Synergistic aspects of modern phytopharmacotherapy in gastroenterology

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SUMMARY

The analysis of the formulation of the drug "Gastroguttal" (stomach drops), approved for medical use on the territory of the Russian Federation about 20 years ago, from the point of view of modern ideas about biologically active substances of natural origin and the compatibility of the incoming ingredients. It is shown that the composition of the combined herbal preparation clearly illustrates the principle of kinetic synergism of the components, when unidirectional types of pharmacotherapeutic action are reliably implemented in the body by various mechanisms using biologically active substances of various structures. The implementation of this principle, along with the natural origin and standard quality of the studied OTC phytopharmaceutical, determines the reliability of therapy, including during the period of establishing an accurate diagnosis,

Key words: evidence-based herbal medicine, phytokinetic synergy, kinetic synergyin herbal medicine, biologically active substances, Gastroguttal, anacid gastritis, chronic cholecystitis, dyskinesia of the gallbladder and biliary tract.

RESUME

We analyzed the formulation of the drug "Gastroguttal" (gastric drops) in terms of modern ideas about plant biologically active substances and the compatibility of ingredients. This drug is allowed for medical use in Russia about 20 years ago. We found that the composition of the combined herbal remedy clearly illustrates the principle of kinetic synergism of the components, when unidirectional types of pharmacotherapeutic action are reliably realized by various mechanisms of action of biologically active substances of various structures. The implementation of this principle determines the reliability of therapy, and the herbal composition of the drug and its standard quality determine the demand for the drug both by specialists and by different age groups of the population.

Keywords: evidence-based herbal medicine, phyto kinetic energy, kinetic synergism in herbal medicine, biologically active substances, Gastroguttal, anacid gastritis, chronic cholecystitis, gallbladder and biliary dyskinesia.

INTRODUCTION

The phytotherapy method received official recognition in Russia in 2000 [46], however, practitioners are not always sufficiently informed about the advantages of this method and the proven efficacy of official (pharmacopoeial) medicinal preparations (MP) of herbal origin.

Today, scientifically grounded herbal medicine is an integral part of pharmacotherapy, and standardized herbal medicines are registered by the Ministry of Health of Russia in the prescribed manner along with synthetic ones [33, 62, 73, 74].

In Europe, the registration of traditional medicinal products (MPs) of herbal origin is significantly simplified in terms of proving their efficacy and safety in comparison with synthetic medicinal products. The definitions and basic principles of a common (for EU member states) regulatory framework for herbal medicines (including traditional ones) are set out in EU Directive 2001/83 and its amendments. Interstate approval regarding the circulation of herbal medicines in Europe is carried out according to the standards developed by the Committee on Herbal Medicines (NMPC) of the European Medicines Agency (EMA) and the European Pharmacopoeia [91].

In general, international regulations for herbal medicines, including traditional medicines in Europe and other continents, are regulated and coordinated by WHO and IRCH (International Regulatory Cooperation for Herbal Medicines), a global network of regulatory bodies responsible for the regulation of herbal medicines, created in 2006. ... IRCH's mission is to protect and promote

a healthy lifestyle and safety of the population through improved regulation of herbal medicines around the world [10, 91].

The effectiveness and safety of mono- and multicomponent herbal medicines produced in accordance with the requirements of modern pharmaceutical standards based on the experience of traditional medicine (TM) is explained not only by their high quality, due to compliance with GMP standards. An important role is played by the centuries-old selection of the “best” (effective and safe) traditional formulations and certain types of medicinal plant materials used in the development of formulations for the creation of herbal medicines [25–27, 33, 73, 91]. Ethnopharmacological aspects of the search for effective medicinal plants and formulations play an increasingly important role in the development of modern effective and safe formulations for the production of modern herbal medicines all over the world [68, 78, 84–86, 90].

An important aspect of the effectiveness of multicomponent herbal medicines is also the use of the principle of phytokinetic synergism in the creation of modern formulations based on the experience of the traditional use of individual ingredients of herbal origin [28–32].

