NATIONAL UNIVERSITY OF PHARMACY
TECHNOLOGY OF DRUGS DEPARTMENT

Discipline "Pharmacy-based technology of drugs"

The topic of the lecture :

"Pharmaceutical incompatibilities"

A LECTURE FOR ENGLISH STUDENTS of THE 3-RD COURSE IN THE SPECIALTY "PHARMACY"

Edited by associate professor Herasymova I.V.

PLAN OF THE LECTURE

1. Classification of chemical incompatibilities.
2. Oxidizing-restorations reactions.
3. Reactions of ousting.
4. Reactions of exchange decomposition.
5. Reactions of hydrolysis.
6. Reactions of neutralization.

Questions for self-control

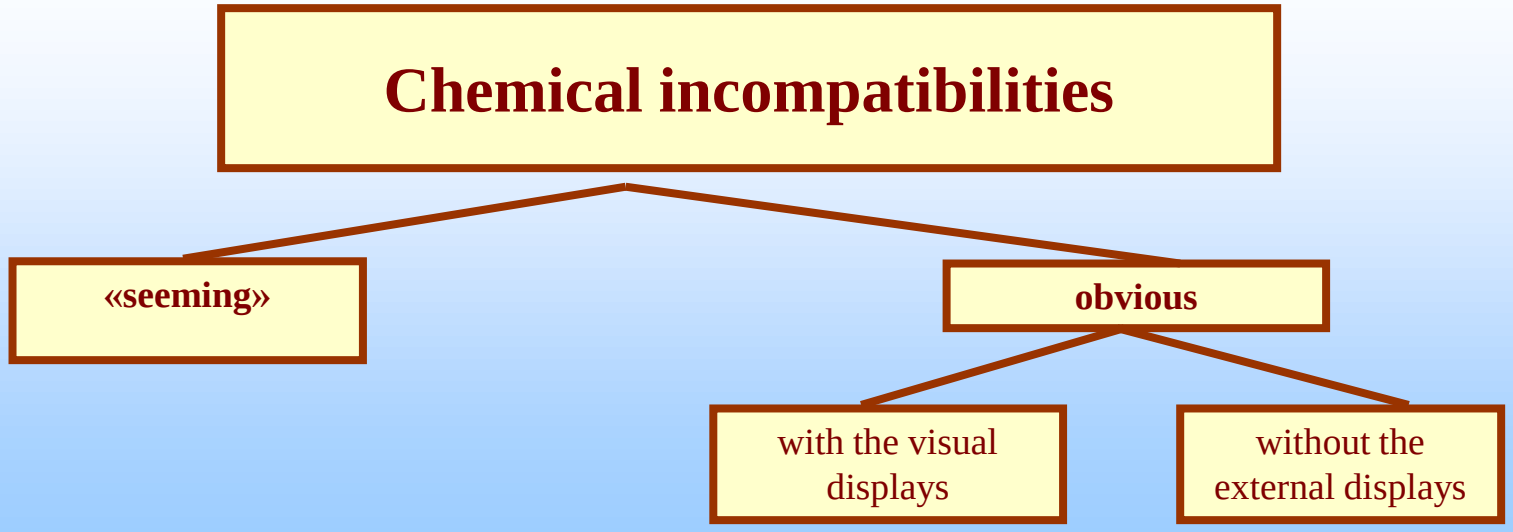
Incompatible combinations of medicinal substances in formulas

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., 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.

