Syrups, fragrant waters. Theoretical foundations of distillation of essential oils. Equipment. Technological schemes of production. Mixtures with fragrant waters and syrups.

Lecture for the 4th year students of the Institute of Pharmacy

syrups (Sirupi)

syrups (Sirupi) –oral dosage forms, which are concentrated solutions of sucrose, polyhydric alcohols or their combinations in water (up to 64%) and fermented berry juices, as well as mixtures of them with solutions of medicinal substances (API), tinctures and extracts. There are thick, transparent liquids, which, depending on the composition, have a characteristic taste and smell.

Pharmacopoeia XV

Syrups - liquid dosage form in the form of an aqueous solution of viscous consistency with a sweet taste, containing sucrose in concentration not less 45% or its substitutes.

Syrups, as a rule, are homogeneous dispersed systems, but can also be heterogeneous (most often suspensions) or combined disperse systems.

Term*"syrup" is used for syrups intended for internal usage*.

Syrup packaging can be single dose and multidose.

positive and negative syrup quality*:*

- ease of use; Easily swallowed, hence convenient for children

and the elderly.

- accuracy of dosing of the drug introduced into the syrup and the accuracy of dosing of the drug itself when used (as a rule, a measuring spoon is included in the package of the syrup for ease of dosing);

- Faster acting than tablets and capsules.
- homogeneous, hence the API is more uniformly distributed.
- Reduce irritant effect of some drugs (aspirin, Kl, KBr in the form of tablets) and minimize side effects in the gastrointestinal tract, such drugs as KCl (in tablets).
- Possibility use in patients with diabetes due to the use as a basis some sugar substitutes (sweeteners);
- possibility masking the unpleasant taste and smell of drugs that are part of the syrup, which makes this drug the most acceptable for children.

disadvantages

But, like any other dosage form, syrups have their disadvantages:

- inability to use for unconscious patients, patients with vomiting and fainting;
- bioavailability of API from syrups is lower if compared to injection solutions, as the drug passes through the gastrointestinal tract.

Disadvantages

- They take up a lot of space during transportation and storage, therefore creating difficulties with this

- Unpleasant taste and smell of some API is difficult to mask.

- The need for dispensers to measure the dose (spoon, etc.).

- Less stable than solid forms.

The main signs of instability: color change, precipitation, gas, growth of microorganisms.

syrups

Flavoring (flavors)

- Sugar syrup
- fruit and berry

Medicinal

- Alteic syrup
- Glycyrrhizae syrup

flavor syrups

- syrups, which are used only for correction of unpleasant taste of the main active ingredients of drugs (sugar, cherry, raspberry, tangerine and other fruit and berry syrups).

Flavored syrups

syrup sugar(Sirupus simplex, Sirupus sacchari). The sugar concentration is 64%, which gives the syrup the appearance of a thick, viscous liquid.

Concentrated solutions of sucrose have reducing properties due to the formation of inverted sugar, which allows you to maintain the stability of easily oxidizing substances in the preparation. At this concentration, the syrup is almost saturated solution. Besides, a high concentration of sugar creates a high osmotic pressure in syrups, which completely prevents the growth and development of microorganisms during storage.

Due to this syrup is resistant to microbial contamination

medicinal syrups

- Medicinal syrups - syrups, used as drugs and having a therapeutic effect on the body due to the drugs included in their composition (paracetamol syrup; bromhexine, ambroxol, ketotifen etc.),

(dog rose, marshmallow, rhubarb, licorice syrups; pertussin, syrups of viburnum, buckthorn; "Doctor Mom", "FerrumLek" and others).