Taking into account the urgency of the problem of treating diseases of the digestive system in different age groups, our attention was drawn to the herbal preparation Gastroguttal, which includes 4 well-known tinctures from official medicinal raw materials, which have a long history of traditional use in our country. Positive feedback on this drug on the Internet from consumers, as well as more than 18 years of its official use in medical practice, played an important role in the choice of the research object. Gastroguttal was first registered in 2001 (year of birth P N003532 / 01). To date, the drug is widely used in gastroenterology [11, 12, 20, 82] for diseases of the gastrointestinal tract, accompanied by spasms of smooth muscles, including hypo- and anacid gastritis, chronic colitis, chronic cholecystitis, biliary dyskinesia [82]. The results of scientific studies of its ingredients and many years of experience in the use of Gastroguttal in clinical practice allow us to conclude about the high efficacy and safety of this antispasmodic herbal remedy [82].

In accordance with the data of the Register of Medicines (RLS), Gastroguttal (a combined herbal preparation) belongs to the pharmacological group of M-anticholinergics in combinations; according to the ATC classification - to the A03ED group - Antispasmodics in combination with other drugs [11]. According to the nosological classification (ICD-10), the range of application of Gastroguttal is extremely wide: K29.6.0 - Anacid gastritis, K52 - Other non-infectious gastroenteritis and colitis, K81.1 - Chronic cholecystitis, K82.8.0 - Dyskinesia of the gallbladder and biliary tract [11]. And taking into account the synonyms of nosological groups (Table 1), the spectrum of action of the herbal preparation Gastroguttal (the cost of a package today ranges from 129 to 147 rubles) in gastroenterology is significantly expanding.

Table 1

Synonyms for nosological groups according to ICD-10 [65]

ICD-10 heading	Synonyms of diseases according to ICD-10
K29.6.0 * Anacid gastritis	Anacid gastritis
	Chronic hypoacid gastritis
	Hypoacid gastritis
	Chronic hypoacid gastritis
K52 Other non-infectious gastroenteritis and colitis	Non-infectious gastroenteritis
	Gastroenterocolitis
	Colon disease
	Colitis
	Non-dysenteric colitis
	Colitis, non-infectious
	Chronic colitis
	Chronic non-infectious colitis

	Local enteritis
	Sigmoiditis
	Sigmoiditis, non-infectious
	Senile bowel syndrome
	Chronic inflammatory bowel disease
	Chronic inflammatory diseases of the small intestine
	Chronic enterocolitis
	Chronic atrophic gastroenteritis
	Chronic gastroenteritis
	Chronic colitis
	Chronic enterocolitis
	Enteritis
	Enteritis non-infectious
	Enterocolitis chronic non-infectious
K81.1 Chronic cholecystitis	Chronic acalculous cholecystitis
	Chronic gallbladder disease
K82.8.0 * Dyskinesia of gallbladder and biliary tract	Biliary obstruction
	Biliary reflux gastritis
	Biliary reflux esophagitis
	Biliary sludge
	Pain syndrome with spasms of smooth muscles
	Pain syndrome with spasms of smooth muscles (renal and biliary colic, intestinal spasm, dysmenorrhea)
	Pain syndrome with spasms of smooth muscles of internal organs
	Pain syndrome with spasms of smooth muscles of internal organs (renal and biliary colic, intestinal spasm, dysmenorrhea)
	Hypermotor dyskinesia of the biliary tract
	Gallbladder hypokinesia
	Hypomotor dyskinesia of the gallbladder
	Biliary dyskinesia
	Dyskinesia of the gallbladder
	Biliary dyskinesia
	Biliary colic
	Biliary reflux
	Violation of bile secretion
	Violation of the outflow of bile
	Subacute and chronic biliary tract disease
	Biliary tract spasm

	Biliary tract spasm
	Spastic dyskinesia of the biliary tract
	Spastic dyskinesia of the gallbladder
	Spastic conditions of the gastrointestinal tract

Thus, today there are inexpensive herbal preparations registered in the prescribed manner and having a very wide spectrum of pharmacotherapeutic action.

The purpose of this information and analytical study was the analysis of the recipepreparation Gastroguttal from the standpoint of the implementation of the principles of kinetic synergism and modern concepts of biologically active substances (BAS), causing a wide range of pharmacotherapeutic action of standardized herbal preparations.

