



**NATIONAL UNIVERSITY OF PHARMACY**  
**TECHNOLOGY OF DRUGS DEPARTMENT**



Discipline “Pharmacy-based technology of drugs”

*The topic of the lecture :*

**“Technological  
peculiarities of  
emulsions preparation ”**



a lecture for English students of 3<sup>rd</sup> course  
in the speciality “Pharmacy” for foreign students

*Lecturer: associate professor Yuryeva A.B.*

# **THE PLAN OF THE LECTURE**

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- 1. Rules of introduction medicinal substances into emulsions**
- 2. Formulation of emulsions**
- 3. Quality control and storage of emulsions**
- 4. Perfection of emulsions technology**

## **QUESTIONS FOR SELF-STUDY**

- 1. Prospects for the development of emulsions technology**
- 2. Introduction of the means of small mechanization;**
- 3. Instrumental methods of quality assessment.**



# REFERENCES:

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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. Tikhonov A.I., Yuryeva A.B. Chemist's Technology of Drugs. **Emulsions**. 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.
3. **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.
4. Tikhonov A.I., Yuryeva A.B. Chemist's technology of drugs. **Suspensions**. 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.
5. 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. Rules of introduction medicinal substances into emulsions

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## The addition of medicinal substances (MS) to emulsions

MS dissolve  
in water

Dissolve in a part of  
water, which intended  
for the dilution of  
primary emulsion

It is possible  
to use as a  
concentrated  
solutions

by analogy adds an alcohol solutions,  
syrups, extracts

MS dissolve in oil

Dissolve in oil before  
introduction into the  
primary emulsion

The amount  
of emulsifier  
calculate for the  
mass of oil phase

exception - phenylsalicylate

MS  
undissolve  
in water and oil

By rules of suspension  
preparations: adds as a  
thinnest powder by a way of  
the careful grinding with  
prepared emulsion

Add  
a stabilizer, if  
necessary



## 2. Formulation of emulsions

Per 10,0 of oil should be added the following components:

- ✓ **5.0 g of gelatose (7,5 ml of water);**
- ✓ **2.0 g tweene-80 (2-3 ml of water);**
- ✓ **10.0 g of dry milk (in a solution with 10 ml of water);**
- ✓ **1.0 g of methylcellulose (as 5 % solution – 20.0 g);**

## 2. Formulation of emulsions

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Checking of doses:

M total = 100.5

Number of doses:  $100.5 / 15 = 6.7$

15 = 6.7

M.S.D. =  $0.5 / 6.7 = 0.07$

M.D.D. =  $0.07 \times 3 = 0.21$

H.S.D. = 0.5

H.D.D. = 1.5

Doses are not overstated *(as emulsifier are use the solution of Methylcellulose 5 %)*

**Rp.:**

<b>Emulsi</b>	<b>olei</b>	<b>Persicorum</b>	<b>100.0</b>
<b>Coffeini-Natrii</b>		<b>benzoatis</b>	<b>0.5</b>

**Misce. Da. Signa. Use 1 table spoon 3 times a day.**

### WCP (reverse side)

**Peach oil:  $100.0 / 10 = 10.0$**

**Solution of MC 5 %:  $10.0 \times 2 = 20.0$**

**(water for preparation of the primary emulsion is not required)**

**Purified water for diluting of the primary emulsion:**

**$100.0 - (10.0 + 20.0) = 70 \text{ ml}$**

**Solution of Caffeine-sodium benzoate 10% (1:10):  $0.5 \times 10 = 5 \text{ ml}$**

**Purified water:  $70 - 5 = 65 \text{ ml}$**

### WCP (front side)

Date

Nº Pr.

**Sol. Methylcellulosae 5 % 20.0**

**Olei Persicorum 10.0**

**Aquae purificatae 65 ml**

**Sol. Coffeini-natrii benzoatis 10 % 5ml**

**$m_{\text{total.}} = 100.5$**



## 2. Formulation of emulsions

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### Technology:

In porcellain mortar put 20.0g of 5% solution MC, add 10.0g of Peach oil, mix until obtaining primary emulsion. In a vessel measure 65.5 ml of purified water, and 5 ml of 10% solution of caffeine sodium benzoate. Put this solution in the mortar by several portions for dissolving of the primary emulsion. Obtained emulsion put in the bottle for dispensing, cork, register by prescription number.

#### Stick labels:

- "For internal use ";
- "Shake well before use";
- "Keep in a cool, dark place";
- "Keep out of the reach of children".



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**Camphor is a volatile, aromatic and poorly powdered substance; soluble in fats, oils, alcohol.**

*(as emulsifier – tween-80)*

In a porcelain cup weigh out 20.0 g of castor oil and dissolve 1.0 g of camphor, it is possible at the heating (till 40°C) on the water bath. In a mortar place 4.2 g of tween-80, add oil solution of camphor and mix. Than add 5 ml of water by drops and grind till the primary emulsion obtained. The prepared primary emulsion dilute gradually by 170.8 ml of purified water.



