SYRUPS AS A DOSAGE FORM

Syrups (Sirupi) - oral Lf, which is concentrated sucrose solutions, polyhydric alcohols or their combinations in water (before 64%) and fermented berry juices, as well as mixtures of them

* solutions of medicinal substances (Lv), tinctures and extracts. It's thick, clear liquids, having a characteristic taste and smell, depending on the composition.

Syrups are indispensable components of medicines for children, and in this case, the main purpose of such syrups - correcting the unpleasant taste of certain medicinal substances. For these purposes, sugar is used, inverted, sugar-treacle, sugar-inverted, sugar-inverted-treacle syrups.

Invert syrup is made from sugar syrup by inverting (hydrolysis) sucrose when heating sugar syrup in the presence of acid (catalyst); neutralize acid if necessary... Invert syrup - it is a mixture of equal amounts of glucose and fructose; sugar-treacle - mixture of sucrose and molasses, etc.

Positive qualities of syrups***:***

* ease of use;
* the dosing accuracy of the drug introduced into the syrup and the dosing accuracy of the drug itself when applied (usually, the syrup package includes a measuring spoon for easy dosing);
* the possibility of use in patients with diabetes mellitus due to the use of sugar substitutes as a basis;
* the ability to mask the unpleasant taste and smell of drugs, included in the syrup, what makes this formulation the most suitable for children.

But, like any LF, syrups have their drawbacks:

* inability to use in case of vomiting and fainting;
* the bioavailability of drugs from syrups is lower compared to injectable solutions, since the drug passes through the digestive tract.

Classification of syrups

All syrups are divided into two groups:

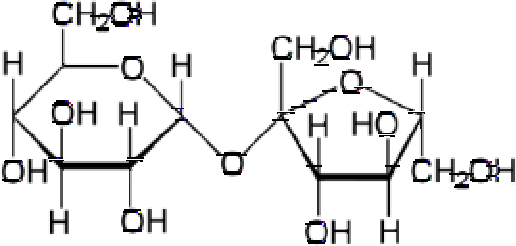
1. Flavor syrups - syrups, which are used only for the correction of the main active ingredients of drugs (sugar, cherry, crimson, tangerine and other fruity-berry syrups).
2. Medicinal syrups - syrups, used as drugs and have a therapeutic effect on the body due to the drugs they contain (paracetamol syrup; rose hips, marshmallow, jealous, licorice syrups; pertussin, ambroxol, viburnum syrups, buckthorns; ketotifen, bromhexine, "Dr. Mom","Ferrum Lek" other).

AUXILIARY SUBSTANCES IN SYRUP TECHNOLOGY

When produced as flavoring, as well as medicinal syrups, various groups of excipients are used.

1. Substances**,** constituting the basis of the syrup**:**

Sucrose (beet or cane sugar) - carbohydrate, disacharides.



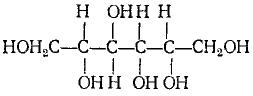
The viscosity of sucrose solutions increases with increasing concentration and decreases with increasing temperature. Sucrose solutions refract light rays, the refractive index depends on its concentration in the solution, what is used to quantify. Sucrose solutions are non-conductive, dissolve other sugars well.

Concentrated sucrose solutions have reducing properties due to the formation of invert sugar, which allows you to maintain the stability of easily oxidized substances in the preparation. Besides, high sugar concentration also creates high osmotic pressure in syrups, which completely prevents the growth and development of microorganisms during storage.

Sugar of the highest purity is used for the preparation of syrups- refined, containing at least 99.9% sucrose and no more 0.4% water. It does not contain ultramarine, which is the cause of the deterioration of syrups as a result of the appearance of hydrogen sulfide. In some cases, ethyl alcohol is added to preserve them. Sugar is insoluble in anhydrous alcohol, but in the presence of water in alcohol, its solubility increases. for instance, at room temperature in 70% alcohol solubility of sugar is about 16%, and in 40% - before 37% and etc.

The boiling point of aqueous sugar solutions increases with an increase in its concentration. So, e.g., syrup, containing 50% Sugar, boils at temperature 101.8 ° C, 60% - at 103 °C, 65% - at 103.8 °C, 75% - at 107 °C and etc.

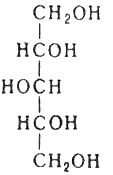
Sorbitol (sorbitol) - hexahydric alcohol, glucose recovery product...



