Kaunas

Language of abstracts was not corrected.
Dear participants and guests of the conference,

Welcome to the International Conference – Contemporary pharmacy: Issues, Challenges, and Expectations, organized by Faculty of Pharmacy, Department of Drug Technology and Social Pharmacy. This conference is designed for pharmaceutical specialists, physicians, and nurses. For the first time, the conference will be broadcast live so it is open to professionals from different parts of the Republic of Lithuania. It is important to note that the scientific session for researchers, doctoral students, and students is organized together simultaneously. The program of the conference, oral talks, and presentations are enclosed in this abstract book. We hope that the scientific news from the conference will be useful in modelling innovative pharmaceutical expectations, and the ideas will be applied in practice.

On behalf of the organizing committee International Conference – Contemporary pharmacy: Issues, Challenges and Expectation 2019

Prof. dr. Jurga Bernatonienė
Chair of the Organizational Committee

Prof. dr. Lina Raudonė
Assoc. Prof. Jurgita Daukšienė
Chairs of the Scientific Committee
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Penktadienis gegužės 3 d., 2019  
Friday, May 3rd, 2019

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Scientific Oral Presentation
(No – Category – Authors list (Presenting author) – Title – Country)

1. YS-01 Lauryna Pužiūvelytė, M. Marksa, V. Jakštas, L. Ivanauskas, J. Bernatonienė, Impact of different wall materials for spray-dried microcapsules morphology and encapsulation efficiency of total phenolic compounds content obtained from Elsholtzia ciliata extract (Lithuania);

2. YS-02 Inga Matulytė, Z. Kalvėnienė, J. Bernatonienė, The influence of magnesium aluminometasilicate on essential oil yield from Myristica fragrans seeds (Lithuania);

3. YS-03 Justina Kamarauskaitė, R. Banienė, S. Trumbeckaitė, Effect of caffeic acid phenethyl ester on mitochondrial functions during kidney ischemia/reperfusion in vivo (Lithuania);

4. US-01 Gustė Vitkutė, N. Savickienė, O. Ragažinskienė, G. Balčiūnaitė, Comparative study of the influence of method on the quantity of proteins extracted from the raw material of (Baptisia australis (L.) Willd) roots (Lithuania);

5. US-02 Gabija Gulbinaitytė, J. Dauksienė, The attitude towards medication use among community pharmacy hypertensive patients in Kaunas (Lithuania);

6. US-03 Julija Jakubavičiūtė, G. Kaspaviciuenė, Technology and quality assessment of multiple W/O/W emulsion with grape seed oil and Tea tree (Camellia sinensis L. Kuntze) extract (Lithuania);

7. US-04 Brigita Venclovaitytė, G. Drakšienė, M. Marksa, Chitosan as a natural disintegrant in the technology of orally disintegrating tablets (Lithuania);


9. US-06 Rugilė Okulevičiūtė, M. Liaudanskas, K. Zymonė, J. Lanaukas, J. Viškelis, P. Viškelis, D. Kvikklys, Effect of two different rootstocks on the anthocyanin composition in fruits of different plum (Prunus domestica L.) cultivars (Lithuania);

10. US-07 Evaldas Šaulys, J. Dauksienė, Student pharmacists attitudes toward complementary and alternative medicine (Lithuania);

11. US-08 Ugnė Saliamoraitė, S. Velžienė, The impact of technological factors on ethanol extracts of Dwarf Everlast (Lithuania);

12. US-09 Monika Pucėtaitė, S. Velžienė, The technology of a medicinal syrup with pine buds (Lithuania);

13. US-10 Akvilė Zieniūtė, L. Kubiliūnė, G. Urbonas, Finding distinct types of organizational culture in Lithuanian community pharmacies using cluster analysis (Lithuania);

14. US-11 Monika Miškinytė, G. Kaspaviciuenė, The effect of gel forming agents on the qualitative parameters of the gels (Lithuania);

15. US-12 Judita Morkytė, Deividas Burdulis, Variation of quantitative composition of anthocyanins, proanthocyanidins and total phenolic compounds in lingonberry (Vaccinium vitis-idaea) fruits (Lithuania);

16. US-13 Greta Gudauskaitė, Kostas Ivanauskas, Dynamics of pharmaceutical industry in Lithuania and globally (Lithuania);
17. SC-01 Nataliia Hudz, Foundations of the pharmaceutical development of sterile dosage forms (Ukraine);

18. SC-02 Kateryna Dorykevych, Nataliia Hudz, The role of a hospital pharmacist in the treatment of chronic kidney disease (Ukraine);

19. SC-03 Giedrė Kasparavičienė, Zenona Kalvėnienė, Rita Koškinaitė, Correlation between instrumental and sensory analysis of different product formulations (Lithuania);

20. SC-04 Asta Kubilienė, Kornelija Eitutytė, Mindaugas Marksa, Justė Baranauskaitė, Qualitative and quantitative comparison of essential oils in thyme herb and thyme spice (Lithuania).
YS-01

Impact of different wall materials for spray-dried microcapsules morphology and encapsulation efficiency of total phenolic compounds content obtained from *Elsholtzia ciliata* extract

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2 Department of Pharmacognosy Medical Academy, Lithuanian University of Health Sciences, Sukileliu pr. 13, Kaunas LT-50161, Lithuania;
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**Introduction.** Spray-drying is the most popular encapsulation method used for stabilization and protection of biologically active compounds from various environmental conditions, such as oxidation, moisture, pH, and temperature. The aim of this work was to study the effects of different wall materials on encapsulation efficiency (EE) of phenolic compounds from *Elsholtzia ciliata* herb.

