

Semester II.

Pharmacology

Laboratory 1 and 2

ANTISEPTICS AND DISINFECTANTS

1. Oxidizing substances

1. Pharmacognosy – the substances recognition
2. Pharmacodynamics – how they work (Course recall)
3. Laboratory practices
4. Pharmaceutical technique

3. Lab part

Toxicity of iodine vapors

Discussion about

Choking phenomena are observed, the breathing becomes more and more dyspnea and after a few minutes the animal dies by suffocation, following a gluteal edema. At the same time phenomena of nervous and cardiac depression appear. The skin and hair have a yellow-brown color due to iodine vapors. The danger of inhalation of iodine vapors by the persons performing treatments by vaporizing iodine on wounds will be deduced from the experience. The same danger also appears in case of its inspiration by the treated animal.

Chlorine vapor toxicity

Discussion about

It will be observed that as the chlorine gas is released, there will be poisoning phenomena manifested by alarming symptoms from the respiratory system. The animal becomes restless, signs of suffocation, dyspnea, followed by pulmonary edema and suffocation, with cyanosis of the skin and mucous membranes. The higher the amount of chlorine released, the faster the poisoning evolves.

Conclusions are drawn on how disinfection with lime chloride is carried out in the stables where the animals are not evacuated.

Thus, at a concentration of 1: 100,000 there is a slight irritation of the nasal mucosa.

The concentration of 1: 50,000 already causes slight disturbances, and at the 1: 10,000 serious disorders occur.

The concentration of 1: 1000 is capable of producing death in 5 minutes.

Molecular oxygen release from oxygenated water

- Blood - 3 ml is placed in a tube. Then pour an equal amount of oxygenated water. Under the action of catalase and peroxidase in the blood, molecular oxygen is released, appearing in the form of a whitish foam that rises to the top of the tube. The same can be done using meat or organs from slaughtered animals.
- Conclusions are drawn on the mode of action of the oxygenated water beyond the level of the wounds, where its main role is the mechanical one and less antiseptic, knowing the weak action that O₂ has, as opposed to O. By removing O₂, the pus, the cellular debris are removed, together with their harmful bacteria and products, leaving the living tissue capable of regeneration.

Incompatibility of iodine with cu amidon

- Prepare a 10% starch mucilage and place it on a clock bottle. Add a drop of iodine tincture. A blue or purple-violet coloration appears due to the formation of amyloiodide.
- The starch mucilage is used in the antidotism of iodine poisoning. The reaction is also used in food control for the detection of sour cream by the addition of starch.

Incompatibility of iodine with sodium thiosulphate

- In a tube, 5 ml of iodine tincture is added, over which gradually a 10% solution of sodium thiosulphate is added with a pipette stirring continuously until the iodine solution is completely discolored.
- Thus we find that sodium thiosulphate antagonizes the iodine which converts it to sodium iodide. This is based on the use of sodium thiosulphate as an antidote for iodine poisoning, or removing iodine stains from clothing.

4. Pharmaceutical technique

Solubilization of iodine in water

Iodine is very insoluble in water. The saturated iodine solution in water (0.045%) is called the solution Pregl. To achieve a good dissolution of iodine in water, potassium iodide is used as intermedium.

Weigh 0.5 g of metal iodine and place in a tube, making up to 10 ml with distilled water. Stir until a yellowish solution of iodine is obtained in water. 0.75g of potassium iodide is then added. It can be seen that the whole amount of iodine dissolves almost immediately.

In alcohol where iodine is obviously more soluble than in water, however, potassium iodide, as an intermediate, is added.

Preparation of iodine tincture

It is prepared by mixing 0.5g of iodine, 0.75g of potassium iodide and dilute alcohol (700) q.s. at 25.0 g. The tincture of concentrated iodine is prepared from 3.25g iodine, 1.25g potassium iodide and concentrated alcohol (950) q.s. ad. 50.0g. Both tinctures are official.

Preparation of concentrated Lugol solution

1.25g of iodine is solubilized, together with 2.5g of potassium iodide in 21.25g of distilled water. From the concentrated solution various dilutions are made, depending on the use.

Preparation of iodized glycerin

Dissolve 0.25g of iodine and 0.50g of potassium iodide in 1.75 ml of distilled water. 22.50g of glycerin is then added gradually and stirred until completely homogenized. Iodized glycerin is used as a mouthwash on the mucous membranes.

Preparation of lime chloride suspension

Weigh 10 g of lime chloride, over which add 20 ml of water mixing until homogenized, then add with another 20 ml of water stirring a few times. This results in a 20% suspension of lime chloride in water.

2.