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

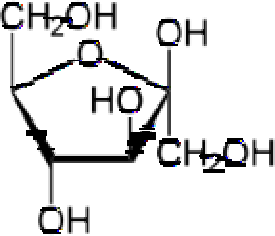
Xylitol (xylitol) **-** polyhydric alcohol (pentite), optically inactive isomer.

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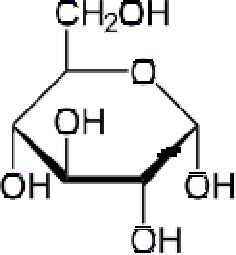
Xylitol is identical in calories to sugar (4 kcal/r), twice as sweet as him, but has no biological value. Does not have a negative effect on the body, due to which it is used in the food industry, for example, instead of sugar in the production of confectionery for diabetics and obesity. Has a choleretic and laxative effect.

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



For the absorption of fructose, no insulin required, therefore, it can be included in diabetic foods. It is natural sugar. It is found in honey, fruits and berries.

Glucose (dextrose; grape sugar) - monosaccharide, hexatomic sugar (hexose).



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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.

* + used as a syrup base as separate substances, listed above, and their mixtures in various concentrations. As the main sweet component in the compositions, sucrose is used in a mixture with other sweeteners., usually with sorbitol. Mixtures of sucrose with sorbitol the most delicious systems... The literature contains the following compositions: 40% sucrose + 20% sorbitol; 50% sorbitol + 20% sucrose; thirty% sorbitol + 30% sucrose. To the specified mixtures, if necessary adding synthetic sweet substances.

1. Flavoring agents**:** sweeteners, fruit concentrates, vanillin, menthol.
2. Odor flavors**:** essential oils, essences, menthol.

The selection of flavors and their matching to a harmonious product is difficult and requires a lot of patience. There are no special theoretical rules for obtaining a complete drug. When choosing a taste, it is necessary to take into account the age group of the main consumers. So pediatric drugs should be sweet with fruity aromas, for adults, the drugs should be less sweet, lemon flavored. Geriatric drugs are best flavored with mint. Wherein, as practice shows, it is recommended to use flavors, having the usual taste and aroma, and all the unusual are rejected.

Bitter taste is corrected by sweetness combined with aroma, which evokes a feeling of bitter: cocoa, chocolate, orange.

Essences are used to correct the bitter taste: mint, apricot, honey, cherries, chocolate, cocoa, cinnamon, orange. Sometimes additionally sodium chloride is added, citric acid.

The sweet taste is the hardest to correct. Correction with caramel or vanilla flavor is most suitable, banana or egg cream flavor. At high concentrations of sweets, use, so-called, "Salt effect" - improvement of taste with a small addition of sodium chloride.

Salty taste corrected with fruit syrups - apricot, cherry, lemon, orange. Slight acidification is sometimes desirable. Cinnamon syrups are widely used, mint, cocoa, caramel.

Sour taste corrected by sweetness combined with lemon aroma, orange, blueberry, apricot, cherries.

When adding flavors to syrup, odor should be avoided:

* 1. unusual aromatization;
  2. overdose of aromatic substances;
  3. uncompensated additional flavor.

1. Color flavors**:** natural and synthetic dyes, mineral pigments.

The main requirement, determining the possibility of using dyes in the pharmaceutical industry, is their harmlessness.

In recent years, there has been a tendency for the wider use of natural dyes (chlorophyll, carotene, etc..). However, natural dyes have a number of significant disadvantages.: low light fastness, oxidizing and reducing agents, as well as to a change in the pH of the medium, temperature effects and variability of composition, what makes it difficult to standardize, Besides - low coloring power, approximately at 10-25 times less, than synthetic.

Synthetic dyes are most widely used in the pharmaceutical industry. They refer, basically, to five connection classes: azo dyes, triphenylmethane, indigo, xanthonic and quinoline. Azo dyes make up almost 90% of all dyes used in various countries. Synthetic dyes include tropeolin 00, acid red 2FROM, tartrazine, indigo carmine, etc.... Sucrose based dyes are also used: ruberosum, flavarosum, cerulesum.

Besides, nowadays mineral pigments are widely used as food coloring agents - titanium dioxide, iron oxide.

Masking unwanted optical effects and color matching with the existing smell and taste, for a pleasant looking final product, is the final factor in the preparation of the composition of the drug and excipients... The most attractive paints for children: red, blue, violet; less attracted to pink, orange and green; repulsive effect is produced by black and unpainted solutions.

1. Preservatives**:** ethanol, sodium benzoate, nipagin (methyl-4-hydroxybenzoate), sorbic acid and others, approved for medical use.