Materials and methods.We used the following methods research: information and analytical, historical, content analysis, systematization.

RESULTS AND DISCUSSION

1. Modern views

on the rational use of herbal medicines in liquid dosage formsThe most characteristic feature of modern rational and evidence-based herbal medicine is the use of standardized drugs registered in the established order in modern or traditional dosage forms (DF), providing ease of use and reproducible therapeutic results [26, 27, 34, 40, 45, 46]. At the same time, one of the advantages of the therapeutic and prophylactic process in scientifically grounded phytotherapy is the biological effect of the drug not only on the affected organ, but also on the associated systems of the body, including with the aim of reducing the likelihood of chronicity of the disease and reducing the side effects of synthetic drugs in combination therapy [27 , 34, 40, 46].

Modern herbal preparations, as a rule, are developed either on the basis of a ready-made traditional recipe, which has often passed the test of time for centuries, or they combine the experience of the traditional use of each herbal component with modern ideas about its chemical composition, as well as about the mechanisms and characteristics of the development of one or another nosological forms [26–28, 31, 34, 73]. Consideration of ethnobotanical, ethnopharmcological and ethnomedical aspects in the development of effective and safe medicinal products of natural origin is recognized all over the world as more and more justified [68, 81, 87].

An important traditional principle of herbal medicine is the use of liquid DF as preferred, and in some traditional medical cultures of the world - and the only one possible [23–6, 29, 47]. Historically, liquid DF was prepared in the form of aqueous (infusions, decoctions, vapors, explosions, water extracts) and alcohol-water (medicinal vodka and wines, tinctures, extracts) extracts [26, 27, 47].

Despite the fact that it is currently considered more convenient to consider solid dosage formulations of DF, standardized liquid DF still retain their importance in modern clinical practice and in the pharmaceutical assortment, especially drops for internal use (Guttae pro usu interno) [19, 21, 27, 45, 51]. When taken orally, they are absorbed and act significantly faster compared to solid DF (powders, tablets, etc.), the effect of which is manifested only after their dissolution in the body, that is, liquid DF are characterized by a higher bioavailability and speed of onset of the effect, as well as a pronounced local pharmacotherapeutic action on the mucous membranes of the oral cavity, esophagus, stomach and intestines. As a rule, in the presence of several LFs of the same drug, treatment of acute cases of diseases begins with liquid LF, sometimes later switching to more comfortable firm ones with a supportive and prophylactic purpose [29, 45]. Liquid dosage forms are characterized by the relative simplicity of the technology, as well as the simplicity and ease of administration (especially in pediatric and geriatric practice). When drops for internal use are diluted with water immediately before taking, the irritating effect of their ingredients on the walls of the stomach is significantly reduced [45].

2. Modern characteristics of the drug Gastroguttal (gastric drops)

The name Gastroguttal is derived from lat. gaster - stomach, lat. gutta - drop and suffix - al [twenty]. The active ingredients of the Gastroguttal preparation are [11]: Belladonna tincture (Belladonna

tinctura), Valerian medicinal rhizomes with roots tincture (Valerianae officinalis rhizomatum cum radicibus tinctura), Peppermint leaf tincture (Menthae piperitae foliorum tinctura), Wormwood tincture (Artemisiae absinthii tinctura). Data on the individual ingredients of the Gastroguttal preparation are summarized by us in table. 2.

table 2

Ingredients preparations Gastroguttal (according to [3, 11, 13, 39-41, 34, 36, 72, 75])