**Materials and Methods.** Dried *Elsholtzia ciliata* herb („Zolynu namai“, Vilnius, Lithuania). Wall material compounds: sodium caseinate (CAS), skim milk (SKIM), maltodextrin (MD), gum arabic (GUM), beta-cyclodextrin (BCYC) were purchased from Sigma-Aldrich, Germany, resistant-maltodextrin (Promitor 85™) was purchased from Bang & Bonsomer, Vilnius, Lithuania. All chemical reagents were analytical grade.

Powdered material of dried *E. ciliata* was extracted with 70% (v/v) ethanol in a round bottom flask by ultrasound-assisted extraction performed in an ultrasound bath at 25 °C for 30 min. Ethanolic extract and wall material solutions (30%) were mixed together. The prepared liquid feeds were spray dried in a Buchi B-291 Mini Spray-Dryer. Spray-drying conditions: temperature was 160 °C, outlet temperature - 80-90 °C, spray flow feed rate - 30 mL/min, air pressure - 6 bar, aspirator - 100%.

**Results.** Study shows that the highest EE of TPC was than using SCAS30 (75.59±0.36%) as wall material and the lowest than using MD30 (12.83±0.56%). SCAS, SKIM, MD and RMD microparticles showed more semi-spherical particles with smooth and wrinkled surfaces than BCYC and GUM.

**Conclusion.** According to obtained results, SCAS is the most suitable wall material for *E. ciliata* ethanolic extract encapsulation. Extract encapsulated with SCAS has the highest EE% than using other encapsulating agents. SEM micrographs showed that SCAS, SKIM, MD and RMD forming semi-spherical microparticles with smooth and wrinkled surfaces. Considering these results it is nessesary to exam two or more wall materials to obtained the highest EE values of biologically active compounds and microparticles with perfect shape.
The Influence of Magnesium Aluminometasilicate on Essential Oil Yield from
Myristica fragrans Seeds

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Introduction: Magnesium aluminometasilicate is a white amorphous powder with high surface area, practically insoluble in water. The magnesium aluminometasilicate has the ability to absorb materials, which is characterized by liquid absorption capacity [1,2]. It is the first time that magnesium aluminometasilicate was used as an excipient for essential oil, previously it was used as an excipient only in solid dosage forms. The aim of this work was to compare the yield of essential oil with magnesium aluminometasilicate and without it.

Materials and methods: The dried seeds of Myristica fragrans (nutmeg) were from Grenada (brown-beige color, had a characteristic odor, and strong, bitter, and spicy flavor). Seeds were ground into a powder (particles smaller than 0.5 mm) with a laboratory mill. Magnesium aluminometasilicate (Neusilin® US2, Fuji Chemical Industries Co., Ltd., Toyoma, Japan) was used as an excipient. Distilled water was used throughout the experiment. Essential oils were prepared by hydrodistillation (Clevenger type apparatus). The yield of essential oil is presented as mean ± SEM.

Results: Four samples of essential oil were produced using hydrodistillation (magnesium aluminometasilicate concentration was: 0%, 0.5%, 1% and 2%). The control sample of essential oil (without excipient) yield was 0.79 ± 0.04 g (15 grams of nutmeg powder and 300 ml water were used for all samples). When magnesium aluminometasilicate was used (from 0.5% to 2%) the essential oil was obtained in higher quantities – from 1.19 ± 0.09 g to 1.57 ± 0.09 g (p < 0.05). The highest yield of essential oil (10.43%) was obtained by using 2% magnesium aluminometasilicate.

Conclusion: The yield of the essential oil from nutmeg seeds was significantly higher when magnesium aluminometasilicate was used. It increased from 5.25 ± 0.04% to 10.43 ± 0.09%.

References:
Effect of Caffeic Acid Phenethyl Ester on Mitochondrial Functions During Kidney Ischemia/Reperfusion in vivo

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Introduction: Ischemia/reperfusion (I/R) injury induces cellular damage, which is accompanied by a variety of metabolic alterations. Mitochondria (the main producers of cellular ATP, regulators of cell death and ROS generation) play an important role in pathophysiology of I/R injury. For improving kidney I/R tolerance, recently much attention has focused on antioxidants. Caffeic acid phenethyl ester (CAPE) is highly lipophilic phenolic compound, an active component of propolis which has antibacterial, antiinflammatory, cytotoxic, cardioprotective activity [1,2,3]. The aim of this study was to test the effect of kidney ischemia/reperfusion in vivo on mitochondrial functions and effects of CAPE against ischemia-induced mitochondrial injury.

Materials and methods: Rats were injected intraperitoneally with CAPE (34 mg/kg). Warm renal ischemia in rats was induced by the clips around renal artery for 30 min. Then the clips were removed and reperfusion was performed for 30 minutes. Mitochondria from rat’s kidneys were isolated by the method of differential centrifugation. The mitochondrial functions were measured using high resolution respirometry system Oxygraph-2k, glutamate/malate and succinate were used as substrates.

Results: It was determined that after 30 min of ischemia/reperfusion the mitochondrial respiration rate in state 3 with glutamate/malate and succinate decreased by 1.2 and 1.3 folds, respectively. Respiratory control index decreased by 1.2 fold and there was an increase in permeability of mitochondrial outer membrane by 1.3 folds. There was no statistically significant effect of CAPE after ischemia 30 min/ reperfusion 30 min neither with glutamate/malate nor with succinate.

Conclusion: Ischemia/reperfusion (30 min/30 min) leads to rat’s kidney mitochondrial injury. CAPE didn’t protect mitochondria from ischemia/reperfusion injury.