The use of preservatives in the technology of making syrups is justified by the instability of microbiological purity during the storage of LF, special, if not sucrose is used as a sweetener.

APPARATUS AND EQUIPMENT**,** USED ​​IN SYRUP TECHNOLOGY

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

Syrup boiler



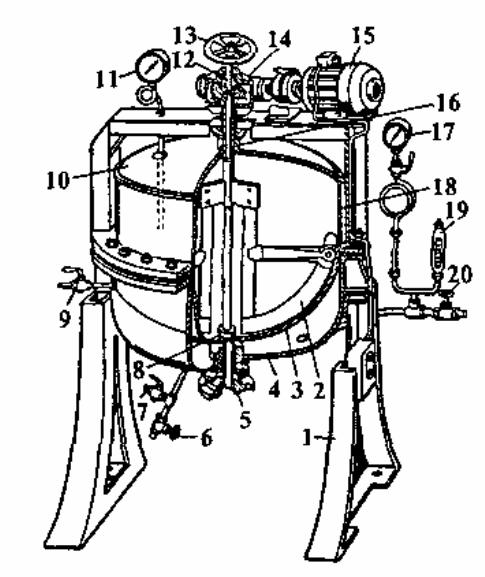
Boiler (picture 1) consists of a copper hemispherical bowl 3 with copper shell 18. The bowl is placed in a steel steam jacket 4 and is connected to it on the gasket using flanges and bolts... The boiler is installed on two cast-iron stands 1.

Steam for heating is supplied through the valve 20. Condensate is discharged through a valve 6 at the bottom of the steam jacket, but goes down through the crane 7.

* the boiler is connected to a condensate drain...

The boiler has a cover ten with a hatch for loading sugar and inspection and a fitting sixteen for removing secondary steam... During cooking, the mass in the bowl

agitated with an anchor stirrer 2, driven by an electric motor fifteen via worm gear



1. There is a fitting at the bottom of the boiler five for lowering the finished mass, which the

Rice... 1. Syrup

boiler

closed by a valve during cooking eight. When unloading the boiler, the opening of the union is opened by lifting the valve eight up with a vertical screw 12 with handwheel 13.

The boiler is equipped with a pressure gauge 17, safety valve nineteen, manometric thermometer eleven and a valve for air release nine.

Devices for filtering syrup and its filtration

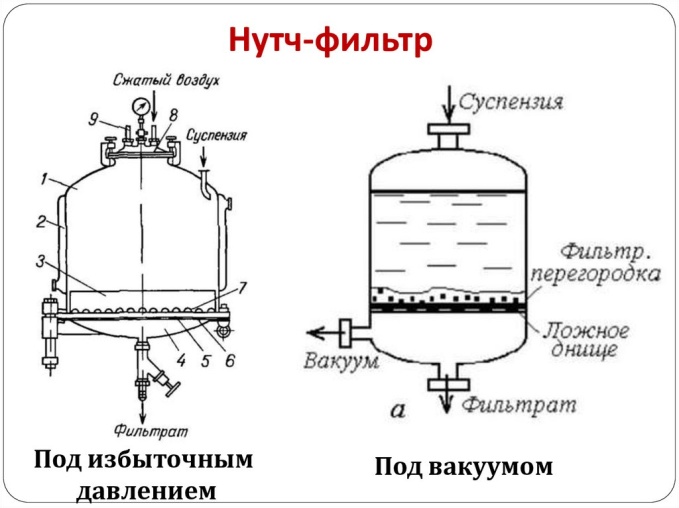
To filter the finished syrup from accidental impurities, use a metal mesh... Filters of various designs are used to filter LF.: nutsch-filters, druk-filters, filter KhNIHFI and others.

Nutsch***-***filters

Nutsch-filters are open (discharged) and closed (overpressure - before 4 atm.) - druk***-***filters.

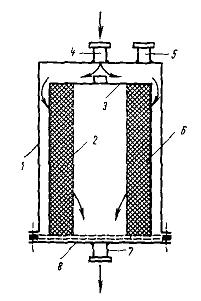
Open nutsch-filter (picture 2) consists of a rectangular or

bottom. The partition consists of porous ceramic tiles or fabric, laid on the lattice. After filling the filter with suspension and turning on the vacuum, the filtrate passes through the partition, and the sediment lingers on it. After filtration, the precipitate is manually washed from above and removed from the filter.



Picture 2. Open nutsch-filter

The filtered liquid does not pass through the filter layer perpendicularly, but at an angle, which increases the path of the solution through the filter and significantly improves the quality of the filtrate...



