

## **Into the pediatrician's practice**

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## **Herbal Treatment of Inflammatory Diseases of the Upper Respiratory Tract**

*This article is devoted to one of the most common manifestations of diseases of respiratory system and upper respiratory tract - coughing. While performing a protective function, the cough in some cases significantly impairs a child's condition. The choice of treatment requires a clear understanding of the mechanism of a drug's action, its safety profile and effectiveness. In this paper the authors present a comparative description of herbal remedies relating to secreting motor antitussives. Along with the description of the pharmacological actions of the components of these drugs, the issues of safety and efficacy are also described. We consider the herbal remedies, which can be used in wet and dry cough in patients older than 2 years.*

**Keywords:** *cough, respiratory infections, treatment, expectorants, herbal medicine.*

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"Anti cough" plant-based remedies are still occupying the market firmly in spite of the abundance of other drugs. The demand for herbal remedies is caused by a satisfactory safety profile with an efficiency comparable to synthetic analogues, as well as the possibility of achieving a high commitment to patient care. It's not a secret that many parents have a negative attitude towards the prescription of synthetic drugs and they willingly resort to herbal medicine, which allows to achieve a higher compliance that is an important factor for success in the child's treatment.

### **The classification of antitussive drugs, indications for usage**

Cough is a protective physiological reflex of the body, providing passage of respiratory system, clearing the airways from foreign material and mucus. When the cough becomes constant, excessive and disturbing, it is necessary to begin treatment, despite the fact that it is a natural defense mechanism.

Drugs "for cough" can be divided into a centrally acting drugs (cough suppressors): secretomotor (stimulating expectoration) and secretolytic [1].

Expectorants are indicated for phlegm congestion, which leads to airway obstruction and for unproductive cough. The choice of anti cough remedies is caused by specific action and the nature of pathology that disturbs drainage function.

There is a distinction among secretomotor drugs into directly acting on bronchial glands and drugs acting gastric mucosa reflexes (containing emetine, saponins and essential oils). Among mucolytic drugs there are drugs operating on the disulfide bonds of mucopolysaccharides and peptide bonds of protein molecules, as well as normalizing the intracellular formation of bronchial secretions.

Although herbals are classified as secretomotor drugs they often have a mixed effect. They irritate the stomach receptors and stimulate the neurons of the vomiting reflex, respiratory center, leading to increased peristalsis of the bronchioles and increased activity of ciliate bronchial epithelium. Herbal remedies contained in essential oils and other ingredients, stands out through the airways, causing increased secretion of mucus and thinning ( secret dissolving resorbing effect) [2, 3].

In this review the characteristic of Gerbion is introduced which consists of plantain and primrose syrups. Both drugs have expectorant, anti-inflammatory, antimicrobial effect, and are prescribed in inflammatory diseases of the upper respiratory tract (URT) for bronchitis, tracheid, laryngitis, and tracheobronchitis.

### **Composition, Description of drugs**

Active ingredients of the drug in the form of syrup are aqueous extracts of primrose root, herbs, thyme and menthol.

The drug helps to reduce the viscosity of sputum and improves its discharge due to saponins and glycosides contained in the extract of primrose. Their action is directed at suppressing the inflammatory process, thinning mucus and stimulating the respiratory center [3]. Essential oils of thyme (20-55% thymol) levomentol help to reduce bronchospasm; remove sputum from the bronchial tubes through the excitation of the respiratory center; and provide antiseptic effect[3].

Thus, the primrose syrup has mucolytic and secretomotor properties; indicated as an expectorant in the treatment of inflammatory diseases of the URT with difficult expectoration (Table 1).

Aqueous extracts of lance late plantain, mallow flowers and ascorbic acid are included in the remedy. The action of the components is aimed at reducing the sensitivity of the mucous membranes, and thus, decreases the frequency of cough. Extracts of Mallow and plantain have a defensive effect on the mucous membrane of the URT: they protect against irritation [3], resulting in a reduced intensity and frequency of cough. In addition, these extracts possess anti-inflammatory effects [3]. Aukubin contained in plantain has bacteriostatic effect and ascorbic acid as an addition has antioxidant effect.

Thus, remedies in the form of plantain syrup are indicated for diseases accompanied by dry cough (Table 2).

