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*Asfendiyarov Kazakh National Medical University***THE USAGE OF THE LICORICE ROOT EXTRACT FOR PREPARING THE CHILDISH RECTAL SUPPOSITORIES**

A rational technology of combined children's suppositories with a thick and dry extract of liquorice root has been developed. Quality indicators of the developed preparations were studied. It is established that the received suppositories on two technologies for organoleptic, physic-chemical and technological indicators are suitable with the requirements.

Keywords: *licorice root extract, childish rectal dosage form, glycyrrhizin acid, suppository*

Introduction. At present time, the assortment of children's medicines for treating and preventing the various diseases of the immune system of both imported and domestic production is not wide enough on the Kazakh pharmaceutical market. Particular attention is drawn to the almost complete absence of rectal dosage forms.

However, it is the rectal route of drug administration that is most promising in pediatric practice, because while the main pharmacological effect is quickly manifested, irritation of the mucous membrane of the stomach and duodenum is eliminated, rapid inactivation of the drug in the liver and gastrointestinal tract is prevented.

Actuality. The urgent and necessary task of pharmacy and medicine for today is an intensive search for effective natural components for the creation of various children's rectal medicinal forms. One of the promising medicinal substances in this regard are extracts of licorice root (thick and dry).

Extracts of licorice root contain various biologically active substances (BAS), among which, first of all, glycyrrhizin acid (content in extracts of not less than 14%), flavonoids (liquidoritin, lycurazide, etc.), pectins, amino acids and polysaccharides.

Purpose of the task. The purpose of this work is to develop the technology of children's suppository medicinal forms of immunomodulating action on the basis of thick and dry extracts of licorice root.

Methods of research. Licorice preparations have multifaceted biological activity [1-4]. The mechanism of anti-inflammatory action of licorice is associated with the stimulating effect of glycyrrhizin acid on the adrenal cortex. It is this pharmacological property of the plant. The most important constituent of the licorice root is glycyrrhizin (glucoside-glycyrrhizic acid or licorice sugar), which is mainly in the form of potassium and calcium salts. Its chemical formula is C₄₄H₆₃N₀O₁₈ and it is this component that gives the sweet taste of licorice - it is 50-200 times sweeter than sugar.

In commercial extracts of Lacrychnik is contained in an amount from 5 to 18%.

Glycyrrhizin acid - consists of two molecules of glucuronic acid. It is refers to steroid saponins. The molecule of glycyrrhizin acid is very similar to the structure of the hormones produced by the adrenal cortex (cortisone, etc.). This makes it possible to use it as a substitution therapy, if necessary, to use the hormonal therapy. In this case, it is possible to significantly reduce the dose of pure hormones (for example cortisone) used as a medicine.

It also exhibits anti-allergic, anti-inflammatory action. Therefore, it is used in the treatment of various kinds of allergic diseases, in the treatment of arthritis.

Considering that glucuronic acid contained in glycyrrhizin acid binds and inactivates poisons produced in the body, it is also used in antidote therapy, that is, treatment of poisonings and intoxications of various origins.

Studies carried out in 1980 showed that glyceric acid stimulates the production of interferon, which has antiviral activity. In addition, it was found that this same acid suppresses the growth of Herpes cells.

Japanese scientists managed to achieve success in the treatment of AIDS patients by injection with glycyrrhizin.

In recent comprehensive studies, American scientists have proven the anti-cancer effect of this substance is considered most important. Drugs of licorice promote the healing of wounds.

The licorice roots were taken by naked, biologically active compounds (glycyrrhizin acid, licurazide, liquidoritin, ononin, liquiditetigenin, isolikviritigenin, formononetin) isolated from the raw material of this plant, as well as glycyram standard sample and a licourazide-standard sample. Medicinal preparation "Licorice extract liquid" is obtained by extraction from the roots of licorice naked (1:1) 40% of ethyl alcohol.

Thin layer chromatography methods were used in the work; UV spectra were recorded using a spectrophotometer.

In developing the technology of preparation of suppositories, special attention was paid to pharmaceutical factors affecting their therapeutic effectiveness, namely the nature of the suppository base and auxiliary substances, their quantity, and the physic-chemical properties of licorice root extracts and essential oils of chamomile blue and tea tree.

It is known that the main stage of the technology of rectal dosage forms is the introduction of active components into the suppository base. Since the introduction of active components in the dissolved state is preferable, we have studied the possibility of using emulsion suppository bases consisting of lipophilic, hydrophilic components and various surface active substances (SAS).

The choice of emulsion suppository bases was also based on the fact that their use is promising for the production of suppositories with many drug substances with different degrees of affinity both with lipophilic and hydrophilic phase of the system. Such bases allow controlling the melting and solidification temperatures, the time of complete deformation of suppositories, other technological characteristics, including the speed and completeness of the release of active components from the dosage form due to the introduction of certain surfactants and combinations thereof.

As the lipophilic component of the emulsion, solid fat type A was used, hydrophilic water was purified, and as an emulsifier, a combination of surfactant-80 and lecithin in a total amount of 13% by weight of the emulsion.

Suppositories were prepared taking into account the physic-chemical properties of the main components and auxiliary substances by the pouring method.

Results of the research.

The optimum concentration of thick and dry extracts of licorice root was determined based on the study of antiviral activity. The concentration of essential oils of chamomile blue and tea tree was substantiated on the basis of microbiological studies in experiments by the diffusion method in agar.

Calculations in the manufacture of suppositories by spillage into molds using a base. When calculating the basis weight, take into account: the volume of the mold cavity; the volume occupied by the drug substance; basis density.