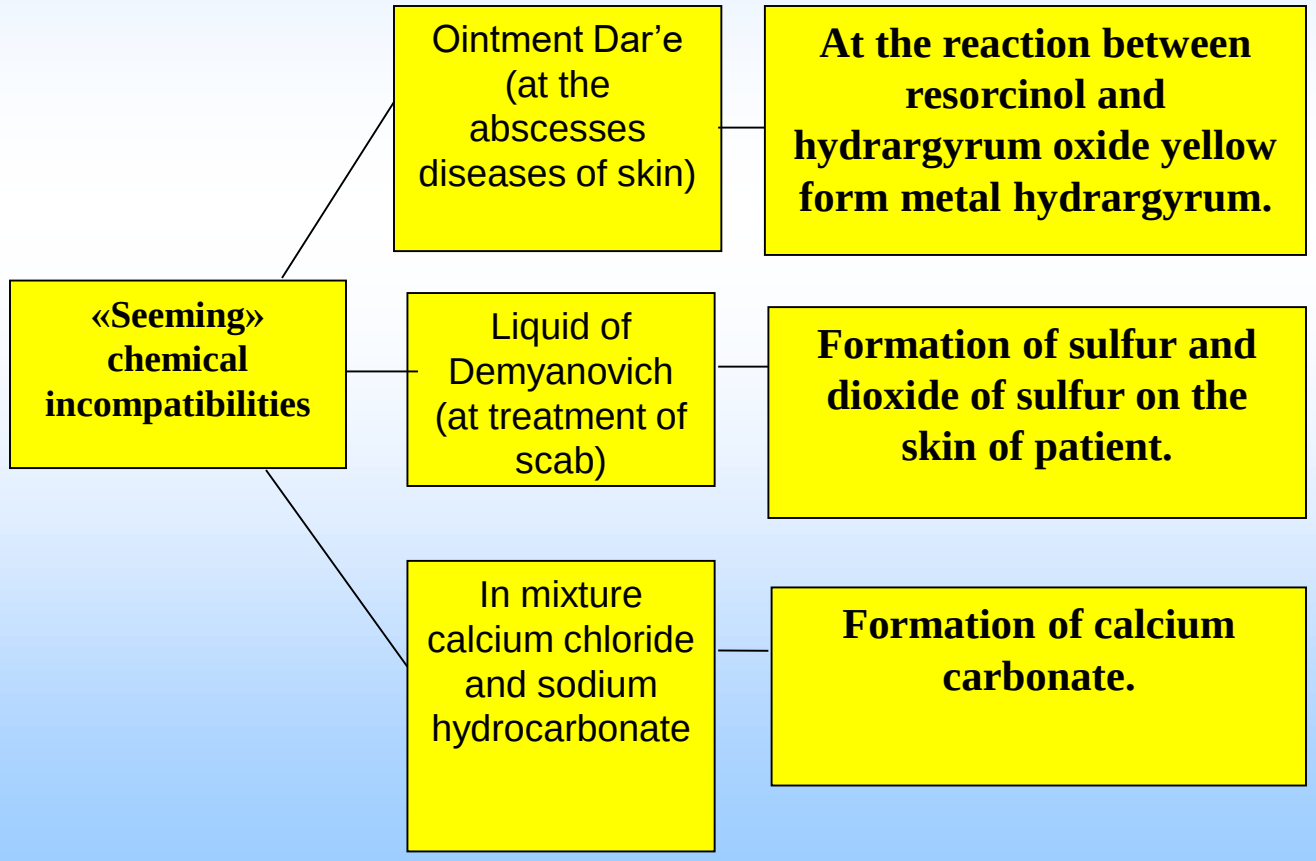
1. Classification of chemical incompatibilities

The chemical name such the incompatibility, which are accompanied by the unforeseen chemical reactions between the medicinal substances, that results in weakening or complete loss of medical activity of medicine, and also to strengthening of side effects.



1. Classification of chemical incompatibilities

«Seeming» chemical incompatibilities are the chemical reactions beforehand foreseen by a doctor between Components, in which a therapeutic effect is rendered by the again appearing substance



1. Classification of chemical incompatibilities

on the type of chemical reactions

on the visual signs of chemical reactions

- oxidizing-restorations
- ousting
- exchange decomposition
- hydrolysis
- neutralizations

2. Oxidizing-restorations reactions

Rp.: Argenti nitratis 0.5
Anaesthesini 1.0
Vaselini 25.0
Misce fiat unquentum.
Da. Signa. For skin.

The given medicine is chemical incompatibility.
Anaesthesine oxidizes in this combination and silvers nitrate is restored to metallic.
Ointment turns black. Medicine can't be prepared and dispense.

Rp.: Tincturae Belladonnae 5 ml
Kalii permanganatis 0,1
Aquae purificatae 200 ml
Misce. Da.
Signa. Use 1 table spoon 3 times a day.

The given medicine is chemical incompatibility.
Potassium permanganate oxidizes
the alkaloids of tincture Belladonna (organic compounds)
and restored to the manganese of dioxide (darkly-brown sediment).
The color of mixture changes to greenish-dark.
.

3. Reactions of ousting

Rp.: Solutionis Natrii benzoatis 2% 100 ml
Acidi hydrochlorici diluti 1 ml
Misce. Da.
Signa. 1 table spoon 3 times a day.

The given medicine is chemical incompatibility.
As a result of reaction of ousting by strong hydrochloric acid a weak benzoic acid from sodium benzoate form a white
crystalline sediment of benzoic acid, which irritate a
mucous of stomach.
.

Rp.: Natrii thiosulfatis
Acidi hydrochlorici diluti 25 ml
Aquae purificatae 200 ml
Misce. Da. Signa. External.

The given medicine is chemical incompatibility.
As a result of reaction of ousting by strong hydrochloric acid from sodium thiosulfate a precipitation of sulphur and
sulphur dioxide (gaseous product) is selected.

4. Reactions of exchange decomposition

Rp.: Unguenti Kalii iodidi 30.0
Solutionis Plumbi subacetatis 2 ml
Misce. Da.
Signa. For smearing a skin.

The given medicine is chemical incompatibility.
At the mixing of ointment of potassium iodide with solution of basic lead acetate it gets a light-yellow color as a result of formation of lead iodide.

Rp.: Infusi herbae Adonidis 180 ml
Calcii chloridi 10.0
Magnesii sulfatis 12.0
Misce. Da.
Signa. Use 1 table spoon 3

The given medicine is chemical incompatibility.
The reason of this incompatibility is formation a precipitation of calcium sulfate, on which can be absorbed a cardiac glycosides from Adonis.