As flavors syrups are widely used in children's dosage forms


CADISTIN
EXPECTORANT
Pectoral
Actifed
Piriton
syrup
Ascori
CADISTIN
EXPECTORANT
Pectoral
Actifed
COUGH & COLD
Piriton
syrup
Rhinathiol
TOUX GRASSE


Benylin
COUGH
MEDICINE
SYRUP
Diphenhydramine hydrochloride 14 mg/5 ml
Levomenthol 1.1 mg/5 ml
Immediate soothing effect
ORIGINAL FORMULA
POWERFUL
COUGH RELIEF
Benylin
COUGH
MEDICINE
SYRUP
125 ml


Benylin
NON DROWSY
DRY
COUGHS
SYRUP
Dextromethorphan hydrobromide 7.5 mg/5 ml
Immediate soothing effect
POWERFUL
COUGH RELIEF
Benylin
NON DROWSY
DRY
COUGHS
SYRUP
125 ml


Benylin
Dry & Tickly
Cough
Syrup
Glycerol & Sucrose
RELIEVES DRY, TICKLY COUGHS & SORE THROATS

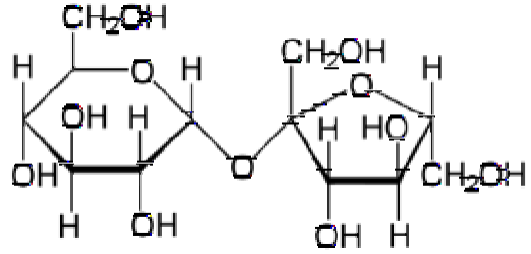

Benylin
Children's
Dry Cough
& Sore Throat
Syrup
GLYCEROL
& SUCROSE
FOR DAY & NIGHT USE
1 + year
Benylin
Children's
Dry Cough
& Sore Throat
Syrup
Glycerol and Sucrose
1 + year

AUXILIARY SUBSTANCES IN SYRUP TECHNOLOGY

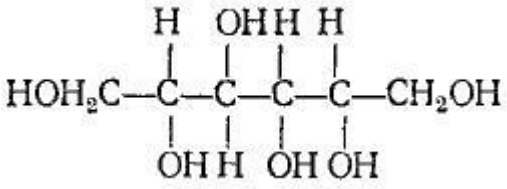
- In the production of both flavoring and medicinal syrups, various groups of excipients are used.

1.Substances, which form the basis of the syrup:

❖Sucrose (beet or cane sugar) is a carbohydrate belonging to the group of disaccharides.



- **Sorbitol** (sorbitol) is a hexahydric alcohol,

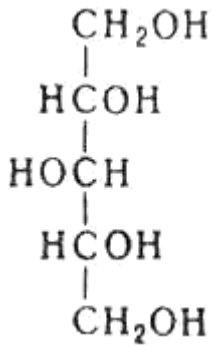


Product of glucose recovery.

Sorbitol is found in fruits, algae, higher plants. Used as a sugar substitute for diabetics; used to produce ascorbic acid.

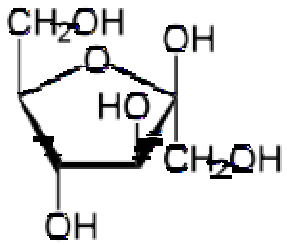
- **Xylitol** (xylitol)**-**polyhydric alcohol (pentite), an optically inactive isomer.

In terms of calories, xylitol is identical to sugar (4 kcal / g), twice as sweet as it, but has no biological value. It does not have a negative effect on the body, due to which it is used in the food industry, for example, instead of sugar in the production of confectionery for patients with diabetes and obesity. It has a choleretic and laxative effect.

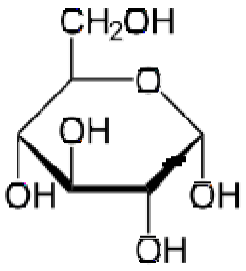


- Fructose (fruit sugar) - one of the main sources of carbohydrates, an isomer of glucose, belongs to the group of monosaccharides and is one of the most important natural sugars.

Fructose does not require insulin to be absorbed, so it can be included in diabetic foods. This is natural sugar. It is found in honey, fruits and berries.



Glucose(dextrose;grape sugar) – monosaccharide,hex sugar(hexose).