Reducing substances

1. Pharmacognosis
2. Pharmacodynamics
3. Laboratory
4. Pharmaceutical technique
5. Pharmacography

3. Lab

The mummifying action of formaldehyde on the skin

It will be observed the appearance of mummification of the skin in the place where the substance it worked. It compares with the normal tegument areas.

The toxic action of formaldehyde

The strong irritating aspect of formaldehyde released on the mucous membranes and severe respiratory phenomena will be observed.

Formaldehyde release by exothermic reaction

In crystallizer, place 3.5 g of potassium and add 5 ml of concentrated formalin (30-40%).

We notice an effervescence due to the exothermic reaction by contacting the two substances, of which first is oxidizing and the other a reducing one

Following this, by heating, the formaldehyde, is rapidly released from formalin. It appears in the form of vapors and if the lid is raised slightly, their extremely irritating effect on the nasal and ocular mucosa is felt.

Used for disinfection of incubators and small rooms, as well as of tools or utensils. Use 35 g of potassium permanganate 50 ml of formalin for 1 m³ volume.

Formaldehyde release by heating the formalin

In a metal cup, place the formalin and heat it. To make the formaldehyde release more visible, cover the opening with a funnel. It will be seen that as the formalin heats, the vaporization of formaldehyde is stronger. This method is used rooms, clothes and utensils disinfection.

Neutralization of formaldehyde with ammonia

The heated vessel with formol is covered with a glass bell, placing under the same bell and a vessel with ammonia. We will find that formaldehyde vapors are immediately neutralized by ammonia, giving rise to urotropin (methenamine) a solid substance.

Neutralization of formaldehyde with ammonia is sometimes used in shelters that have been disinfected by formalization and where after aeration still remains an amount of formaldehyde that may be irritating to animals that need to be brought into the shelter. In order to avoid such risks, neutralization must be carried out in advance.

Identification of methenamine

Take in a tube 30 cg of methenamine to which is added 3ml sulfuric and then 30 cg salicylic acid. Shake and heat to the flame. A carmine-red color appears.

Decomposition of methenamine in the acidic environment

In a tube, put 10 ml solution of 40% methenamine, plus 2 drops of 10% HCl. The tube is heated to the flame and there is a slight odor of formaldehyde, and sometimes a faint ammonia smell. In the acidic environment urotropin decomposes into formaldehyde and ammonia, which is produced in the body at the level of the kidneys in the acidic pH of urine. This mechanism is based on its antiseptic action of the urinary tract and slightly diuretic.

4. Pharmaceutical technique

Preparation of the disinfectant solution of formol

To achieve the disinfectant concentration of 2% formaldehyde, take 5 ml 40% formalin and 95 ml water. This solution is widely used for spraying shelters with disinfection pumps

Lysophorm preparation

Mix 4 parts potassium soap with two parts alcohol until dissolved and add 4 parts concentrated formol. The result is a viscous yellow liquid. It is a very good antiseptic and even disinfectant used in the form of aqueous solutions.

5. Pharmacography

Rp./

Iodi 2,0
Kalii iodati 3,0
Alcoholi dil. q.s. ad 100,0

M.f sol

D.S. ext

Rp./

Iodi 2,0
Kalii iodati 3,0
Vaselini 15,0

M.f ung.

D.S. ext

Rp./

Kalii iodati 10,0
D.t.d XV

S. int 1/zi

In water, to cow (actinobacilois)

Rp./

Sodium iodine 10% of 10 ml vials XXX

D.S. ext în inj. i.v. 6 fiole/zi la vacă

Rp./

Hexamin 40% 10ml vials VI

D.S. ext în inj. i.v. la cal

Rp./

Iodi 1,0
Kalii iodati 1,5
Aq. distil. ad 1500,0

M.f sol. ext to sheep (for intratracheal injection in pulmonary strongiloidosis)

Rp./

Iodoformi 10,0
Aetheri 90,0

M.f sol

D.S. ext (în aspersioni pe plăgi)

Rp./

Iodoformi 3,0
Vaselini ad 30,0

M.f ung.

D.S. ext. (in ulcerative wounds)

Rp./

Metenamin compr. 0,5

D.t.d. XXX

S. int câte 1 comp/day to hen, for 3 days (treatment for 10 hens with difterovariola)

Stable antiseptics

2. Pharmacodynamics

The phenol's action on the skin

In four crystallizers phenol solutions are prepared in various solvents, as follows: 5% phenol in distilled water, in alcohol 50 vol., in glycerin, in sunflower oil. The solutions are prepared in equal parts and four fingers are inserted into the four solutions and kept for 5 min. The effect on the skin: whitening, itching sensation and slight surface anesthesia. The strongest effect is obtained where it was phenol in water, and then in: alcohol, glycerin and oil. The effect decreases inversely in proportion to the solubility.