5. Reactions of hydrolysis

Rp.: Infusi foliorum Digitalis 0,5 200 ml
Acidi hydrochlorici 4 ml
Misce. Da. Signa. 1 table spoon 3 times a day.

The given medicine is chemical incompatibility without the visible external displays.
A cardiac glycosides (from extract of leaves) are hydrolyzed by hydrochloric acid.

Rp.: Barbitali-natrii
Chlorali hydrati ana 2,0
Infusi radicis Althaeae
Aquae Menthae ana 60 ml
Misce. Da. Signa. 1 table spoon 3 times a day.

The given medicine is chemical incompatibility.
Destruction of chloral hydrate with formation a chloroform in alkaline conditions.
We will feel it in the clear expressed smell, and the drops of chloroform appear a day.
In addition, a precipitation of barbital base is form out gradually.

6. Reactions of neutralization

The given medicine is a chemical incompatibility .
The prescribed amount of ascorbic acid inactivated by pepsin

Rp.: Solutionis Acidi hydrochlorici 2% 200 ml
Pepsini 4.0
Acidi ascorbinici 2.0
Tincturae Absinthii 5 ml
Misce. Da. Signa. 1 table spoon 3 times a day.

On the visual signs of chemical reactions

- Formation a precipitation
- discoloration
- change of smell of medicine and selection of gases
- changes without a visible external displays

Formation a precipitation

- **poisonous**
- **nonpoisonous**

medicine can't be dispense

therapeutically inactive, changing action of medicine on organism

Example of examination card

Check the doses for strong-effective substances in this formula, if it is necessary correct the doses:

a) Rp.: Adonisidi
Tincturae Belladonnae ana 10 ml
Tincturae Valerianae
Tincturae Convallariae ana 15 ml
Misce. Da. Signa. Use 20 drops 3 times a day.

(HSD – 40 drops; HDD – 120 drops for adonisid
HSD – 23 drops; HDD – 70 drops for tincture belladonna).

b) Rp.: Coffeini-natrii benzoatis 0.5
Natrii bromidi 3.0
Tincturae Valerianae
Tincturae Convallariae ana 10 ml
Aquae purificatae 130 ml
Misce. Da. Signa. Use 1 table spoon 3 times a day.

(HSD – 0.5; HDD – 1.5 for caffeine-sodium benzoate)

Example of examination card

2. 2. Calculate the quantity of isotonic substance for the solution for injection or eye drops:

a) A) Rp.: Sol. Apomorphini hydrochloridi 0.5 % - 200 ml
Natrii chloridi q.s., ut fiat solutio isotonica
Sterilisa! Da. Signa. For injections.

(($E_{\text{apomorphini hydrochloridi in NaCl}}$ = 0.14;
depression of 1 % solution apomorphin hydrochloride = 0.081°).

b) B) Rp.: Sol. Dimedroli 0.1 % - 10 ml
Acidi borici q.s., ut fiat sol. isotonica
St Sterilisa! Da. Signa. Put 2 drops in each eye 3 times a day.

Che (($E_{\text{dimedrol in NaCl}}$ = 0.20; $E_{\text{boric acid in NaCl}}$ = 0.53).

3. Calculate the quantity of 90 % alcohol and water for preparation 30 ml of 60 % alcohol (use the formula and table №3 or table №4 from the State Pharmacopoeia of Ukraine)

4. 4. Mass of one globule in the oil base is 3.2 g. Calculate the quantity of gelatine-glycerine
5. base for preparation of 80 globules, which consists of 0.1 g of ichthyole ($1/E_{\text{ichthyole}}$ = 0.91)
or **or Mass of one globule in the oil base is 2.8 g. Calculate the quantity of oil base for preparation of 60 suppositories, which consists of 0.1 g of bismuth nitrate base and 0.15 g of phenylsalicylate** ($1/E_{\text{bismuth nitrate base}}$ = 0.21; $1/E_{\text{phenyl salicylate}}$ = 0.72).

Example of examination card

5. **5. Calculate the quantity of vegetable raw material and water for preparation of 300 ml of folium Salvia infusion (**water - swelling factor 3.3**).**

6. **6. Calculate the quantity of the standard pharmacopoeia liquid and water for preparation:**

R Rp.: Sol. Perhydroli 8 % 250 ml

Da. Signa. For hand washing.

7. **7. Calculate the quantity of medicinal substance and water for preparation of 2 liter - 10 % sodium salicylate solution (**CVI $_{\text{sodium salisylate}}$ = 0.59; density 10 % solution sodium salicylate = 1.0301**). Correct the concentration if during analysis it was 9.3 % and 10.7 %.**

8. Translate the formula into Latin, write the formula according to the Order of Ministry of Health of Ukraine № 117.

Take: Phenobarbital 0.1
Analgin 1.5
Chloral hydrate 0.6
Solution of sodium bromide 2 % 200 ml
Tincture Convallaria
Tincture Valeriana each 5 ml
Mix. Distribute. Designate. Use 1 table spoon 3 times a day.

Write down the characteristic of this prescription, in case, if it is necessary, check the doses, write WCP (reverse side), technology, registration for dispensing and WCP (front side).

Thank you for attention!