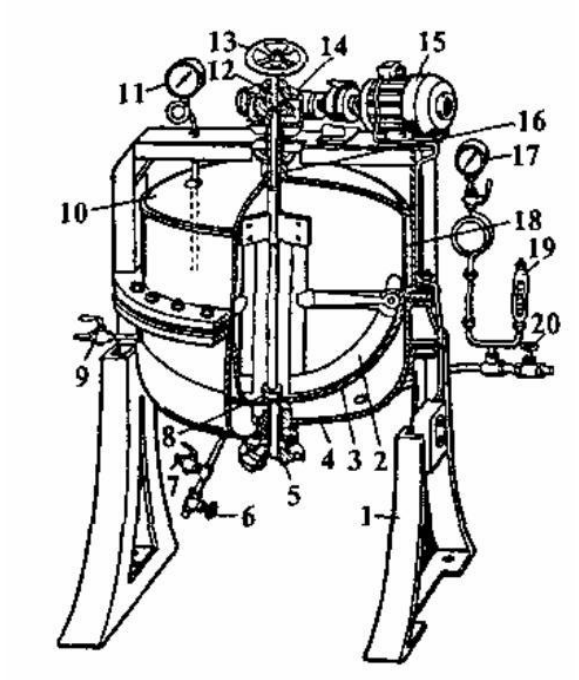
Glucose is found in almost all organs of green plants..A lot of glucose is found in grape juice.Glucose is sometimes even called grape sugar..Bee honey is also mainly composed of a mixture of glucose and fructose..

EQUIPMENT, USED IN SYRUP TECHNOLOGY

- In pharmaceutical plants or factories, sugar syrup is prepared in copper-tinned syrup-cookers boilers with steam heating, having an anchor agitator. When preparing small amounts of syrups, steam enamelled cast-iron bowls are used, which are closed with a wooden lid, and mixing is done with an ordinary wooden spatula.


牢固的把手

Syrup boiler



The boiler consists of a copper hemispherical bowl with copper shell.
Steam for heating is supplied through the valvey. Condensate is drained through the valve at the bottom of the steam jacket, and descends through the crane7. k boiler is connectedsteam trap.
The boiler has a lid (ten) with a hatch for loading sugar and inspection and fitting for the removal of secondary steam. During the cooking process, the mass in the bowl
agitated with an anchor agitator 2,driven by an electric motor through a worm gear
•The fitting is located at the bottom of the boiler. ready for lowering masses

SYRUP TECHNOLOGY

Technology of flavor syrups

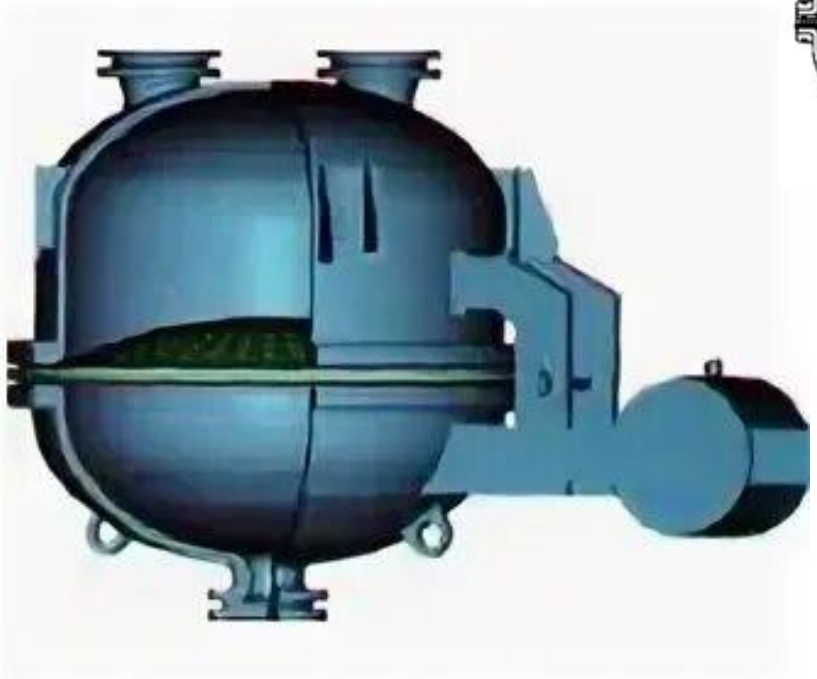
sugar syrup ***(Sirupus Sacchari)***

To prepare the syrup, first pour 0.64 kg of sugar into the cauldron and moisten it with a small amount of water. The mixture is left for 30 minutes