### **Comparison with other antitussive drugs**

We know that every drug has some side effects. Thus, derivatives of cysteine with

large volumes of bronchial secretions can cause stagnation of phlegm, and also provoke bronchospasm. In addition, this group of drugs is incompatible with some antibacterial drugs (tetracycline derivatives, semisynthetic penicillin, aminoglycosides and cephalosporin) [2, 4]. Syrup "Gerbion" is compatible with all antibacterial agents and doesn't have similar side effects.

Often, expectorants include ethyl alcohol and ammonia as additions, which make them not possible to be used in children, as well as in human with liver and kidney problems [4]. Represented syrups are prepared on the basis of the water.

Many herbal expectorants include the extract of ivy leaves [4]. The plant is poisonous, as it is reflected in the safety profile of medical products containing an extract of ivy leaves. In case of overdose, nausea, vomiting, headache, increased blood pressure and diarrhea appear.

Medicines which include the istod root extract cause stool disorders and conjunctivitis as side effects due to increased secretion of mucous and salivary glands [3, 4]. Active ingredients of syrups "Gerbion" cause the only secret motor effect on bronchial glands secret.

Some plant-based expectorant drugs contain anise, licorice, and oregano and produce laxative effect [2]. Gerbion syrup does not contain substances that have a laxative effect.

Increased temperature, tachycardia, hoarseness (due to irritation of the mucous membranes of the respiratory tract) may be caused by the usage of proteolysis agents. [2,4]. They can also cause bronchospasm and allergic reactions.

Medications are contraindicated in diseases of the liver, pancreas, and heart failure. Herbal psyllium as a syrup and syrup primrose do not have systemic effects and can be assigned to patients with chronic diseases.

### **The effectiveness of herbal remedies**

According to clinical studies in adults, the drugs in the form of syrup, and plantain syrup primrose showed high efficacy in the treatment of cough. Multicenter comparative open study was conducted at the Research Institute of Pulmonology State Medical University named by Pavlov and the St. Petersburg Institute of MH (St. Petersburg) in 2007. The safety and efficacy of both syrups - plantain and primrose were studied in parallel groups: the medications were used for relieving symptoms of laryngitis, bronchitis (acute / exacerbation of chronic), tracheitis, and tracheobronchitis. The intensity of cough, sputum quantity and quality were assessed over time during treatment with syrups.

Primrose syrup was used as an expectorant in the treatment of inflammatory diseases of the URT with difficult expectoration (bronchitis, tracheitis, bronchitis, etc.) and acute respiratory diseases involving non-productive cough. It was shown that treatment with primrose syrup cough reduced frequency by 30% for 3-4th day of the disease and by 59% - to 8-9th day of illness (Fig. 1). Sputum was significantly improved: 16% for 3-4th day of illness, compared with the control group and 21% - to 8-9th day of illness (Fig. 2).

The studied plantain syrup was used in the treatment of inflammatory diseases of the URT, accompanied by a dry cough. It is noted that the frequency of attacks of

dry cough for 3-4th day of illness decreased by 15% compared with the control group and 22% - to 8-9th day of illness (Fig. 3). In addition, psyllium reduced 1/3 the frequency of sputum (Fig. 4).

The results obtained in the course of follow-up of patients indicate that psyllium syrup is more effective for severe attacks of coughing. Thus, this study demonstrates the high efficacy of the studied drugs in the treatment of inflammatory diseases of the URT.

### **Safety of herbal medicines**

The safety of active substances and included additions were proved. In study with adult patients no serious adverse events were indicated. However, using syrups might develop allergic reactions in very rare cases such as nausea, vomiting. Syrups are prepared on the basis of water, which makes them easy to assign for children older than 2 years old; a simple dosing regimen makes it possible to use the drug at home. It should be marked that the syrup should not be simultaneously used with antitussive drugs and drugs that reduce the formation of mucus [2, 4]. The main contraindications to the use of syrups are associated with carbohydrate metabolism disorders, and hypersensitivity to the active components of drugs: hypersensitivity to the drug, as well as to medications, containing active ingredients of Primrose family and the family of Dead-nettle, diabetes, congenital intolerance to fructose, malabsorption syndrome glucose / GA lactose, congenital deficiency of sucrose / isomaltase for children younger than 2 years after acute obstructive laryngitis (croup syndrome) [4].