References:
Comparative study of the influence of method on the quantity of proteins extracted from the raw material of (Baptisia australis (L.) Willd) roots

Gustė Vitkutė, Nijolė Savickienė, Ona Ragažinskienė, Gabrielė Balčiūnaitė
1Lithuanian University of Health Sciences, Department of Pharmacognosy
2Vytautas Magnus University, Department of Biology

Baptisia australis (L.) Willd. - perennial plant of the Fabaceae family, which preparations have anti-inflammatory, analgesic, antioxidant effects and can be used for cardiovascular prophylaxis. It has been investigated that Baptisia australis (L.) Willd. herbal raw material, such as grass, roots, accumulates flavonoids, alkaloids, triterpene saponins and other compounds, but proteins were not quantified. In this research, protein concentration was evaluated based on the protein extraction method [1].

The aim of the experiment: To determine the influence of protein extraction from Baptisia australis (L.) Willd. raw material on the quantitative composition of proteins.

Experimental tasks: 1. To determine the amount of proteins extracted from the roots of Baptisia australis (L.) Willd. raw material using PBS (phosphate buffer solution) and precipitating proteins with ammonium sulfate. 2. To determine the amount of proteins extracted from the roots of Baptisia australis (L.) Willd. raw material using PBS and 0.5% thiourea solution and precipitating proteins with ammonium sulfate. 3. To compare the effect of protein extraction methods based on protein content.

Material and methods: Material – fresh Baptisia australis (L.) Willd. roots were collected in Vytautas Magnus University botanical garden medical herbs section. For the first method of protein extraction from raw material we used a phosphate buffer solution (PBSx10) prepared from Na2HPO4, NaH2PO4, NaCl and deionized water; For the second method of the protein extraction from raw material we used phosphate buffer solution (PBSx10) adding 0.5% thiourea solution. For both methods we used protein precipitation method by ammonium sulfate, resuspension method by PBSx1 [2], spectrophotometric (at 595 nm) protein determination by Bradford method [3], statistical analysis method based on SPSS 17.0 and Microsoft Excel.

Results: Extraction of the raw material by the first method showed that 1,056 mg ± 0,170 mg of protein was extracted from 1 g fresh root sample. In the second method of raw material extraction, it was found that 0,481 mg ± 0,105 mg of protein was extracted from 1 g of fresh roots.

Conclusion: After a quantitative analysis of the proteins isolated from the roots of Baptisia australis (L.) Willd, it was found that the higher protein content has been extracted using phosphate buffer only.

References:
The attitude towards medication use among community pharmacy hypertensive patients

Gabija Gulbinaitė*, Jurgita Daukšienė
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*Corresponding author e-mail: ggabija95@gmail.com

Introduction. Hypertension is estimated to cause 7.5 million deaths in the world. Diseases of the circulatory system are main cause of death in Lithuania. There are numbers of study about the importance of appropriate medication usage. The patient attitude towards medication and collaboration with health-care workers can influence medication adherence and treatment outcomes. The aim of the study was to explore the attitude towards medication use among community pharmacy hypertensive patients in Kaunas.

Materials and methods. A method of questionnaire was chosen. The participants were community pharmacy to patients who entered to a randomly chosen pharmacy in Kaunas city to obtain antihypertensive medications during the period from November 2nd to December 31st, 2018. Overall 298 cases were documented. For data analysis we used questionnaires which met the study criteria (76.2% (N=227) questionnaires). The questionnaire consisted of 24 questions. The questions about medication adherence, information sources and attitude towards physicians and pharmacists were included.

Results. Patients made their self-evaluation about medication adherence. 55.9% (N=127) respondents missed their medication dose in the last 12 months. The main reason was forgetfulness (38.8% (N=50) patients). 34.8% (N=79) respondents were refrained from purchasing medicines, which prescribed doctor. The main reason was negative experience, when they were used these drugs (35.4% (N=28) patients). 82.4% (N=187) respondents often consult with pharmacist, when they need nonprescription drugs. 39.6% (N=90) patients always read the medications leaflets. However, only 28.2% (N=64) patients completely understand them. 52.9% (N=120) patients use alternative drugs information sources. The most popular information source is the internet (78.5% (N=95) patients, who used information in alternative sources).

Conclusions. The problem of not appropriate medication usage exists. Poor understanding of drugs use information is associated with medication nonadherence. Patients collaboration with health-care workers and correct information sources can influence appropriate medication usage.

References:
Technology and quality assessment of multiple W/O/W emulsion with grape seed oil and Tea tree (Camellia sinensis L. Kuntze) extract

Julija Jakubavičiūtė*, Giedrė Kasparavičienė
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Introduction: The main advantages of multiple emulsion are: enhanced dermal absorption and ability to protect drugs, which are prone to oxidation [1]. Because of antioxidants (polyphenols, vitamin E) and linolic acid, grape (Vitis vinifera L.) seed oil moisturizes skin, reduces skin aging and provides protection against free radicals [2]. Tea tree extract is rich in catechins and methylxanthines, that is why it has antioxidant, photoprotective and wound-healing effects, when applied topically [3].

Materials and methods: Multiple emulsions were composed of purified water, grape seed oil, Span 80, Tween 80, glycerol, NaCMC. Mixing was done with digital mixer (IKA Eurostar 200, USA). The emulsions were formed by two-step emulsification process at 23±2°C. Testing was done with centrifuge (Sigma, Germany), texture analyser (TA.XT.plus, UK), pH-meter (WinLab, Germany) and electronic microscope (Motic, Japan). Determination of total phenolic compounds (TPC) was done in fresh emulsions and after 8 weeks with Folin-Ciocalteu reagent and UV-spectrophotometer (Shimadzu, Japan).