During this time, the sugar becomes loose and dissolves more easily. Then the rest of the water is poured at the rate of 0.36 liters per 0.64 kg of sugar, steam is supplied to the boiler and the mixture is heated to 60-70 ° C. Sugar can be added in parts to heated water with continuous stirring.

After the sugar is completely dissolved, the syrup should boil 2 times, the resulting foam (protein and mucous substances) is removed with a slotted spoon. Cooking the syrup should be short: heating the mixture to dissolve sugar - 35-40 minutes and boiling the mixture twice - 20-25 minutes. It excludes caramelization of sugar, leading to a change in the color of the syrup, an increase in the content of reducing substances, which entails a decrease in the stability of syrups during storage.

druk-filter



Purpose. Application area. Advantages

Druk filters are used for filtration of:• dense, viscous, thick liquids with inclusions;• colloidal solutions;• mixtures with a high sediment content;• liquids with small, medium and large particles, with particles of different sizes;• solutions with inclusions that clog pores filter;• volatile, toxic, flammable, photosensitive materials;• while heating or cooling the mixture.

The devices are distinguished by their simple design, high reliability and performance. In them, filtration is much faster than in open nuts. Suitable for high pressure applications. With their help, you can rinse the sediment very efficiently.

TECHNOLOGY FEATURES

Syrups are made by dissolving sugars (sucrose) in water.

Others syrup-forming substances (eg.polyalcohols) when heated

to the boiling point. Usually the concentration of sugar or other

syrup-forming substance in the finished syrup is at least 45%

(m/m). The finished syrup is filtered.

- Sugar syrup is a transparent, colorless or slightly yellow, thick liquid, sweet in taste, odorless, neutral reaction, the density of which is 1.308-1.315 g/ml, the refractive index is 1.451-1.454. Store sugar syrup in filled to the brim and well-corked bottles in a cool, dark place.

cherry syrup (Sirupus Cerasi)
Raspberry syrup (Sirupus Ruby idaei)

Syrups are prepared by dissolving 62 parts of sugar in 38 parts of fermented clear berry juice, followed by rapid boiling and filtering. It is possible to make cherry and raspberry syrups from the highest quality food extracts. In this case, 4 parts by weight of the extract are mixed with 96 parts by weight of sugar syrup.

- Crushed berries (together with seeds) are placed in wide-mouthed glass bottles, filling them to 2/3 of the container, are poured on top with a small amount of sugar (1.5-2%), the bottles are closed with stoppers with two holes and left to ferment at 20-25 ° C for several days. Fermentation is considered complete if there is no carbon dioxide bubbles (CO_2). The mixture is stirred from time to time by shaking the balloon.

After fermentation, the berry mass is filtered through a linen filter bag, and the residue is passed through a frame or manual screw press with a differential head.

Juice stand for 2-3 days, and then carefully drained from the sediment, filtered and syrup is immediately prepared.

AT syrup cooker the boiler is heated to 70 ° C, sugar is poured in the appropriate proportion and the syrup is allowed to boil, removing the foam. After that, it is filtered through several layers of gauze.

Boilers must be enameled or nickel-plated; in other pots, berry syrups may lose their aroma (copper) or acquire a dirty tint (tin).

- Raspberry syrup is a thick liquid of bright crimson color, with a pleasant smell and a sour-sweet taste. Cherry syrup is transparent, dark cherry in color, with a pleasant characteristic odor (benzaldehyde) and sour-sweet taste. The density for both syrups should be in the range of 1.305-1.330 g/ml. Store the syrup in a glass container in a cool, dark place.