Name ingredient	Composition	Qty per 100 ml drug	Official data according to the approved Instructions for Use			Experimental and clinical results research	
			Pharmaco therapeutic group	Pharmacological action	Indications for application	Pharmacological properties	Application
Valerian tincture - Tinctura Valerianae (Valerianae officinalis rhizomatum cum radicibus tinctura)	Rhizome with roots valerian crushed numbered - 200 g These alcohol fishing 70% (ethanol) - sufficient number before receiving 1 l tincture	40 ml	Sedatives funds	Sedative and antispasmodic. Demonstrates moderately pronounced sedative effect. Active beginning - borneol ester and isovalerian acid free valeric acid. Sedative effect comes slowly, but stable enough. Renders antispasmodic action on smooth muscle-latura of the gastrointestinal tract, choleretic action, increases secretion mucous membrane Gastrointestinal tract, slows down heartbeat, expands coronary vessels. Influence at heart activity mediated through neuroregulatory mechanisms and direct influence on automatism and conductive system hearts. Facilitates offensive natural sleep	Increased nervous excitability, insomnia, migraine, hysteria, functional disorders cardiovascular systems, spasms Gastrointestinal tract	The action is due, mainly with essential oils and valepotriates: sedative, tranquilizing on the central nervous system, regulating cardiac activity, antispasmodic, choleretic, enhancing the secretion of the glandular apparatus of the gastrointestinal tract. It has also been shown experimentally: the tincture reduces the reflex excitability of the central parts of the nervous system and enhances inhibitory processes in it, increases sleep duration, caused by various hypnotics, has a noticeable anticonvulsant action. Has a positive neuroregulatory effect on the activity of the cardiac muscles, directly to the conducting system and basic mechanisms automatism of the heart. Has a coronary dilator and antihypertensive (hypotensive) action	Soothing and improving cardiac activity vascular system with diseases accompanied by nervous excitement, insomnia migraine-like headaches. Prescribed for lungs forms of neurasthenia and psychasthenia, with climacteric disorders vegetative roses, neuroses of the heart vascular system, for prevention and early stage treatment angina pectoris, hypertensive illness, some liver disease and biliary ways, diseases, accompanied by stomach cramps and intestine with breaking their secretory function. K. p. drugs are prescribed for a long time
Wormwood tincture - Tinctura Artemisiae absinthii (Artemisiae absinthii tinctura)	Wormwood bitter grass and leaves - 200 BC Ethanol (ethyl alcohol) 70% - sufficient number before receiving 1000 ml drug	30 ml	Stimulant appetite a significant origin	The main acting substances are arsumin (sum lactones) and absintin (individual lactone). Annoying taste buds mucous membranes of the mouth and language, reflex by calling increased secretion gastric juice (increases acid production), increased appetite, improvement digestion. Renders anti-inflammatory choleretic and antimicrobial action	Anorexia, hypo- and anacid gastritis, chronic cholecystitis, dyskinesia biliary paths along the hypomo- type	Like all bitterness, it reflexively stimulates the function of the gastrointestinal glands, enhances bile secretion, significantly improves digestion	As bitterness - to whet your appetite and improvements activities of bodies digestion. Usage sick, suffering chronic diseases pancreas glands and biliary paths, reduces or fully eliminates pain, dyspeptic phenomena, improves appetite, normalizes chair. Application with galenic drugs, possessing choleretic action, significantly increases therapeutic efficiency at gastrointestinal diseases
Peppermint tincture - Tinctura Menthae piperitae (Menthae piperitae	Mint peppery leaves - 50 g Mint list butter -	20 ml	Spasmoly- tic means vegetable origin	Has a moderate antispasmodic action on the digestive tract, antiemetic, lung sedative and local annoying (irritates nervous	Symptomatic remedy for nausea, vomiting, spasms smooth musculature gastrointestinal intestinal tract	A wide range of pharmacological activities and types of action: sedative, antispasmodic, analgesic, reflex coronary dilator, local	With spasm of the gastrointestinal tract, flatulence, nausea, vomit. As choleretic - with cholecystitis, cholangitis, gallstone