Phenol burns washing with soap or water, soap does not remove the burn, on the contrary it aggravates it, whereas washing with concentrated alcohol or oil has favorable effect. In poisoning by accidental ingestion of phenol, stomach washes are used with 10-20% alcohol, or the administration of vegetable oil.

Demonstration of toxic actions of phenol on CNS

On animals, at first, over-excitation is observed, followed by a CNS depression in which motility and sensitivity gradually disappear, while clonic contractions of the limbs after which paralysis and finally death are installed continue.

Conclusions are drawn on the affinity of phenol to nerve cells, due to their rich content in lipids. The sensitivity to phenol, related to the animal species, is also discussed. Thus it is known that cats are particularly sensitive to this substance, the application on the cells of 1-2ml 3% solution has a lethal effect. The most resistant are the horses.

Phenol in the proportion of 5/1000 is also used for the preservation of normal and immune sera, which are injected into animals. They are not administered to sensitive species.

3. Lab

Comparative solubility of tar

Take 3 tubes and place a small amount of tar in each.

Thus, in the first pix liquida is put, in the second lithantracis and in the third one ichtiol.

Add about 10-15 ml water over each, then shake vigorously.

It is observed that the lithantracis does not dissolve in place, the pix liquida it dissolves slightly giving a yellowish aqueous solution, and the ihtiol dissolves well, resulting in a blackish-brown solution.

The different uses of the three tar will be discussed.

4. Pharmaceutical technique

Dilution of alcohol

The following table shows the quantities in volumes, to obtain exact dilutions of alcohol with water. Thus, in the left vertical column are given the concentrations of the alcohol we want to dilute, and in the horizontal column above the alcohol concentrations we want to obtain. The reading is done at the intersection of the two columns, the figure found in the respective box representing ml of water which is added to 1000 ml of alcohol.

For example, if we want to dilute alcohol from 800 to alcohol 500, at the intersection of the columns we find the number 630, which means we will add 1000 ml of alcohol of 800, 630 ml of water (or 100 ml of alcohol of 800, 63 ml of water).

Dilution of concentrated alcohol with water to volumes at 20 °C

Alcohol diluted	Obtained alcohol concentrations												
	30°	35°	40°	45°	50°	55°	60°	65°	70°	75°	80°	85°	90°
30°	167	-	-	-	-	-	-	-	-	-	-	-	-
35°	335	144	-	-	-	-	-	-	-	-	-	-	-
45°	505	290	127	-	-	-	-	-	-	-	-	-	-
50°	674	436	255	114	-	-	-	-	-	-	-	-	-
55°	845	583	384	229	103	-	-	-	-	-	-	-	-
60°	1017	730	514	344	207	95	-	-	-	-	-	-	-
65°	1189	878	644	460	311	190	88	-	-	-	-	-	-
70°	1360	1027	774	577	417	285	175	81	-	-	-	-	-
75°	1535	1177	906	694	523	382	264	163	76	-	-	-	-
80°	1709	1327	1039	812	630	480	353	246	153	72	-	-	-
85°	1884	1478	1172	932	738	573	443	329	231	144	68	-	-
90°	2061	1630	1306	1052	847	677	535	414	310	218	138	63	-
95°	2239	1785	1443	1174	957	779	629	501	391	295	209	133	64

Preparation of camphorated alcohol

Camphorated alcohol is an official solution, named as *Solutio camphorae spirtuosa* or camphor spirit and has a 10% camphor content.

It has the following composition: camphor 10g, concentrated alcohol 70g and water 20g.

It is prepared by first dissolving camphor in alcohol, then adding water in small quantities, stirring continuously. Finally, it is filtered.

Camphor alcohol is used in the form of frictions or compresses in muscular, tendons', joint disorders, etc. with effects of the best.

Preparation of soap alcohol

The soap alcohol is in the form of a slightly opalescent, yellowish liquid. It consists of: potassium soap 16g, alcohol conc. 50g and water 34g.

A few drops of Aetheroleum lavandulae and water can be added for flavoring. It is left for 24 hours and then filtered. It is prepared by stirring the soap in the alcohol mixture by stirring.

It is used externally in the form of fractions, either as such or in mixture with camphor alcohol, a mixture that is called liquid opodeldoc, or alcohol-camphor-saponate liniment.