## 2. Formulation of emulsions

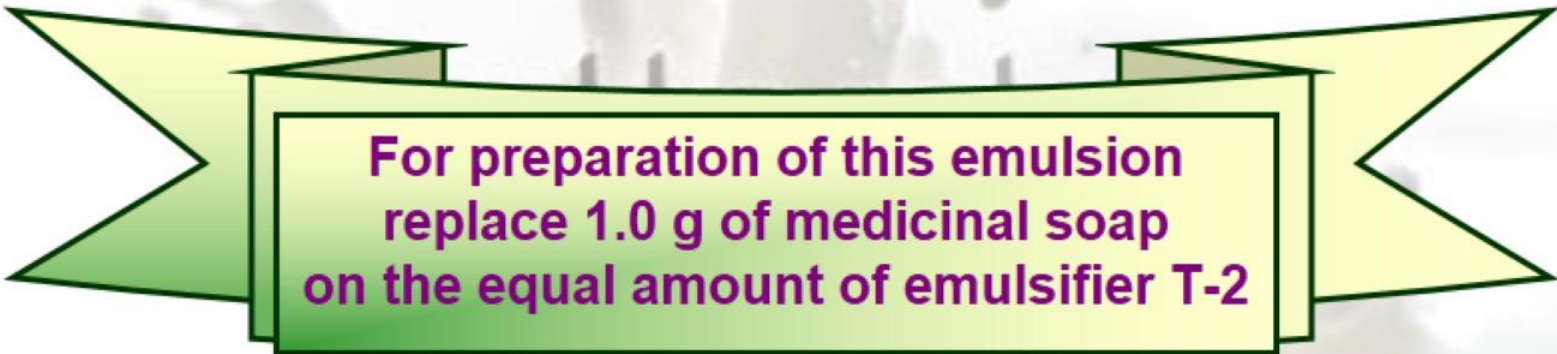
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**Rp.: Benzylis benzoatis 20.0**

**Saponis viridis 2.0**

**Aquae purificatae 78 ml**

**Misce. Da. Signa. For a smearing of skin.**



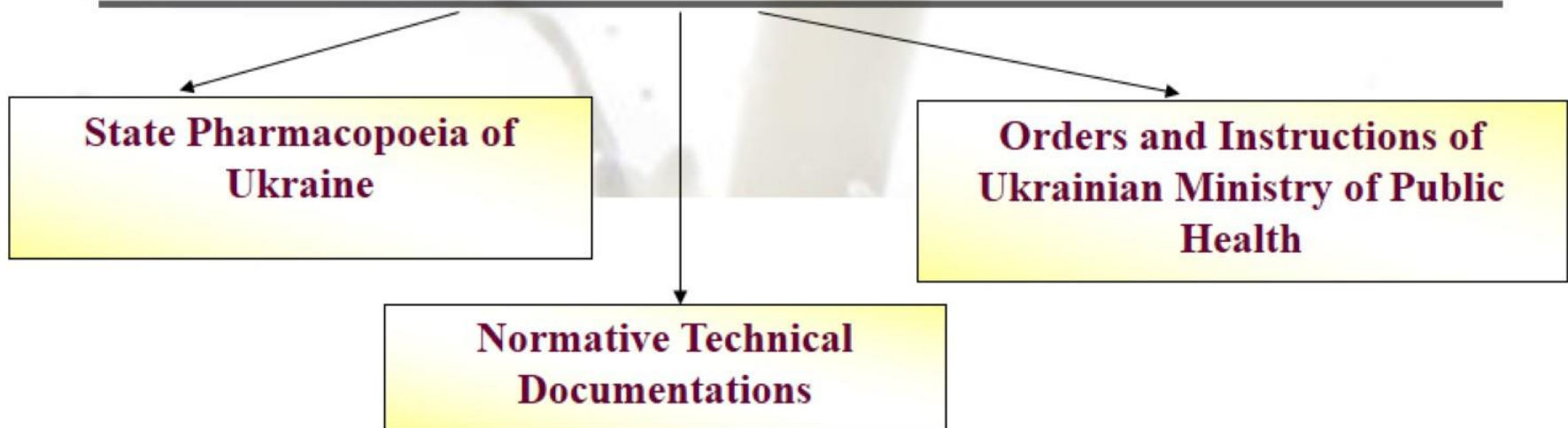
**For preparation of this emulsion  
replace 1.0 g of medicinal soap  
on the equal amount of emulsifier T-2**

In a porcelain cup melt 1.0 g of emulsifier T-2, outpour in a mortar which warmed before, add 1-2 ml of hot purified water, mix until a mass as sour cream formed. Than add by portions the remaining amount of hot water with dissolved 1.0 g of the medicinal soap and carefully mix. Then add 20.0 g of benzylbenzoate by portions at the mixing.