Results: Stability of inner w/a emulsion was determined by centrifuging at 10000rpm/5min. The stable ones (W1/O ratio 1:3) were used to prepare multiple emulsions. Emulsions were too liquid and not stable, so 1.6% of NaCMC was added. W/O/W ratio of stable emulsions - 3:9:11. Addition of 0.16% of tea tree extract to W1 resulted in drastically lower density, so amount of Tween 80 was adjusted. Firmness, work of shear, consistency, cohesiveness, index of viscosity, ph, droplet size and ratio, also amount of TPC was measured.

Conclusions: Addition of glycerol may result in statistically significantly (p<0.05) higher firmness and work of shear of the emulsion. Addition of tea tree extract - in significantly (p<0.05) lower pH and droplet ratio. Addition of tea tree extract with adjusted emulsifier - in higher consistency, cohesiveness and index of viscosity. The amount of TPC did not change significantly (p>0.05) during 8 weeks of storage.

References:
Chitosan as a natural disintegrant in the technology of orally disintegrating tablets

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Introduction: Orally disintegrating tablet (ODT) - a solid dosage form that disintegrates in the oral cavity in 3 minutes, novel type of orally disintegrating – fast dissolving - tablets attracts more attention because it disintegrates in the oral cavity in 1 min. These tablets have faster onset of action and are suitable for patients having swallowing difficulties. The main challenge in the technology of ODT’s is to reconcile appropriate mechanical strength and disintegration time [1]. Several methods were used in this research to overcome this: the use of natural disintegrant - medium molecular weight chitosan [2,3] and wet granulation before compression of powder - improves the flowability, makes the structure of tablets more porous, but it involves extra steps in the production of ODT’s [1]. The present study aim was to adapt the compression force for the production of fast dissolving tablets with natural polymer chitosan by direct compression and wet granulation methods.

Materials and methods: There were experimentally chosen 10 different levels of pressure and 15 different series of tablets with 7 % polymer chitosan were made (7 series made by direct compression (T3) and 8 series made by wet granulation method (G)). The tablets were evaluated with the tests specified in European pharmacopeia (ph. Eur) [4].

Results: All tablets meet the European pharmacopoeia recommendations for uniformity of mass and uniformity of content.

Friability of ODT’s

Disintegration time of ODT’s

Chart 1. Friability of ODT’s
Chart 2. Disintegration time of ODT’s

The influence of compression force and the method of production of tablets to resistance to friability (chart 1), disintegration time (chart 2) is significant.

Conclusion: Obtained results showed, that it is possible to get fast dissolving tablets by direct compression method with 2,7 compression in tablet press or by wet granulation with 2,6 compression, that met the recommendations of European pharmacopoeia. Tablets made by wet granulation method had lower friability, but the disintegration time had no statistically significant difference (p<0,05).

References:
Antimicrobial and antioxidant activity of methanolic extracts of *Leonurus cardiaca* L. and *Leonurus sibiricus* L.


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**Background**: Preparations of different species *Leonurus* L. contain many different pharmacologically important chemical compounds and have different antimicrobial and antioxidant activities [1]. In this study used medicinal raw – herba, from *Leonurus sibiricus* L. and *Leonurus cardiaca* L. obtained from Kaunas Botanical Garden of Vytautas Magnus University, *Leonurus cardiaca* L. - Mažeikiai district, *Leonurus sibiricus* L. – Mexico.

**Materials and methods**: The extraction method – percolation. Antibacterial activity of methanolic extracts were performed by agar dilution in Petri dishes. The minimum inhibitory concentration (MIC) was established. Total phenolic content was measured by Folin-Ciocalteu method. Antioxidant activity was determined using UV-VIS spectrometric methods (DPPH, ABTS, FRAP).

**Results**: DPPH and ABTS free radical binding activity were varying from 93.35±4.26 to 295.85±11.82 (μmol TE/g) and from 290.30±2.9 to 574.49±10.09 (μmol TE/g). The reductive activity by FRAP was varying from 134.23±5.69 to 520.14±9.45 (μmol TE/g). The highest total phenolic content (414.08±2.24 mg/g), the strongest free radicals binding activities and reductive activity were determined in *Leonurus cardiaca* L. (Mažeikiai district) extract. The lowest MIC was determined in the same extract – 5mg/mL against *Klebsiella pneumoniae* and *Bacillus cereus*. The antioxidative activities were correlated with the total phenol.

**Conclusions**: Methanolic extracts of *Leonurus cardiaca* L. showed better antimicrobial and antioxidant activities than methanolic extracts of *Leonurus sibiricus* L.

**References**:
1. Rui-Han Zhang, Zhi-Ke Liu, Da-Song Yang, Xing-Jie Zhang, Han-Dong Sun, Wei-Lie Xiao. Phytochemistry and pharmacology of the genus Leonurus: The herb to benefit the mothers and more. Journal of phytochemistry. 2018; 167-183.
Effect of two different rootstocks on the anthocyanin composition in fruits of different plum (Prunus domestica L.) cultivars

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Introduction. Plum tree size, resistance to frost and diseases yield and fruit size can be affected by the different rootstocks [1-4]. Origin of rootstock can influence quality of fruits. For this reason we decided to investigate effects of two different rootstocks (Prunus domestica L. cultivar 'Wangenheim Prune' and Prunus cerasifera Ehrh.) on the anthocyanin content.

