NATIONAL UNIVERSITY OF PHARMACY
DEPARTMENT OF DRUGS TECHNOLOGY
Pharmacy-based technology of drugs

# NON-AQUEOUS SOLUTIONS

*A LECTURE FOR ENGLISH STUDENTS of THE 3-RD COURSE IN THE SPECIALTY "PHARMACY"*
*Edited by associate professor Herasymova I.V.*

# THE PLAN OF THE LECTURE

1. Non-aqueous solutions.
2. Technology of alcohol solutions.
3. Non-aqueous solutions' quality control and registration for dispensing.

# QUESTIONS FOR SELF-CONTROL

1. Characteristics of non-aqueous solvents (ethyl alcohol, vegetable oils, Vaseline oil, glycerol, chloroform, esylons, dimexide, polyethyleneoxyde-400).
2. Requirements to non-aqueous solvents .
3. Rules engineering safety at work and explosive flammable solvents

# References:


1. Tikhonov A.I., Yarnykh T.G., Yuryeva A.B., Garkavtseva O.A. **Chemist's Technology of Drugs: The manual for students of higher schools** / Ed. by A.I. Tikhonov and T.G. Yarnykh. – Kharkiv: NUPh; Original, 2011. – 424 p
2. **Dry, liquid and soft medicinal forms.** A textbook for English students in speciality "Pharmacy" / A.I. Tikhonov, T.G. Yarnykh, A.B. Yuryeva, L.N. Podorozhna, S.S. Zuykina; Ed. by A.I. Tikhonov. – Kharkiv: NUPh; Original, 2011. – 208 p.
3. Tikhonov A.I., Chemist's technology of drugs. **Liniments.** A lecture for English students of the 3-rd year, speciality "Pharmacy": a handbook for out-of-class work of students / Edited by acad. A.I. Tikhonov. - Kh.: PH of NUofPh, 2009. – 24 p.
4. Tikhonov A.I., Yarnykh T.G., Yuryeva A.B., Podorozhna L.N., Zuykina S.S. **Biopharmaceutics.** Lectures for English students on the speciality "Pharmacy": a handbook for the out-of-class work of students/ edited by acad. A.I. Tikhonov. – Kharkiv: NUPh, Original, 2011. – 140 p.

# 1. NON-AQUEOUS SOLUTIONS

**Non-aqueous solutions**

- lotions
- greasing
- washings
- drops
  - intranasal
  - ear
  - tooth
- inhalations
- rinsing

**Solvents**

- **Volatile**
  - Ethyl alcohol
  - Chloroform
  - Ether medical
- **Non-volatile**
  - Glycerol
  - Fatty oils
  - Vaseline oil
  - Dimexide
  - PEO-400
  - Esilone
- **Combined**
  - Various combinations of solvents

# 1. NON-AQUEOUS SOLUTIONS

**Peculiarities of the non-aqueous solutions technology**

- Prepare solutions directly in the bottles for dispensing.
- Place dry substances into the bottle for dispensing as first, then add solvents (alcohol – by volume; the rest – by weight.
- The straining and filtering stages are undesirable; for volatile substances – heating is undesirable (inflammable).
- Prepare solutions on the dense non-volatile solvents with thermostable medicinal substances by heating of a substance and a solvent together on the water bath up to 50-60 °C.
- Prepare solutions on the dense non-volatile solvents with thermolabile, volatile and aromatic medicinal substances (menthol, camphor, phenol) by dissolving of these substances in the solvent previously heated in the bottle for dispensing up to 40-50°C (the order of dissolving is registered in the front side of WCP).
- If the dental drops with eutectic alloys (menthol, camphor, chloral hydrate, phenyl salicylate) are prescribed, place the substances in the bottle for dispensing, heat on the water bath (at 40°C) until complete dissolution.

# 2. TECHNOLOGY OF ALCOHOL SOLUTIONS

If the concentration of alcohol is not specified in the prescription, *90 %* ethyl alcohol is used, except the cases when concentration is specified by NTD:

**Alcohol, 96 %** →
- 1-2 % solution of iodine
- 1 % solution of cytral

**Alcohol, 95 %** →
- 1.5 % solution of hydrogen peroxide

**Alcohol, 70 %** →
- 0.5-1-2-3 % solutions of boric acid
- 1-2 % solution of resorcinol
- 0.25-1-2-3-5 % solutions of levomycetin
- 4 % solution of tannin
- 2 % camphor alcohol
- 10 % formic alcohol
- 1-2 % solutions of salicylic acid

**Alcohol, 60 %** →
- 1 % solution methylene blue
- 1-2 % solution of diamond green

# 2. TECHNOLOGY OF ALCOHOL SOLUTIONS

• The ***CVI*** when dissolving dry substances prescribed in the quantity more than 3 % ***is not taken into account*** in alcoholic solutions;
• When the concentration of alcohol required is absent in the chemist's, it is prepared from the alcohol with a higher concentration using ***alcoholic tables*** or calculating the ***amount of alcohol according to the formula***:

$$X = V \cdot \frac{B}{A}$$

where: ***X*** – is the quantity of a stronger alcohol, ml;
***V*** – is the quantity of ethyl alcohol of the required concentration, ml;
***B*** – is the required concentration of alcohol, %;
***A*** – is the concentration of a stronger alcohol has to be diluted, %.

**NB !**

**The quantity of purified water by difference of volumes of alcohol of the required concentration and a strong alcohol is not permitted to calculate, because the reduction of the volume of the water-alcoholic solution (the phenomenon of contraction) is not taken into account**

# 2. TECHNOLOGY OF ALCOHOL SOLUTIONS

Ethyl alcohol is in chemist's shop on the qualitative-quantitative account; the prescription is made out in addition by seal "Medical establishment". It also remains in a chemist's for 1 year, the drug is made out by "Signature"; on the back side of the prescription recalculation of volumetric units into the weight ones should be performed (as the account is made by weight).

*Rp.:* *Acidi salicylici 0.3*
*Spiritus aetylici 30 ml*
*M.D.S. Wipe skin of the face.*

Doctor's seal Doctor's signature

Seal "Medical establishment"

**Technology:**

1. Place 0.3 g of salicylic acid directly into the dry bottle for dispensing.
2. Add 30 ml of 70 % alcohol or the calculated amount of 90 % alcohol and purified water.
3. Dissolve while mixing.
4. Close the bottle by a cork and a cover, register for dispensing:
the prescription number;
"Signature";
the additional labels ("Keep in a cool dark place", "Keep out of the reach of children", "Keep out of fire".

# 3. NON-AQUEOUS SOLUTIONS QUALITY CONTROL AND REGISTRATION FOR DISPENSING

**Quality control** →

- Written
- Asking
- Visual (colour, smell, taste)
- Dispensing

**Registration for dispensing** →

- "Internal" or "External"
- "Keep out of the reach of children"
- "Store in a dark cool place"
- "Shake well before use"

**NB!**

Drops and solutions with poisonous or narcotic substances are sealed up and registered for dispensing by signature and additional label "To be handled with caution"

# *CONCLUSIONS*

1. Non-aqueous solutions were considered.
2. Technology of alcohol solutions was explained.
3. Non-aqueous solutions' quality control was studied.
4. Registration for dispensing was studied .

# THANK YOU FOR YOUR ATTENTION!