Mandarin Syrup ***(Sirupus Citri unshii)***

For making tangerine syrup using tangerine peel tincture. In this case, 15 parts of the tincture are mixed with 85 parts of sugar syrup.

The finished syrup is a clear brownish-yellow liquid with a characteristic aromatic smell and taste of tangerine peel. The density of the syrup is 1.220-1.244 g / ml.

TESTS

Syrups must meet the general requirements

OFS "Dosage Forms" and pass the tests characteristicfor givendosage form.

Powders and granules intended for the preparation of syrups, mustcomply with the requirements of the relevant OFS: OFS"Powders" or OFS "Granules".

Description. Give a description of the appearance of the syrup with indicating colors and smell. Syrups should generally be clear., allowed presence of opalescence, signs are not allowed

Crystallization of syrup-forming component may be.

Microbiological purity. All syrupsexceptionsterile, must meet the requirements of the OFS "Microbiological purity".

Retrievable volume. The test is carried out in accordance WithOFS"Retrievable volume". The test is not applicable to syrups in

single-doseindividual packages, if testedfor homogeneitydosing.

Density. The test is carried out using one of the methods described in

OFS "Density". The rules are inpharmacopoeialarticleor regulatorydocumentation.

pH. The test is carried out if indicated in the monographor regulatorydocumentation. The definition is carried outpotentiometric methodin accordance with OFS "Ionometry". Meaning pH indicatein pharmacopoeialarticle or normative documentation.

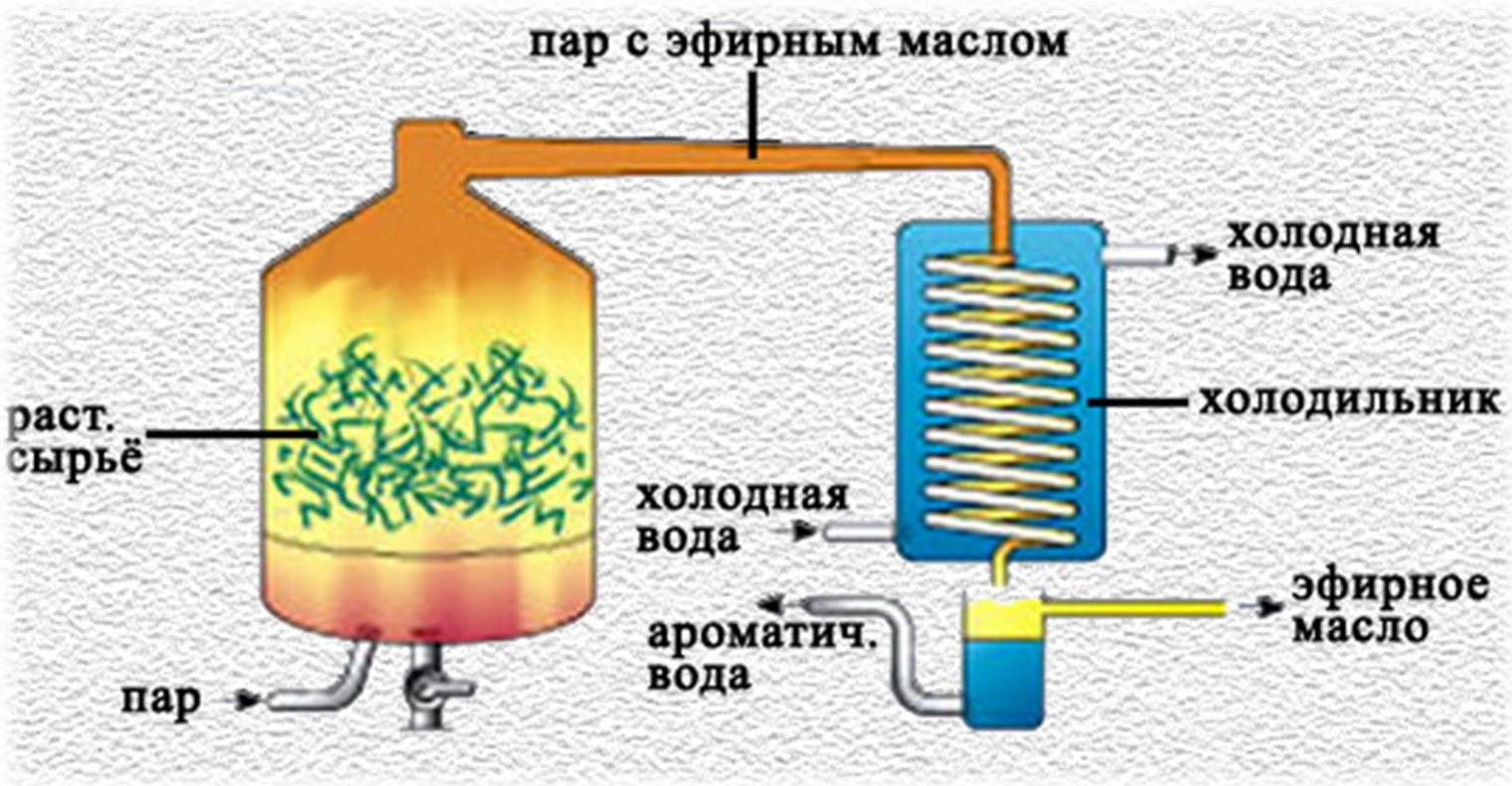
Dosing uniformity. The test is carried out for syrupsin single-dose individual packages according to requirements