foliorum tinctura)	50 g Ethanol (ethyl alcohol) 90% - enough precise number before receiving 1000 ml per racks			the end of the mucous membranes shells) action; has choleretic properties		annoying and stimulating on peripheral neuroreceptors of the mucous membranes (enhances capillary circulation and intestinal motility), stimulating secretion digestive glands, increasing bile secretion, reducing the tone of intestinal smooth muscles, bile and urinary ways, bactericidal (for all types of pathogenic bacteria of the gastrointestinal tract)	diseases, hepatitis. V lung quality reflex vasodilator with angina pectoris and diseases associated with vascular spasms brain. V as a light sediment tive - when increased excitability, insomnia, various neurotic states
Belladonna tincture - Tinctura Belladonnae (Belladonna tinctura)	Leaves belladonna - 100 g, ethanol 40% - enough precise number for receiving 1000 ml tinctures	10 ml	M-Holi-politicians	Determined by the main way, alkaloids tropane series. The action of m-choline blocking and antispasmodic. Hinders stimulating action acetylcholine; reduces secretion salivary, gastric, bronchial, lacrimal, sweat glands, externally secretory function pancreas. Reduces muscle tone Gastrointestinal tract, biliary ducts and bile bubble but increases sphincter tone; causes tachycardia, improves AV conductivity, dilates pupils	Peptic ulcer stomach and 12-duodenal ulcer, cholelithiasis, spasm smooth muscle organ tours abdominal cavity, biliary colic renal colic; bradycardia, AV blockade	The activity is determined mainly by the main alkaloids - atropine and hyoscyamine. it anticholinergics, blocking mainly m-cholinergic receptors. Have pronounced neurogenic and antispasmodic properties, oppress function of glands (salivation and sweating decreases), reduce the formation of gastric juice and pancreatic secretions	As an antispasmodic ical and pain reliever for peptic ulcer stomach and twelve duodenal ulcer, chronic hyperacid gastritis, diseases biliary tract and gallbladder, in some forms pancreatitis, gallstone and urolithiasis, intestinal colic and other diseases accompanied by spasms smooth musculature

A typical clinical and pharmacological article [14, 15] reports that the ingredients of Gastroguttal have the following types of action.

Rhizomes with valerian roots have a sedative and antispasmodic effect. Facilitates the onset of natural sleep. Sedation occurs slowly, but is quite stable. They have a choleretic effect, increase the secretion of the mucous membrane of the gastrointestinal tract (GIT), slow down the heart rate, and dilate the coronary vessels. The effect on the activity of the heart is indirect through neuroregulatory mechanisms and a direct effect on the automatism and the conducting system of the heart (Table 2) [11, 14, 15].

The herb wormwood has a choleretic effect, increases appetite, and stimulates acid production (Table 2) [11, 14, 15].

Belladonna leaves have m-anticholinergic and antispasmodic effects; reduce the secretion of salivary, gastric, bronchial, lacrimal, sweat glands, pancreas. Reduce the tone of smooth muscles of the digestive tract, bile ducts and gallbladder; cause tachycardia, improve AV conduction. Pupils dilate (Table 2) [11, 14, 15].

Peppermint leaves have a sedative, moderate antispasmodic, choleretic, antiemetic and local irritant (irritates the nerve endings of the mucous membranes) effect (Table 2) [11, 14, 15].

In accordance with a typical clinical and pharmacological article [14, 15] Gastroguttal has the following indications: hyperexcitability, insomnia, vegetative-vascular dystonia (VVD), spasm of the gastrointestinal tract (GIT), renal and biliary colic, decreased appetite, hypo- and anacid gastritis; chronic cholecystitis; biliary dyskinesia, nausea, vomiting [11, 14, 15]. Contraindications include: hypersensitivity, hyperacid gastritis, gastric ulcer and 12 duodenal ulcer; to side effects: allergic reactions; heartburn, gastralgia, diarrhea, drowsiness, depression, decreased performance [11, 14, 15]. In case of an overdose, tremor, headache, dizziness, convulsions are observed, and interaction with other drugs can be characterized by an increase in the effect of hypnotics and sedatives,

The drug is recommended to be taken orally, 20-30 drops for each dose, if necessary up to 3 times a day [11, 12].

3. Experience of traditional use of ingredients of the Gastroguttal preparation from the standpoint of modern scientific concepts

Medicinal plant raw materials from which the ingredients of Gastroguttal are prepared are officially used all over the world for a long time and are included in the State Pharmacopoeias (SP) of most countries of the world, including domestic ones [33, 35] (Table 3).

The rules for the preparation of tinctures from medicinal plant materials are standardized both by the General Pharmacopoeia Article (FS) of the GF XIII [50], and by private regulatory documents for each name of the tincture.