# 3. Quality control and storage of emulsions

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**The control of emulsions quality carry out accordantly:**



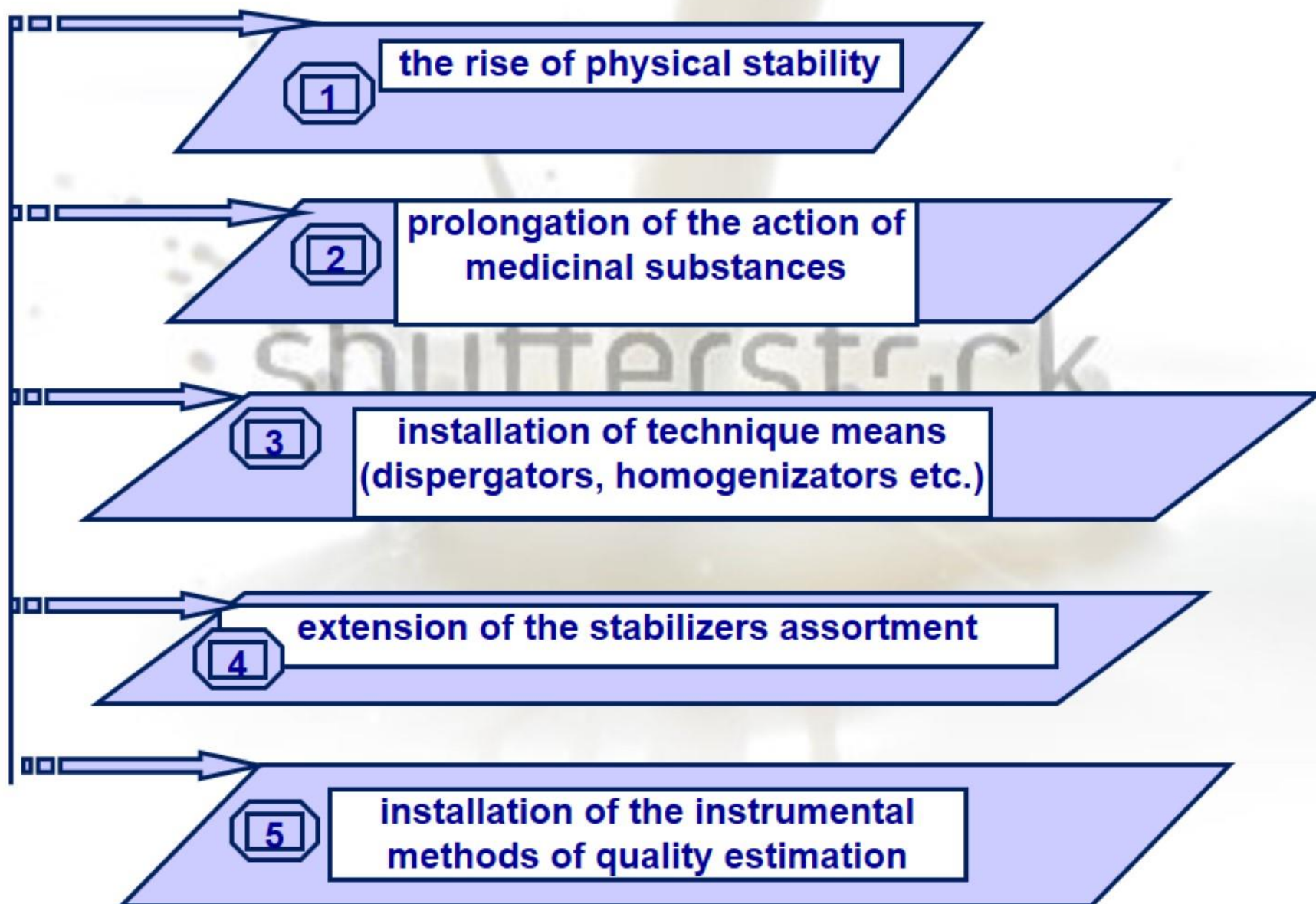
**The quality control includes:**

- written;
- questionnaire;
- organoleptic (color, smell, taste), homogeneity and the absence of mechanical inclusions;
- physical (total mass, which after medicine preparation must not exceed of the possible norms deviation);
- chemical (selective);
- control at dispensing.



## 4. Perfection of emulsions technology

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# Conclusions

1. Rules of introduction medicinal substances into emulsions has been generalized
2. Formulation of emulsions have been studied
3. Quality control and storage of emulsions reviewed
4. Perfection of emulsions technology have been analyzed





**Thank you for  
attention!**