Materials and methods. Anthocyanins from dried plum samples were extracted using ultrasonic bath Bandelin Sonorex Digital 10 P (Bandelin Electronic GmbH & Co. KG, Germany) for 40 min. 86,64 % ethanol with 0,1 % of HCl was used for extraction. Ultrasound power – 678 W, frequency – 80 Hz. Quantitative analysis was performed by high performance liquid chromatography (HPLC) method using Waters e2695 Alliance system (Waters, USA) with photodiode array detector Waters 2998 (Waters, USA).

Results. The highest amounts of cyanidin–3–O–glucoside was found in fruit samples of plum cultivar 'Čačanska najbolje' grafted on both rootstocks. Highest amount of cyanidin–3–O–rutinoside was found in fruit sample of 'Čačanska najbolje' cultivar ('Wangenheim Prune' plum rootstock). The highest amounts of peonidin–3–O–rutinoside was found in fruits of 'Čačanska najbolje' and 'Jubileum' plum cultivars grafted on both rootstocks and also in fruit sample of 'Valor' cultivar grafted on 'Wangenheim Prune' plum rootstock. Significant differences between different rootstocks were observed for cyanidin–3–O–glucoside in fruits of plum cultivar 'Valor' (F=105,712, p<0,05, η²=0,964) and cyanidin–3–O–rutinoside in fruits of plum cultivars 'Čačanska najbolje' and 'Valor' (F=21,572, p<0,05, η²=0,844 and F=45,87, p<0,05, η²=0,920 respectively). No significant differences were observed for peonidin–3–O–glucoside and peonidin–3–O–rutinoside and plum cultivars 'Edinburginė' and 'Jubileum'.

Conclusions. The effect of rootstock origin on anthocyanin content depends on plum cultivar and structure of anthocyanins.

References:
Student Pharmacists Attitudes Toward Complementary and Alternative Medicine

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Background. Complementary and alternative medicine (CAM) often refers to traditional medicine that is practised in a country but is not part of the country's own traditions [1]. CAM may include modalities such as herbal supplements, spiritual or physical practices. This medicine is widely used in many European countries [1, 2]. Most of the undergraduate students use CAM for the treatment of some simple complications like pain, inflammation, cold and flu [3]. The student feels the need to be well-educated about CAM to better advise their patients in the future [4]. The aim of the study was to evaluate pharmacy students attitudes toward complementary and alternative medicine.

Material and methods: A cross-sectional study was conducted at the Lithuanian University of Health Sciences among students of Pharmacy Faculty. A validated, self-administered questionnaire consisted of 25 questions and 5 sections. The questions about self-practice or use of CAM, barriers to CAM use, sources of information, perceptions about CAM and demographics information were included. 323 out of 396 completed the questionnaire for a response rate of 81.56%. Descriptive statistics were used to analyze frequency, percentage and mean. Data analyses were carried out using Statistical Package for the Social Sciences v.20 (SPSS) with 0.05 as the level of significance.

Results: More than half (73%) of the pharmacy students using at least one type of CAM while 29.4% of them use it at least once a month. Three most common types of CAM used by the students were massage (26%), homeopathy (24.1%) and music therapy (16.1%), mainly to reduce stress(40.4%). The majority of the participants claimed that the main barriers to the use of CAM were insufficient scientific evidences to support CAM use (78.3%). Majority of the students (72.75%) agreed that CAM knowledge is important to be a well-rounded professional with significant association with self use of CAM and gender (p<0.05).

Conclusions: Pharmacy students hold generally favorable views of CAM and believing that CAM includes ideas and methods from which conventional medicine could benefit. It is essential to increase the CAM practice, knowledge and safety evidence about CAM. Still lack of scientific evidences were the most perceived barrier for CAM use.
The Impact of Technological Factors on Ethanol Extracts of Dwarf Everlast

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Introduction: Dwarf Everlast (lot. Helichrysum arenarium (L.) Moench) is herbaceous perennial plant, belonging to Asteraceae family. The plant is widely used for digestive diseases, liver protection, detoxity in traditional medicine. [1] The flowers of Dwarf Everlast are rich in phenolic compounds, glycosides, lignans. It is known that the plant has antioxidant properties. [2] The aim of this study was to model the best quality ethanolic extracts of Dwarf Everlast, according the technological factors (bulking time, concentration of extractor) and to evaluate their stability.

Materials and methods: Tested objects were ethanolic extracts of Dwarf Everlast. The content of total phenolics in the extracts was determined spectrometrically according to the Folin–Ciocalteu procedure. Spectrophotometric analysis is based on the absorption of the electromagnetic flow of substance molecules, ions or complexes of UV, visible and infrared spectra. The antioxidant activity was determined spectrometrically according to the DPPH method. Antioxidant activity depends on the percentage of phenolic compounds neutralize DPPH radical. The dry residue was determined by gravimetric method using drying cabinet. The stability of extracts was determined for 18 months.

Results: All extracts showed a regularity that the quality of the extracts is improved with longer bulking times. The highest dry residue, contents in phenolics and antioxidant capacity was obtained for the extracts with bulking time 120 min. The evaluation extract same quality indicators established that the concentration of extractor is 55%. The antioxidant activity value of the most appropriate extract tested is 76,88%±0,12%, the phenolics compound value is 9,96mg/ml ± 0,05mg/ml and dry residue value is 17,85%±0,15%.

Conclusions: The analysis has shown that technological factors are important in producing high quality extracts. Best bulking time is 120 minutes and the most reliable concentration of extractor is 55%. The extract produced under these conditions remains stable for 18 months.