### **Dosage and administration**

**Gerbion psyllium syrup** is assigned 3-4 times a day; for children older than 14 years - 10 ml; for children aged 7 to 14 years - 5 ml; for children aged 2 to 7 years - 2.5 ml [4].

**Gerbion primrose syrup** is assigned after meal, 3-4 times a day; for children older than 14 years - 10 ml; for children aged 5 to 14 years - 5 ml; for children aged 2 to 5 years - 2.5 ml [4]. Duration of treatment is 2-3 weeks. Medications are taken orally with drinking plenty of warm water.

### **Conclusion**

Easy choice, depending on the clinical disease, ease of usage, proven clinical safety and efficacy; easy achievement of treatment compliance can confidently recommend these remedies as herbal expectorants in the treatment of diseases of the bronchopulmonary system, leading to acute and chronic cough.

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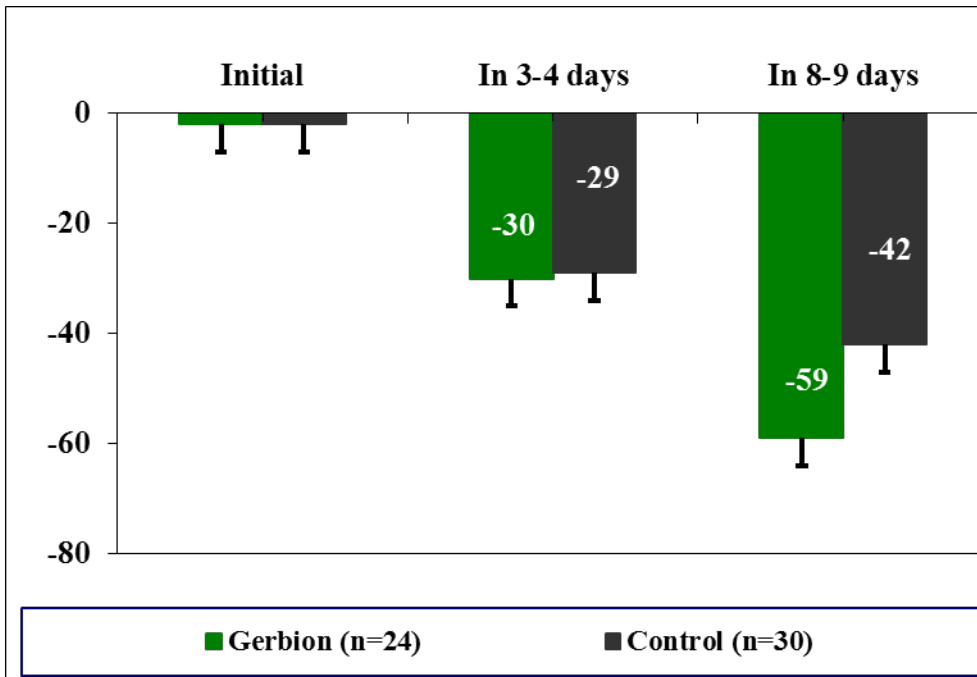
**Table 1** Main effects of herbs components in wet cough

Action	Gerbion syrup primrose	Primrose root	Thyme herb
Mucolytic	++	+	+
Expectorant	++	+	+
Antiinflammatory	++	+	+
Antiseptic	+		+
Bronchodilator	+		+