Rice... 4. KhNIHFI filter

Physical methods for ensuring the microbiological purity of syrups As you know, the less synthetic components Lf contains, the more suitable it is for the child. Respectively, the presence of preservatives in the syrup is undesirable, therefore, to ensure microbiological

purity use alternative methods.

High and ultrahigh frequency currents ***(***RF and microwave***)***

High frequency currents and fields lie in the range 200 kHz - thirty MHz, and ultra-high frequency - 300 MHz - thirty GHz. The use of HF and UHF to ensure the microbiological purity of LF is due to the fact, that there is a simultaneous heating of the entire processed liquid as in a macro-, and microvolumes, and under the influence of high temperature the death of microorganisms occurs.

Infrared ***(***IR***)*** and ultraviolet ***(***UV***)*** Radiation Infrared electromagnetic radiation is within the

wavelengths from thirty μm to 760 nm (0.76 μm). Ultraviolet

electromagnetic radiation lies in the wavelength range from 380 ± 80 nm. IR- and UV-radiation is invisible to the eye, used in diagnostics, therapy, pharmacy.

The main action of IR-radiation - thermal... In this way, IR-radiation is a variant of LF heat sterilization and has a bactericidal effect...

There is also the possibility of using UV-radiation to ensure the microbiological purity of syrups by acting on bacterial cells, namely on DNA molecules, and the development of further chemical reactions in them, which leads to the death of microorganisms... UV-radiation is harmful to the eyes, because, acting on the anterior membrane of the eyeball - conjunctiva, causes its inflammation - conjunctivitis... Therefore, when working with devices, in which UV-radiation, you need to protect your eyes with special glasses...

* currently processing UV syrups-rays are rarely used, since a relatively small amount of drugs is resistant to ultraviolet radiation...

Ultrasound

Ultrasound - these are longitudinal elastic waves inaudible to the human ear, whose frequency exceeds 20 kHz (before ten6 kHz).

Ultrasound is well absorbed by air... In the ultrasound region, an increase in the phase velocity of waves is observed with an increase in the ultrasound frequency

- positive variance...

Ultrasound is widely used in pharmacy:

1. Ultrasound is used to grind, dispersion of the medium in the manufacture of dosage forms: suspensions, colloidal solutions, medicinal emulsions.

Suspension - dispersed system, in which a solid is suspended in a liquid. Emulsion - appearance homogeneous system, consisting of mutually insoluble finely dispersed liquids. Colloidal

solution - microheterogeneous system, also consisting of mutually insoluble liquids.

* + depending on the substance used and the ultrasound parameters, a system can be obtained with certain properties. for instance, at low ultrasound intensity, an emulsion of the type is formed from mutually insoluble water and oil "oil in water", at high - "water in oil". In the destruction of matter, sound resonance plays an important role.

1. At a significant power of ultrasound in places of rarefaction, the substance breaks with the formation of cavities. This phenomenon is called cavitation.
   * cavity liquids are filled with gases dissolved in it... In the compression phase, the cavities collapse... Large local pressures occur ~ 1000 atm... Cavitation is used to sonicate shells plant and animal cells, extraction of biologically active substances from them - enzymes, vitamins, etc....d... Ultrasound is used not only to accelerate the extraction of medicinal raw materials from the cells and tissues of plant material, and also to ensure greater completeness of the extraction of active substances... Ultrasound is used to accelerate material impregnation.
2. Under the influence of ultrasound, many gels (gelatinous substances) turn into sols (colloidal solutions), the viscosity of the sols decreases, aerosols coagulate... Ultrasound is used to improve mixing of medicinal substances in liquid media, acoustic mixing. The advantage is further grinding of the solid phase, which significantly speeds up the dissolution process.
3. Ultrasound is used to kill viruses, bacteria, fungi when cleaning ampoules when washing them before filling. Cavitation phenomena help to remove wall contamination, rejection of ampoules with microdefects, which at the same time are destroyed, bactericidal processes. Due to the bactericidal action of ultrasound, received from

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using it, emulsions and suspensions are sterile, are better preserved, than obtained by mechanical dispersion. In case of delamination, they easily resuspend with shaking. Ultrasound is used to accelerate the sedimentation of suspensions.

1. At ultrasound intensity, causing cavitation, some chemical reactions are accelerated, especially oxidation processes. Polymerization processes slow down.

Hence, processing of syrups with ultrasound allows not only to ensure the microbiological purity of LF, but also to make the syrup homogeneous by improving the dissolution of sparingly soluble drugs...