References:
The technology of a medicinal syrup with pine buds

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Introduction: Pine buds products are used as antiseptic, tonic but mostly as expectorant in respiratory system disorders [1]. This medical plant chemical composition consists of many essential oils and antioxidants such as vitamin C and some phenolic compounds which mostly consists of phenolic acids (gallic acid, benzoic acid and etc.) [2]. One of the most known medicinal formulation of pine buds is syrup. It is useful to know the amount of the antioxidants in the pine buds’ syrups to be able to assess the health impact of a product. The aim of this study is to produce a single syrup with the best properties, which contains of ethanolic liquid extracts of pine buds.

Material and methods: A pine buds’ syrup was made and tested in the laboratory scale with three different ethanol extracts of pine buds (with 30%, 35% and 40% of ethanol solutions). The total amount of phenolic compounds within pine buds syrup was measured using spectrophotometric determination on gallic acid. Antioxidant activity was determined spectrophotometrically by DPPH radical scavenging method. Dynamic viscosity and stability studies were conducted. The results were obtained using Microsoft Office Excel 2013 and GraphPadPrism 8.1.0 programs.

Results: The lowest amount of phenolic compounds (0.39 mg/ml) and antioxidant properties (15.81%) contained a syrup with the 30% of the ethanol pine buds’ extract. The highest amount of phenolic compounds (0.55 mg/ml) and antioxidant properties (17.74%) contained a syrup with 40% of the ethanol pine buds’ extract. The highest dynamic viscosity (59.61 mP·a) also showed up in a syrup with 40% of the ethanol extract. Stability studies of this particular syrup has shown statistically insignificant differences during the relevant study period.

Conclusion: All obtained data between the different syrups was statistically significant. According to the analytical methods, the maximum total amount of phenolic compounds and antioxidant activity were in the syrup with 40% of the pine buds’ extract.

References:
Finding Distinct Types of Organizational Culture in Lithuanian Community Pharmacies Using Cluster Analysis

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Introduction: After establishing the prevailing culture type in Lithuanian community pharmacies as Clan-like, there was a need to inspect if groups of pharmacists that work in distinctively different cultures exist. The aim of this study was to perform cluster analysis to find such groups.

Materials and methods: Hierarchical cluster analysis was performed, using Ward’s method and squared Euclidean distance as a measure of similarity was used when performing analysis. The accuracy of clustering was tested by discriminant analysis.

Results: The obtained results revealed two distinct groups exist, one made of 338 pharmacists (the majority group) and the other that consists of 46 pharmacists (the minority group). The majority group has a more well-rounded culture profile, while the minority group completely rejects market culture and wishes to work in a very distinct clan organisational culture.

Conclusions and future work: Even though pharmacists would prefer clan culture overall, there is a balanced profile of preferred cultures overall, with all types included. However, there is a minority group that rejects other culture types and only agrees to working in clan culture.

References:
**The effect of gel forming agents on the qualitative parameters of the gels**

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**Introduction:** Gels are semisolid forms that consist of two or more components. One of the component is liquid while the other one is polymer which forms the gels structure [1]. Gels are classified into hydrogels which are water soluble and oleogels which were made from oil base [2]. The difference is that both of these forms formulating agents that are responsible for the shape of the gel are not the same. In that manner they provide unequal hardness, adhesion, cohesion and consistency [3]. The aim of this study was to determine how gelification agent can affect physical and mechanical properties of gel.

**Materials and methods:** The subjects of our study were hydrogel and oleogel. Both of the products consisted of different structure gelification agents. The hydrogel consisted of purified water and carboxymethylcellulose sodium salt at the concentrations 4, 4.5, 5, 5.5, and 6 percent. Mixture of sea buckthorn (*Hippophae rhamnoides* L) and marigold (*Callendula officinalis* L) oils (1:1) were used to compose oleogel. Stearic acid and sorbitan monostearate were used as a gelification agents at the concentrations 6, 9, 12, 15 percent. Mechanical properties were determined by spreadability test; firmness and work of shear parameters were measured. Testing was conducted using texture analyzer (TA.XT.plus, UK). To determine the viscosity of the preparations - rotational viscometer (Fungilab, USA) was used.

**Results:** Firmness increased from 181.1 g till 715.1 g and work of shear varied from 288.580 g•sec till 991.562 g•sec of hydrogels with increasing the concentration of sodium CMC. Firmness increased from 58.0 g till 224.3 g and work of shear varied from 147,740 g•sec till 189,010 g•sec of oleogels with increasing the concentration of stearic acid and sorbitan monostearate. Viscosity of hydrogels increased from 1041.05 mPa•s till 823702 mPa•s and from 2004.7 mPa•s till 9847.1 mPa•s of oleogels likewise texture parameters. The spreadability and consistency testing results presented that hydrogels are thicker than oleogels. The viscosity test displayed that whilst higher concentration of hydrogel gelification agent were used during the preparation the higher the viscosity was. We observed that same results with the viscosity of oleogel although the overall viscosity was lower than that of hydrogels.

**Conclusions:** The concentration of gelification agents influenced the mechanical and physical properties of hydrogels and oleogels (p<0.05).

**References:**
Variation of quantitative composition of anthocyanins, proanthocyanidins and total phenolic compounds in lingonberry (Vaccinium vitis-idaea) fruits

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Introduction. Lingonberry (Vaccinium vitis-idaea L.) belongs to Ericaceae family. It is widely spread in the northern hemisphere in such countries as Russia, Lithuania, Latvia, Iceland, Scandinavian countries and etc. Lingonberry fruits have anti-inflammatory [1], antibacterial, antioxidative [2] activities and effect on the cardiovascular system [3]. Most of the biological activities of herbal extracts are contributed to polyphenolic content.