Preparation of a 3% boric acid solution

The boric acid is weighed, then dissolved in hot distilled water. After cooling, filtered and make up to 100 ml with distilled water. Ophthalmic solutions should be iso-osmotic with the tear's secretion and be prepared in the following composition:

Rp /

Boric acid needles	1.9
Sol. 2% mercuric phenyl borate	2.0
Distilled water q.s. at	100.0

Boric acid is dissolved by boiling in 90 ml of distilled water. After cooling, phenylmercuric borate solution is added. Filter and make up to 100 ml with sterile distilled water. The solution obtained must have a pH of 5.0.

Preparation of a 2% ointment with yellow mercury oxide

It is an ointment of yellow-orange color, officially having the composition: yellow mercury oxide 2g, petroleum jelly 4g, anhydrous lanolin 5g and petroleum jelly 89g.

The yellow mercury oxide, which is insoluble, soaks well with the petroleum jelly. The lanolin and the petroleum jelly are heated in the water bath until they are melted, and after cooling the mixture is gradually added to the yellow mercury oxide and homogenized well until softened.

It is widely used in eye disorders, which is why it is also called ophthalmic ointment.

Preparation of a 1% picric acid solution

Take 1 g of picric acid over which 99g of distilled water is added. Stir until complete solubilization, then filter. A clear citrine yellow solution is obtained.

Put only a finger on the tongue to retain the very bitter taste of this substance. In this form of solution 1% is used with good results in wounds produced by burns, having antiseptic, astringent and healing effect.

It is not administered orally as it is toxic.

Preparation of a 3% creoline emulsion

In a cylinder, add 3ml creoline, over which add 97ml of heated water to 400ml and mix well. A yellow-brown emulsion (of the appearance of milk coffee) is obtained, which must be kept homogeneous in case the creolin is of good quality.

Creolin is prepared in emulsions up to 4% and has a large number of uses: disinfectant in shelters, transport vehicles, paddocks, in emulsions 3-4%, antiseptic on purulent wounds, in interdigital bathing in cattle and diseases of claws, in emulsions of 1%, in sheep scabies as bath, or as ointment compound in localized forms. It can even be used internally in 0.5-1% emulsions in small quantities to combat chronic weathering and in the treatment of rotten enteritis.

Conclusioning the many possibilities of using the substance, but also on its toxicity and the fact that it smells of meat.

Preparation of a solution of Aqua picis

Aqua picis or aqueous vegetable tar solution has a concentration of 2%. It is prepared by dissolving 1g of vegetable tar in 40 ml of warm water.

Appears as a clear yellowish liquid. It is used internally in various disorders of the digestive tract as well as in airway disorders.

The therapeutic possibilities of this preparation are discussed.

Preparation of a 1% bromocet solution

The bromocet is a 10% hydroalcoholic solution of pyridinium bromide. It is a cationic surfactant, which is in the form of a yellow-brown liquid with characteristic odor. The 10% solution is prepared by mixing 10 parts bromocet with 90 parts water. By mixing, an abundant foam is born.

It is very good antiseptic, external pest control, antifungal, detergent. It is used in the fight against dermato-mycosis (trichophytic), antiseptic and even in disinfectant mixtures, facilitating their penetration.

It is an excellent antiseptic and detergent for veterinarians, at arm washing after gynecological or obstetric interventions and after rectal exploration.

It insists on the multiple possibilities of use. It is also shown to be incompatible with soaps or other anionic surfactants

5. Pharmacography

Rp./

Camphorate alcohol
Saponated alcohol aa 100.0
M.f. linimentum

D.S. ext în fricțiuni la cal în miozite

Rp./

Ammonii ichtyosulfonici 1.0
Anesthesini 1.5
Tanoformi 2.0
Zinci oxydati 2.0
Vaselini ad 25.0
M.f ung

D.S. ext in eczema

Rp./

Acid borici 4.0
Aq. Distill. q.s. ad 100.0

M.f sol.

D.S. ext for conjunctival instillation

Rp./

Argenti colloidale 0,2
Aq. Distill. q.s. ad 20,0

M.f. sol.

D.s. ext. in conjunctivitis

Rp./

Naphtalini 20.0

D.S. Ext

For use in castration wounds

Rp./

Argenti nitrici 0.3
Aq. Distill q.s. ad 30.0

M.f sol.

D.S. ext in blepharitis

Rp./

Argenti proteinici 0.3
Aq. Distill. q.s. ad 30.0

M.f sol.

D.S. ext in conjunctivitis

Rp./

Gudron vegetal 20.0
Sulf sublimat 20.0
Săpun de potasiu 60.0
Alcool 40.0

M.f linim.

D.S. ext in local treatments antiscabies