SYRUP TECHNOLOGY

Technology of flavoring syrups

Sugar syrup ***(Sirupus Sacchari)***

To prepare the syrup, first pour into the boiler 0.64 kg of sugar and moisten it with a little water. The mixture is left on thirty minutes

- during this time, sugar becomes loose and dissolves more easily. Then add the rest of the water at the rate 0.36 l on 0.64 kg of sugar, steam is fed into the boiler and the mixture is heated to 60-70 °C Sugar can be added in portions 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) remove with a slotted spoon. Cooking syrup should be short: heating the mixture to dissolve the sugar - 35-40 minutes and boiling the mixture twice - 20-25 minutes. This eliminates sugar caramelization, 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.

With prolonged heating, sugar dehydration occurs. Glucose anhydrides are formed - reactionary-capable compounds. They can connect or with each other, or with an unchanged sugar molecule, forming reversions (condensation products). Upon further heating

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methylfurfural is formed, it, in its turn, decomposes with the destruction of the carbohydrate skeleton and the formation of formic and levulinic acids or colored compounds.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| sucrose | monosaccharides | anhydrides | |  | oxymethylfurfural | |  |
| sugars | |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  | |  |
|  |  |  |  |  |  |  |  |
|  | mixture |  |  | coloring and | |  |  |
|  |  |  |  | humic |  |  |
|  | glucose and |  |  |  |  |  |
|  |  |  |  | substances |  |  |
|  | fructose |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  | condensation products | | |  | formic and | |  |
|  | (reversions) | | |  | levulinic | |  |
|  |  |  |  |  | acid | |  |



However, among the products of changing sugars there are such, which have a positive effect on the stability of syrups against crystallization - mixture of sugar anhydrides and reversion products (condensation). Resistance to sugar and hygroscopicity also depends on the content of reducing substances (in particular, from the presence of glucose).

A method for the determination of readily hydrolysable anhydrides is proposed to assess the resistance to sugar. (sugar dianhydrides, compounds of anhydrides with unchanged sugar and other condensation products).

The sign of the readiness of the syrup is the absence of foam formation. The finished syrup is filtered through a metal mesh and in a hot able to filter. Use different filter designs (druk-, nutsch-filters, filter KhNIHFI, etc..), small volumes are filtered through several layers of gauze.

Sugar syrup is transparent, colorless or slightly yellow, thick liquid, sweet taste, without smell, neutral reaction, whose density 1.308-1.315 r/ml, refractive index 1.451-1.454. Store the sugar syrup in well-sealed bottles in a cool, protected from light.

Cherry syrup ***(Sirupus Cerasi)*** and raspberry syrup ***(Sirupus Rubi idaei)***

Raw materials are sorted, select ripe and undamaged fruits, remove trapped twigs, leaves and stalks. The sorted berries are then turned into a mushy mass using a roller crusher.

Fresh raspberries and cherries contain up to 82% water, before ten% sugar and before 2.7% organic acid (in terms of malic acid). Besides, they contain pectins, tanning, dyes and ascorbic acid.

To obtain stable syrups from berry juices, pectin substances must be removed from the latter, otherwise, when boiled with sugar and then cooled, they will cause gelation.

Pectin substances (protopectin, pectin, pectic acid) close to carbohydrates. Hydrolysis of pectin produces methyl alcohol, acetic acid, arabinose, galactose and galacturonic acid. You can say, what pectin - it is polygalacturonic acid with methyl alcohol residues.

* presence of sugar 65-70% and acid (pH = 3.1-3.5) jelly formed... At the same time, the gelling ability of pectins increases with an increase in their molecular weight and methoxyl groups. (CH3C).

Pectins are widely used in the food industry for the production of marmalade, jelly and pastilles.

Chopped berries (together with bones) placed in wide-necked glass cylinders, filling them on 2/3 capacity, fall asleep on top with a small amount of sugar (1.5-2%), the cylinders are closed with stoppers with two holes and left to ferment at 20-25 °From for a few days. Fermentation is considered complete, if from the tube, one end of which is lowered into the water, and the other is placed through the stopper into the balloon, the release of carbon dioxide bubbles will stop (CO2). The mixture is stirred from time to time by rocking the balloon.

If fermentation is not over, then a precipitate will appear in the product sample from the added alcohol - pectin substances. Alcoholic fermentation in the bottle helps to clarify the juice.