Materials and methods. The aim of this study was to evaluate variation of quantitative and qualitative composition of phenolic compounds, proanthocyanidins and anthocyanins in the samples of lingonberry (Vaccinium vitis-idaea L.) fruits growing in natural habitats of Lithuania. Spectrophotometric methods were applied respectively. Fruit samples were extracted with 70 % (v/v) ethanol 15 min in ultrasonic bath. The total phenolic content has been evaluated by Folin-Ciocalteu method. The total proanthocyanidins content has been determined using DMCA (4–dimethylaminocinnamaldehyde) UV-VIS spectrophotometric method. Total anthocyanins content was assayed according to the European Pharmacopoeia.

Results. Analysis of the composition of phenolic compounds in lingonberry fruits showed that the total content of phenolic compounds varies from 18,23±0,8 mg/g to 42,78±2,36 mg/g. The total content of proanthocyanidins varies from 0,67±0,5 mg/g to 15,61±3,82 mg/g, anthocyanins alters from 0,22±0,06 mg/g to 1,93±0,11 mg/g in analyzed samples. FRAP and ABTS methods were applied for the determination of antiradical activity of berries extracts.

Conclusions. The results of this research indicated that the amount of investigated biologically active compounds in lingonberry (Vaccinium vitis-idaea L.) fruit samples varies due to the vegetation period and different cenopopulation.

References:
Introduction: The Lithuanian pharmaceutical market remains a dynamic commercial field, with authorities willing to increase public healthcare funding, but also seek measures that will promote medical and financial efficiency in the sector. On the same time, globally manufacturers increase the speed of innovations and introduce successful drugs to market.

Materials and methods: The research is based on pharmaceutical industries statistics analyses and comparison with the literature.

Results: Results shows growing export and import in Lithuania, as also the salaries and working hours based on pharmaceutical production. In global situation, there are many data of rising employment, global spending on medicines, R&D services and other. The biggest pharmaceutical markets are in USA and China. USA has also the largest increase in R&D services in contrast to Europe and Japan. The biggest amounts of money (dollar figures in millions in 2017) are invested in pre-clinical ($11,1687), phase III ($21,3770) clinical trials rather than in phase I ($6,2010), phase II ($8,2774) clinical trials.

Conclusions: To sum up, innovation in medicines, along with economic progress, will result in a rise in volume for the pharmaceutical industry. In developed markets, ageing population and development of new specialty medicines will continue to drive pharmaceutical growth. Because of growing export, Lithuania pharmaceutical industry is going to increase in the future. In 2008 approximately 83% of Lithuania’s exports was destined to other EU member countries, and another 4.5% to non-EU countries, excluding DCs. Latvia, the leading destination, accounted for 41% of Lithuania’s exports, followed by Estonia (24%) and Germany (12%). DCs accounted for a 12% share of total Lithuanian exports.

References:
1. The pharmaceutical industry in figures. EFPIA;
2. The pharmaceutical industry and global health: facts and figures 2017;
3. IMS market prognosis, October 2015;
4. Eurostat, COMEXT database, June 2018;
5. Sun pharmaceutical industries;
6. Findout.com database, which has artificial intelligence and Big Data research sources;
7. CBI market survey the pharmaceutical products market in Lithuania, 2010.
Foundations of the pharmaceutical development of sterile dosage forms

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Introduction. The purpose of pharmaceutical development is to design a quality product and its manufacturing process to consistently deliver the intended performance of the medicinal product. Pharmaceutical development has some features depending on the route of administration, dosage form, bioavailability, strength, and stability of a medicinal product.

Materials and methods. Methods of systematization and generalization of literature and own data. Results. Among sterile dosage forms are medicinal products for parenteral administration, eye dosage forms, urethral sticks, sticks for wounds, medicinal products that are intended for application on the skin with severe injuries or large open wounds, solutions for hemofiltration and hemodiafiltration, concentrates for hemodialysis, solutions for peritoneal dialysis. The route of drug administration puts special requirements for quality and manufacture of medicinal products.

Marketing research is the first step that determines the quality of any future medicinal product, the general product design, a product image and general characteristics, cost and competitiveness of the medicinal product, marketing specification and technical task for pharmaceutical development which contain, in particular, Quality Target Product Profile, the information about composition, packaging materials and class of clean areas and premises for future manufacture of the medicinal product being developed, sterilization regime, etc. Next stage of pharmaceutical development of liquid sterile dosage forms is experimental composition and laboratory technology elaboration of the medicinal product with relation to stability study of the composition during thermal sterilization and procedure elaboration of the determination of sterility and content of bacterial endotoxins. As a rule, elaboration of composition, including the selection of excipients, and choosing of sterilization regime is carrying out simultaneously. Afterward, development of pilot industrial and industrial batches is carrying out with the elaboration of validation protocols of technological process. The registration dossier in the form of Common Technical Document is formed on the base of performed theoretical and experimental studies for submission into regulatory bodies.

Conclusions. Steps of pharmaceutical development of liquid sterile dosage forms are provided briefly.
The role of a hospital pharmacist in the treatment of chronic kidney disease

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Introduction. The prevalence and morbidity of chronic kidney disease (CKD) is an important health problem in the world. The population of patients receiving treatment by renal substitution therapy is growing faster than the world population as a whole.

According to the Quality Standards of Pharmacy Services, pharmacists develop their practice in a way that provides patients with wider service on rational use of medicines. In this direction, we would like to consider the role of a hospital pharmacist in the treatment of CKD.