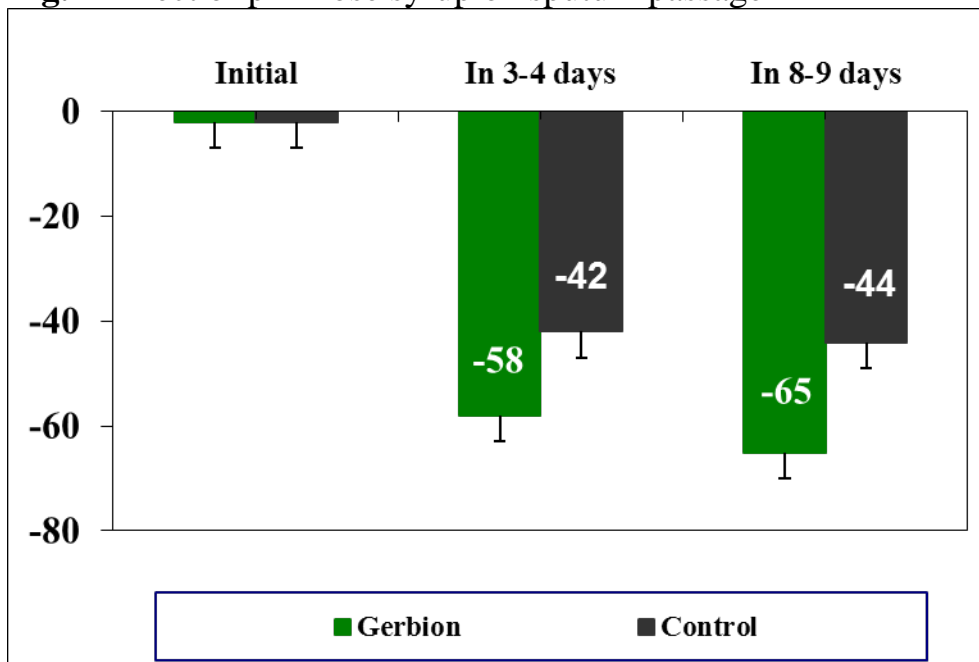
**Table 2** Main effects of herbs components in a dry cough

Action	Gerbion psyllium syrup	Psyllium herb	Mallow flowers
Anti inflammatory	++	+	+
Antiseptic	++	+	+
Normalization of surfactant	+	+	
Increasing resistance	+		+

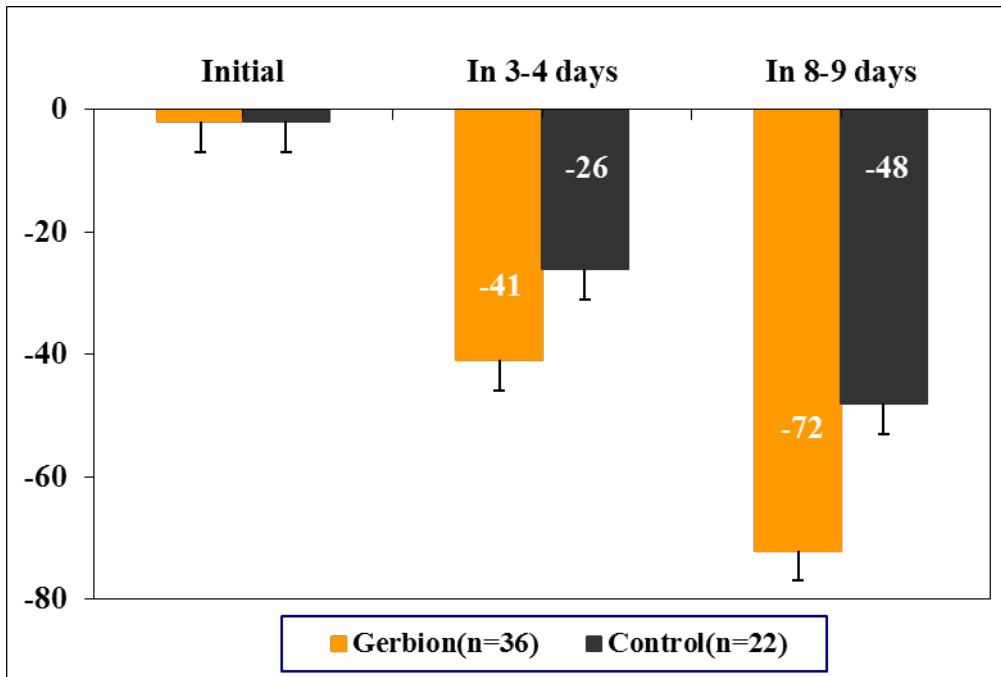
**Fig. A.** The dynamics of cough frequency in the treatment of herbal medicines such as primrose syrup



**Fig. 2** Effect of primrose syrup on sputum passage



**Fig. 3** The dynamics of cough frequency in the treatment with psyllium syrup



**Fig. 4** Effect of plantain syrup on the frequency of sputum