If the mass of the medicinal substances that make up the suppository mass is more than 5%, the bases are taken less and the reverse substitution factor (1/E) is used when calculating the basis weight, which shows the mass of the fat base corresponding to the volume occupied by 1.0 g of drug substance its introduction into a fatty basis.

The mass of fat basis is calculated by the formula, which is given in the "Methodical recommendations for pouring and quality control of suppositories based on solid fat."

$$\left\{ M = n \times M_0 - \sum (m \cdot 1/E) + 0,05 \right\}$$

where: M is the mass of the suppository base for manufacturing a batch of suppositories, g;

$M_0 = V \times \rho$, mass of the base for filling one cell of the suppository form, g;

m - mass of medical substance per suppository, g;

1/E - reverse substitution factor for a given medical substance (on a fat basis);

0,05 - the average loss value of the suppository mass, established experimentally, g;

V - actual capacity of one cell of suppository form (CФ), cm^3 ;

ρ - suppository density, g/cm^3 ;

n - number of suppositories (party),

Considering the number of extracts of licorice root in the composition of suppositories (more than 5%), we conducted preliminary studies to determine their replacement coefficients. As a result of the experiments, it was found that for the dry extract of the licorice root $i/E_{ж} = 0.92$, and for the thick extract - $i/E_{ж} = 0.78$.

Taking into account the calculated replacement coefficients, as well as the solubility of the dry and thick extract of the licorice root, we developed the following technologies for the preparation of children's rectal suppositories.

The technology is given for suppositories: the amount of the base was calculated taking into account the substitution coefficients of dry and thick liquorice root extract and the volume of suppository-shaped cells.

6.50 (in the preparation of suppositories with a dry extract) or 6.85 (for the preparation of suppositories with a thick extract) were weighed, placed in a porcelain dish (FCh-i) and melted in a water bath.

2.50 of dry or thick liquorice extract was taken, placed in a mortar (C-1) and mixed with 1.00 ml of distilled water.

0.50 of tween-80 and 1.00 lecithin was added, a mortar (C-1) was added to the mortar and a solution of a dry or thick liquorice root extract was emulsified with stirring, a solid fat melt from (FCh -I) was added and mixed with trituration.

After that, the resulting mass was transferred to a porcelain cup (FCh-i), it was melted, 0.10 of the essential oils of chamomile of blue and tea tree were added and mixed until homogeneous.

Table 1 - Indices of quality of children's rectal suppositories on the basis of liquorice extracts

Samples of suppositories	Quality indexes				
	Appearance	Uniformity	Average weight	Melting temperature	Time of complete deformation
With a dry extract of licorice root	candles of brown color with a smooth surface, the correct form of "torpedo"	homogeneous on the longitudinal section	1,15	$35 > 8 \pm 1,0$ °C	9 min
With thick liquorice extract	candles of brown color with a smooth surface, the correct form of "torpedo"	uniform on the longitudinal section, sometimes there is an air rod	1,15	$36 > 8 \pm 1,0$ °C	8 min

The ready suppository mass was poured into a contoured package of polyvinyl chloride film or into pre-prepared suppository molds. The filled form was aged for 15-20 minutes at room temperature, and then placed in a refrigerator and cooled at a temperature of (2-8) °C for 30-40 minutes. After cooling, suppositories were removed, quality control was performed.

The quality of suppositories was assessed by the following parameters: appearance, uniformity, average mass, melting point, time of complete deformation.

As can be seen from the table, the obtained suppositories of brown color, with a smooth surface, the correct shape of the "torpedo", homogeneous in the longitudinal section, in suppositories with a thick extract, an air rod is sometimes observed.

For all other quality indicators studied, the suppository samples obtained meet the requirements for rectal dosage forms, which in turn confirms the correctness of the developed technology for the preparation of children's rectal suppositories with both dry and thick liquorice extracts.

Conclusions.

1. A rational technology of combined children's suppositories with a thick and dry extract of liquorice root has been developed.
2. Quality indicators of the developed preparations were studied.
3. It is established that the received suppositories for two technologies for organoleptic, physic-chemical and technological indicators meet the requirements.

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МИЯ ТАМЫРЫНЫҢ ЭКСТРАКТЫНАН БАЛАЛАР СУППОЗИТОРИЙ ДАЙЫНДАУ

Түйін: Қою және құрғақ мия тамырының экстрактынан балалар суппозиторий дайындау рациональды технологиясы көрсетілген. Осы технологиямен алынған препараттың сапалық көрсеткіші зерттелді. Екі технологиямен алынған суппозиторий органолептикалық, физико-химиялық және технологиялық көрсеткіш талаптарына сәйкестігі анықталды.

Түйінді сөздер: мия тамырының экстракты, балалар ректальды дәрілік формасы, биологиялық-активті заттар, глицирин қышқылы, суппозиторий

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ИСПОЛЬЗОВАНИЕ ЭКСТРАКТА КОРНЯ СОЛОДКИ ДЛЯ ПРИГОТОВЛЕНИЯ ДЕТСКИХ РЕКТАЛЬНЫХ СУППОЗИТОРИЕВ

Резюме: Разработана рациональная технология комбинированных детских суппозиториев с густым и сухим экстрактом солодкового корня. Изучены показатели качества разработанных препаратов. Установлено, что полученные суппозитории по двум технологиям по органолептическим, физико-химическим и технологическим показателям соответствуют требованиям.

Ключевые слова: экстракт корня солодки, детская ректальная лекарственная форма, глицирризиновая кислота, суппозиторий