Materials and methods. Methods of systematization of information have been used.

Results. We have substantiated main functions of a hospital pharmacist in the treatment of CKD:

1. Purchase and/or acceptance of drugs and medical products, and organization of their storage. Calculation of the need of drugs and medical products at the department of a hospital for a week (month, half a year, year).
2. Quality control of drugs and medical products, including water control for pyrogens.
3. Informational work among medical personnel: seminars, printed materials on rational pharmacotherapy of CKD (including medical errors analysis), new research about these drugs and medical products.
4. Educational work among students of pharmaceutical and medical faculties.
5. Regular tracking and analysis of the results of laboratory tests of patients and their appointments, communication with doctors and giving recommendations on the correction of appointments (if needed); detailed explanation to the patients of therapy’s scheme, possible side effects of drugs, etc.
6. Participation of a hospital pharmacist in the development and updating of the CKD therapy protocol. Tracking the latest scientific publications on this topic, analyzing them, formulating recommendations.
7. Observation and fixing of drugs adverse reactions in the treatment of CKD, their frequency, the features of drugs interactions, and the most frequent "mistakes of appointments", etc.

Conclusions. The role and functions of a hospital pharmacist in the treatment of CKD have been determined: purchase, acceptance, storage and quality control of drugs and medical products; evaluation of the rationality of CKD pharmacotherapy; educational and information functions.
Correlation between instrumental and sensory analysis
of different product formulations

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Introduction: Acceptable characteristics of topical products for the consumers should have a suitable texture and spreadability. These characteristics can vary according to the composition of ingredients; therefore, it can be carefully chosen during product modelling. Descriptive sensory profiling is an essential tool in this process as it allows an experienced panel to assess the qualitative and quantitative characteristics of a product [1]. A combined sensorial and instrumental characterization of formulation properties is an important tool to predict sensorial characteristics from theoretical data [2].

Materials and methods: Tested formulations were lipsticks, scrubs and creams containing natural composition and prepared in the laboratory scale. Sensory analysis was performed by filled questionnaires with permissions of Bioethics commission of University of Lithuanian life sciences. Texture profile analysis of formulated products was conducted using a TA. XT. plus (Stable Micro Systems Ltd, Godalming, Surrey, UK) texture analyzer. Statistical analysis was performed by Microsoft Excel; correlation analysis was performed applying Spearman’s rank coefficient.

Results: Instrumental data of penetration and hardness evaluated by sensory analysis were compared for the lipstick formulations: high negative correlation r = - 0.879 was determined. A medium correlation r = 0.463 was detected between common texture (sensory) and consistency (instrumental) parameters for the cosmetic skin scrubs. A highest correlation was observed between sensory parameter - spreadability and instrumentally tested - firmness and work of shear r = 0.95 for cream formulations. Results showed that the raw materials of different products strongly influenced the physical, texture and sensorial parameters.

Conclusions: Correlation analysis showed significant relationship between sensory and instrumental evaluation. The objective instrumental methods can be successfully used for the new products formulation, to avoid time and money consuming sensory evaluation methods.

References:
Qualitative and quantitative comparison of essential oils in thyme herb and thyme spice

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Introduction
Thymus vulgaris is a well-known herbal medicine that has been used for thousands of years to treat alopecia, dental plaque, dermatophyte infections, bronchitis, cough, inflammatory skin disorders, and gastrointestinal distress [1]. The plant has been used since ancient times as a culinary ingredient to add flavor too. The major constituents of commercial T. vulgaris essential oil are thymol, γ-terpinene, p-cymene, carvacrol and linalool [1]. However, the compositions of the essential oils are very much influenced by intrinsic factors, such as species, cultivar, clone and ecotype, ecological factors, etc. For this reason, wild and cultivated plants of the same species, but from different contexts can express different features and chemical compositions [2]. The aim of this study – to compare qualitative and quantitative composition of essential oils in thyme herb and thyme spice.

Materials and Methods
Distillation. 30 g of raw material were weighed into a 1 L round-bottomed flask, 500 mL of distilled water was added and the mixture was stirred. Distillation is carried out with distilled water. The thermostatic bath with glycerol was used for extraction, maintaining a constant temperature of 120 °C. The prepared test samples were kept in a thermostatic bath for 3 hours until the essential oil layer was separated. 1 mL of hexane was added to the collected distillate.

Gas chromatography-mass spectrometry. Qualitative analysis of essential oils was performed by GC-QP2010 gas chromatography (Shimadzu, Japan) with a mass spectrometer (RTX-5 MS column, 30 m × 0.25 mm × 0.25 μm; Perkin Elmer, USA). Helium gas was chosen as a gas carrier. Analytical conditions: injector temperature 240°C, column temperature 60°C, injectable sample volume - 1 μL. The temperature in the gas chromatograph was programmed step by step from 60°C (0 min) to 150°C 2°C/min. speed and from 150 °C to 285°C raise 10°C/min. speed.

Results
Qualitative and quantitative composition of essential oil in thyme herb and thyme spice were different. 24 essential oils were identified in spice raw material and 22 – in thyme herb. The main source of the thyme spice were thymol and linalol (56.68 % and 11.72 % respectively). These amounts were significantly (p<0.05) higher than in thyme herb (2.52 % and 3.46 % respectively). Meanwhile, the source of thyme herb were aromadendrin and camphor (17.76 % and 15.35 % respectively).

Conclusion
The qualitative and quantitative composition of essential oils differs significantly between thyme herb and thyme spice.

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