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

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

* in a syrup boiler, it is heated to 70 °FROM, pour sugar in the appropriate proportion and let the syrup boil, removing the foam. After that, it is filtered through several layers of gauze. Boilers must be enameled or nickel plated, in other boilers, berry syrups may lose flavor (copper) or get a dirty tint (pewter).

Cherry and raspberry syrups can be prepared from the corresponding food extracts of the highest quality. Wherein 4 parts by weight of the extract are mixed with 96 parts sugar syrup.

Raspberry syrup - thick liquid bright-crimson, with a pleasant smell and sourish-sweet taste. Cherry syrup is clear, dark-cherry blossom, with a pleasant characteristic odor (benzaldehyde) and sour-sweet taste. The density for both syrups must be within 1.305-1.330 r/ml. Store the syrup in a glass container in a cool, dark place.

Tangerine syrup ***(Sirupus Citri unshii)***

To prepare tangerine syrup, use a tincture of tangerine peel... Wherein fifteen parts of the tincture are mixed with 85 parts sugar syrup.

The finished syrup is a clear brownish liquid-yellow in color with a characteristic aromatic smell and taste of a tangerine peel. Density of syrup 1.220-1.244 r/ml.

Medicinal syrup technology

Altai syrup ***(Sirupus Althaeae)***

Altai syrup is prepared by mixing 2 parts of dry extract of marshmallow root with 98 parts sugar syrup... Technology of preparation of marshmallow syrup: 4 parts of the crushed root insist (maceration) during 4 h from 50 parts of water and 1 part 90% ethyl alcohol (preservative). The resulting extract is filtered, without wringing out the remainder... Then heat up 36 parts of the filtrate and dissolved in it 64 parts of sugar, let the solution boil (removing the foam), then evaporated to obtain 95 parts of syrup. The cooled syrup is then added five parts 96% ethyl alcohol as a preservative.

Altai syrup is a thickish transparent yellowish liquid with a weak specific odor, sweet taste. Density of syrup - 1.322-1.327 r/ml... It is used as an expectorant in mixtures. Store it in flasks with a capacity of no more than 200 ml in a cool place.

Rhubarb syrup ***(Sirupus Rhei)***

Rhubarb syrup is prepared by dissolving 1.25 parts of dry rhubarb extract in a mixture of 2 parts 90% ethyl alcohol and 3 parts of dill water. The filtered solution is mixed with 95 parts of sugar syrup and let it boil. In the absence of extract, rhizomes and rhubarb roots can be used. For this five parts of cut roots and rhubarb rhubarb are macerated 50 parts of water during 12 hours. For completeness of emodin extraction (substances with a weak acid character) add 1/2 parts of potash... The hood is drained, the remainder is lightly wrung out, liquids are mixed, boil and filter. IN 36 parts of the filtrate when heated, dissolve 64 parts of sugar, let the syrup boil, evaporated to 95 parts and add to the syrup 3 part of the dill water and 2 parts of alcohol.

Rhubarb syrup is a liquid brown-red with a peculiar smell and taste; miscible with alcohol, forming clear solution. With water, it gives a clear or slightly degrading solution. Density 1,310-1,344 r/ml. With ammonia, it should give a characteristic reaction to anthraglycosides. Rhubarb syrup spoils easily, therefore it is poured still hot into small bottles, which are immediately sealed and the corks are filled with paraffin. Store in a cool, dark place. Applicable per os in children's practice as a mild laxative.

Licorice syrup ***(Sirupus Glycyrrhizae)***

Licorice syrup is prepared by mixing 4 parts of a thick extract of licorice root with slight heating with 86 parts sugar syrup, after which they add ten parts 90% ethyl alcohol.

Licorice syrup is a yellowish liquid-brown color with a peculiar taste and smell. Density 1.29-1.31 r/ml. Keeps well in a cool place. Used as an expectorant and mild laxative per os or in potions.

Pertussin ***(Pertussinum)***

Pertussin is a solution from 12 parts of liquid extract of thyme or thyme and 1 parts of potassium or sodium bromide in a mixture of 82 parts of sugar syrup and five parts 96% ethyl alcohol. Sugar syrup is loaded into an enamel cast iron tank and potassium bromide is dissolved in it with stirring. Then a mixture of liquid extract and alcohol is added, mix again for fifteen minutes and leave to settle for 24 hours. After settling, the liquid is filtered through a triple layer of gauze and poured into flasks 100 r.

Pertussin is a dark-brown liquid with a fragrant odor, sweet taste... Density 1.22 - 1.27 r/ml. Store in a cool place. It is used in children's practice as an expectorant and cough softener for bronchitis and whooping cough.