OFS "Uniformity of dosing".

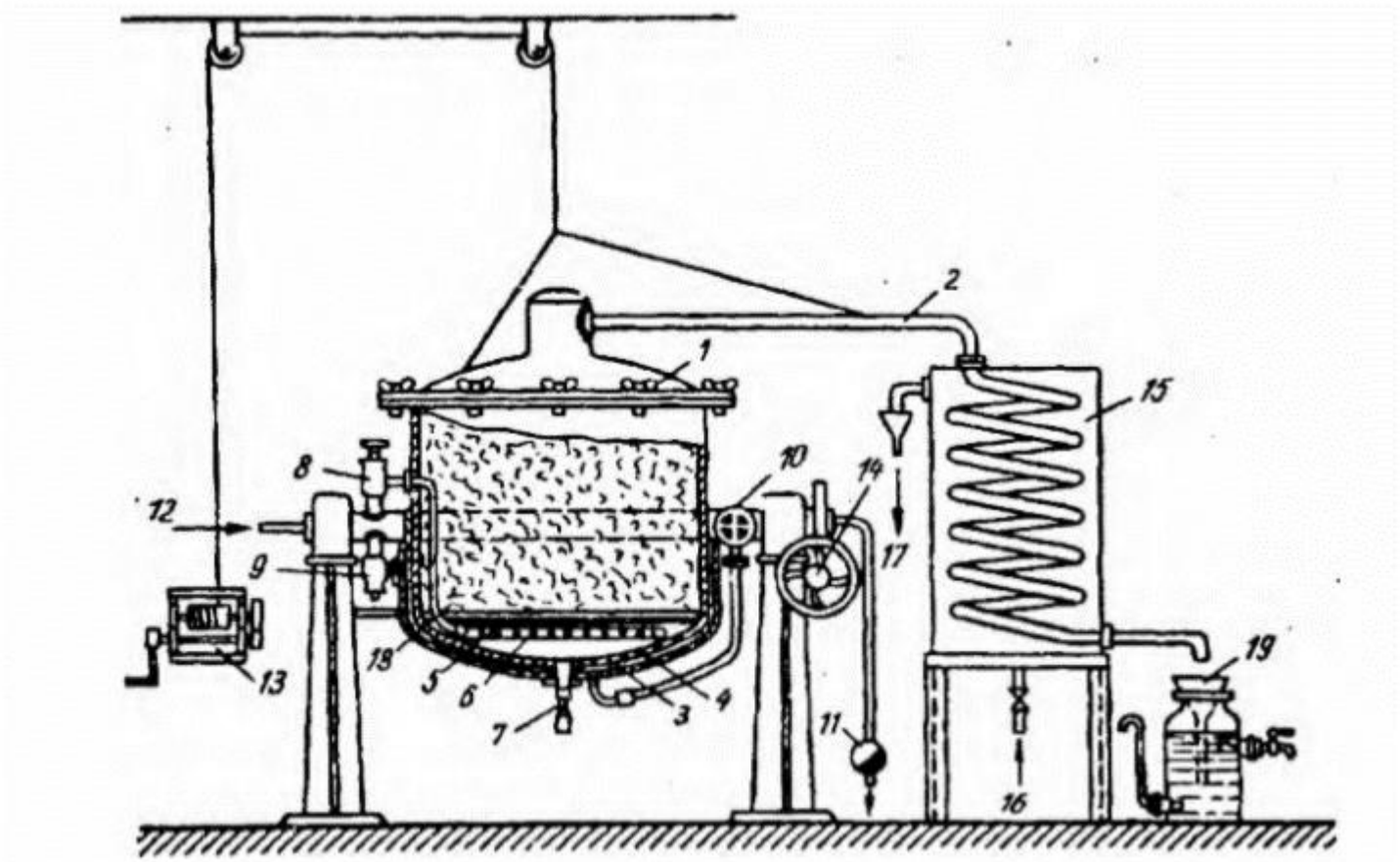
Fragrant waters

Presenta water or water-alcohol solutions of essential oils. Is it transparent or slightly opalescent liquids that have the smell of their constituent substances. The therapeutic value of aromatic waters is usually limited to correcting the taste or smell of dosage forms, but they have some therapeutic effect. Aromatic waters have a weak antiseptic effect, increase the motor and absorption capacity of the stomach.

Aromatic waters are obtained in two ways: by steam distillation of essential oil plant raw materials and by dissolving essential oils in water.oils.



Technological scheme for the production of distilled aromatic waters
BP1 Preparation of premises, equipment, personnel, airKh, Kt,Kmb
BP2 Preparation of farm. substances and excipients Kt
VR2.1measuringextractant
VR2.2weighingLRS
VR2.3 Grinding VP
VR2.4 Screening of VP
VR2.5 Container preparation
TP1 Obtaining fragrant water Kt,Kh
TP1.1 Infusing MRS
TP1.2 Steam distillation
TP1.3 Filtration
TP2 Standardization Kt,Kh,Kmb
UMO1 Packing, marking, shipment Kt,Kh,Kmb



Installation for receiving fragrant waters: 1 - a cover; 2 - tube-trunk; 3 - steam jacket; 4 - cube; 5 - false bottom; 6-bubbler; 7 - crane; 8 - valve; 9 - valve; 10 - valve; 11 - condensation pot; 12 - primary steam; 13 - winch; 14 - gear mechanism; 15 - capacitor; 16 - pipe; 17 - cold water; 18 - a layer of canvas; 19 - receiver.

In the pharmacy practice, fragrant waters are prepared - mint and dill.

Fragrant mint water is used in potions as corrigenta.
Fragrant dill water is used in children's practice for flatulence, and mint water—for rinsing

Prepare fragrant waters under aseptic conditions by vigorously mixing the essential oilWithpurified water for 1 min until the essential oil dissolves. Aromatic waters should be stored in bottles filled to the top with a capacity of 100 or 200 ml in a cool place for no more than 30 days.

Technological fragrant water production scheme by method dissolution

BP1 Preparation of premises, equipment, personnel,
BP2 Preparation of farm. substances and excipients
VR2.1measuringextractant
VR2.2 Measuring oil
VR2.3 Container preparation
TP1 Obtaining fragrant water Kt,Kh
TP1.1 Dissolution and mixing
TP1.2 Filtration

Aromatic waters are dosed by volume. When dissolving solid medicinal substances, the volume of aromatic water prescribed in the prescription is not reduced by the amount of volume change. In the manufacture of potions, in which the main dispersion medium is aromatic water, concentrated solutions of medicinal substances are not used.