Rosehip syrup ***(Sirupus fructuum Rosae)***

Rosehip Syrup is made from Rosehip Water Concentrate and Inverted Sugar Syrup(to stabilize ascorbic acid). In an enamelled syrup boiler with steam heating and an anchor stirrer, load, according to the recipe, granulated sugar and water and after adding lemon (or tartaric) acids heat 30-40 minutes at temperature 90 °C During this time, about thirty% sugar inverted. After some cooling, the syrup is pumped into a filter-press. The filtrate is collected in a measuring tank, from where it is lowered in certain portions in mixer. Rosehip concentrate is also supplied there from the measuring tank. After mixing, the mixture is pumped into a collector-measuring tank, from where the syrup enters the filling apparatus (in flasks by 100 and 200 r), and from there to the filling conveyor and further to packaging.

The drug is reddish-brown syrupy liquid without suspended particles. Sweet taste with smack and smell, inherent in rose hips. Dry matter 71-73%, ascorbic acid not less 4 mg in 1 ml, sugar not less 50%. Density 1.37 r/ml. Better to store at a temperature not higher 12 °C. Daily dose - 1-3 teaspoons with hypo- and vitamin C deficiency in children's practice.

Aloe syrup with iron ***(Sirupus*** Aloe ***cum Ferro)***

Aloe syrup with iron is prepared as follows: to 881 parts of the aloe juice syrup are added 100 parts of a freshly prepared solution of ferrous chloride containing 20% gland, fifteen parts of diluted hydrochloric acid and 4 parts of citric acid (or tartaric).

Density of the finished syrup 1.28-1.33 r/ml. The iron oxide content should not exceed 0.002%. Packaged by 100 and 200 g in flasks of colorless glass. It is used for anemia. In unfavorable storage conditions (in a dark place or in a bottle of dark glass) aloe syrup with iron gradually turns into a brown liquid, what is due

oxidation of ferrous chloride and its transformation into a compound of ferric oxide... If the oxidation process is at an early stage, vials of syrup can be placed in sunlight, which will improve its quality...

Holosas ***(Holosasum)***

Holosas is prepared by mixing 400 parts of thick extract of rose hips (with acidity not less 2.5% in terms of malic acid) and 600 parts sugar syrup.

The drug is a thick syrupy liquid, dark-Brown, with a specific smell. Store it in dark glass vials in a cool place. It is used as a choleretic and hepatoprotective agent.

Amtersol ***(Amtersolum)***

Amtersol is prepared as follows: 1 part of potassium bromide, 1 part of sodium benzoate, 0.2 parts of ammonium chloride, 0.2 parts of thermopsis liquid extract 1: 2 and 0.6 parts of the licorice root extract are dissolved in a mixture of 87 parts of sugar syrup and ten parts of ethyl alcohol 90%.

The finished syrup is a thick syrupy liquid, dark-brown, with a specific smell. Store amtersol in dark glass vials in a cool place... Used as an expectorant.

Paracetamol syrup ***(Sirupus paracetamoli)***

Paracetamol syrup 2.4% has the following composition: paracetamol, sorbitol solution, propylene glycol, ethanol 96%, sodium benzoate, citric acid, sodium citrate, food flavoring "Raspberry".

The drug is a transparent viscous pink liquid with a sweet taste and a characteristic raspberry smell. Stored in dark glass vials in dry, protected from light, at a temperature not lower + 18 °FROM... Freezing is not allowed. If crystals fall out, it is necessary to heat the bottle to 50-65 °From until complete dissolution.

When heated, the quality of the drug is preserved. Paracetamol syrup is used as an antipyretic and anesthetic.

SYRUP QUALITY ASSESSMENT

When standardizing, ready-made syrups are checked according to the following indicators:

1. Organoleptic properties (Colour, smell and taste).
2. Density. Determined using a pycnometer.
3. Refractive index - refractometric
4. Hydrogen exponent (pH).
5. Viscosity..etermined using a viscometer.
6. Chromaticity.
7. Microbiological purity of LF. syrups for microbiological purity belong to 3-her categories: UMCH should be no more ten3 in 1.0 (1 ml) syrup, mushrooms no more ten2 in 1.0 (1 ml) syrup, absence E. coli in 1.0 (1 ml) syrup...
8. Qualitative and quantitative composition of the syrup.
9. Starch syrup. When mixing equal volumes of the drug and 96% ethyl alcohol should not appear any sediment, no mud.
10. Invert sugar... When mixing 3 ml of the drug with 2 ml of Fehling's reagent, the mixture may turn green, but when standing for five minutes there should be no red precipitation.
11. Chlorides, sulfates, calcium and heavy metals... five ml of the drug is mixed with 45 ml of purified water... The resulting solution should not react to chlorides., sulfates, calcium and heavy metals...

When instructed by NTD, syrups are also checked for dyes and the presence of sulfur dioxide...

PRACTICAL PART

1. To cook 50.0 g sugar syrup, determine its quality.
2. To cook 50.0 g marshmallow syrup from raw materials...
3. To standardize syrups by organoleptic properties, density.
4. Draw diagrams of technological processes.
5. Record educational laboratory procedures in the diary.

General guidelines

Sugar syrup ***(Sirupus Sacchari)***

Characteristics of the finished product... Transparent, colorless or slightly yellow thickish liquid, sweet taste, without smell... Density 1,301-1,313 r/ml... Refractive index 1.451-1.454.

Packaging... In well-sealed glass containers 15-20 kg... Storage... Fully filled and well protected from light and

moisture container, in a cool place...

Application. Used as a corrective agent... Serves as the basis for the preparation of other syrups.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  | GF composition X, st... 625: | | |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
| Refined sugar | |  | 64.0 h | | |  |  |  |  |
| Purified water | |  | 36.0 h | | |  |  |  |  |
|  |  |  | Characteristics of raw materials | | | |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
| No. |  | Technical | | | |  |  |  |  |
| pharmacopoeial |  | Content**,** |  |  |  |
|  | or trade | | | |  | Grade |  |
| articles or |  | **%** |  |  |
|  | name | | | |  |  |  |
| GOST |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  | | |  |  |  |  |
| FS 42-77-72 |  |  | Sugar | | | 99.8% |  | by FS |  |
|  |  |  |  | | |  |  |  |  |
| FS 42-2619-97 |  |  | Water | | | pH 5.0-7.0 |  | by FS |  |
|  | cleared | | | |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |

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Description of the technological process

* tared beaker, place the flask or evaporation dish 64.0 parts of refined sugar, add 36.0 parts of purified hot water. The contents of the flask or glass are mixed and placed on an electric stove, stirring until sugar is completely dissolved... Boil 5-10 minutes and bring boiling water to 100.0 parts of the finished product. Due to the small amount of sugar taken, the foam is not skimmed, the syrup is allowed to cool slightly and hot filtered through 2-3 a layer of gauze.

Analysis of the finished product. The density of the syrup should be 1,301-1,313 r/ml. Refractive index 1.451-1.454.

Marshmallow syrup ***(Sirupus Althaeae)***

Characteristics of the finished product... Thick transparent liquid

yellowish, with a faint peculiar smell, sweet taste.

Packaging... In flasks with a capacity not exceeding 200 ml.

Storage In a cool place.

Application... As an expectorant in mixtures.

Composition:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Infusion of marshmallow root | | | 36.0 h |  |  |  |
| Sahara |  |  | 64.0 h |  |  |  |
|  |  | Characteristics of raw materials | | |  |  |
|  |  | | |  |  |  |
| Pharmacopoeia number | Technical or | | | Content**,** | Grade |  |
|  |  |  |  |  |  |
| articles or GOST | tradename | | | **%** |  |  |
|  |  |  |  |  |  |  |
| GF XI, vol... 2, from... |  | Marshmallow roots | |  | by GF |  |
|  |  |  |  |
| 343 |  |  |  |  |  |  |
|  |  |  | |  |  |  |
| FS 42-77-72 |  | Sugar | | 99.8% | by FS |  |
|  |  | | |  |  |  |
| FS 42-2619-97 | Purified water | | | pH 5.0-7.0 | by FS |  |
|  |  |  |  |  |  |  |

Description of the technological process

In a flask on 100.0 ml put 4 parts of cut marshmallow root,

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flood 50.0 parts of water and 1.0 part 90% ethyl alcohol and macerate for 4 hours... The resulting extract is filtered, without wringing out the remainder... Place in a tared porcelain cup 36.0 parts of the filtered hood and 64.0 parts of sugar... The contents of the cup are mixed and placed on the hotplate., stirring until sugar is completely dissolved... Boil 5-10 minutes and bring boiling water to 100.0 parts of the finished product... The hot syrup is filtered through 2-3-a layer of gauze... The finished product is standardized...

Analysis of the finished product... Density 1,322-1,327 r/ml. Authenticity: when adding 95% alcohol (1:1) mucus coagulates. A floating flocculent clot forms, standing precipitate.