Considering that all 4 types of producing plants (Table 3) have a long tradition of medical use in our country, in table. 4, we have compiled information about the known directions of the traditional use of individual ingredients (and raw materials) of the preparation Gastroguttal (Table 4, column 1). We assessed the resulting array of information from the standpoint of modern concepts of biologically active substances (Table 5) responsible for a certain type of pharmacotherapeutic action for each specific type of medicinal plant material according to bibliographic sources of a high degree of reliability [3, 11, 13, 39–41, 34, 36, 72, 75] (Table 4, columns 2–5). The data on the groups of biologically active substances that turn into tinctures from the original medicinal plant raw materials and determine their pharmacotherapeutic action (according to [3, 11, 13, 39–41, 34, 36, 72, 75]) are presented in table. 6.

Table 3

Characteristics of the original medicinal plant raw materials for the production of the drug Gastroguttal in accordance with the latest State Pharmacopoeia of the Russian Federation, XIII edition (GF XIII)

The name of the medicinal plant raw material and producing plant		Normative document	The main groups of biologically active substances and their quantitative content in raw materials
Russian	Latin		
Valerian medicinal rhizome with roots; Valerian officinalis - this Valerianovs [9]	Valerianae officinalis rhizomata cum radicibus; Valeriana officinalis L. sl - family. Valerianaceae	FS.2.5.0009.15	Contents of the amount sesquiterpenic acids in terms of valerenic acid - not less than 0.12%, extractives extracted with alcohol 70% - not less than 25%; acetoxyvalerene and valerenic acid
Belladonna grass, Belladonna ordinary; belladonna Caucasian - this. Solanovykh [38]	Belladonnae herba; Atropa belladonna L., Atropa caucasica Kreyer - fam. Solanaceae	FS.2.5.0020.15	The content of the sum of alkaloids in terms of hyoscyamine - not less than 0.35% and not more than 0.4%
Peppermint leaves; Peppermint - sem. Yasnotkovykh [49]	Menthae piperitae folia; Mentha piperita L. - sem. Lamiaceae	FS.2.5.0029.15	Essential oil content - not less than 1%; the sum of flavonoids in terms of luteolin - not less than 0.6%, menthol, thymol
Wormwood herb; Bitter wormwood - this. Astrovykh [61]	Artemisiae absinthii herba; Artemisia absinthium L. - family. Asteraceae	FS.2.5.0033.15	The content of the sum of flavonoids in terms of rutin is not less than 0.3%; essential oil - not less than 0.2%; extractives recoverable with alcohol 70% - not less twenty %; chlorogenic acid

From the data table. Figures 4 and 5 show that to date, for the biologically active substances contained in the objects of this study, more than 50 types of pharmacotherapeutic actions have been described in their various formulations (Table 4, column 1). Moreover, some of them are duplicated by two or more ingredients of the Gastroguttal preparation using BAS of different chemical structure and even belonging to different groups of biologically active compounds (Section 5, Tables 4-6). This duplication, which significantly increases the reliability of the pharmacotherapeutic action, is characteristic of both traditional formulations and modern herbal and combined drugs [16, 17, 25–32, 53, 80].

Earlier, when analyzing traditional formulations and an arsenal of modern herbal preparations approved for medical use on the territory of the Russian Federation [14, 28, 33], we were able to establish the presence of a number of drugs, the ingredients of which duplicate the main types of action of each other, and also to identify

some patterns in the preparation of herbal formulations. In particular, it has been shown that the amount of ingredients in individual recipes varies depending on the national and personal characteristics of traditional (folk) herbalists [4, 8, 18, 28, 48, 52, 54, 55, 79, 83], and in ready-made herbal Medicinal product - depending on the pharmaceutical product and the country of origin [8, 25, 26, 88, 89].

Table 4

Types of action of ingredients and biologically active substances of the drug Gastroguttal from the standpoint of traditional (folk) medicine and modern scientific concepts (according to [3, 11, 13, 39–41, 34, 36, 72, 75])

Actions (In alphabet order)	BAS passing from raw materials into tinctures and responsible for the implementation of pharmacotherapeutic action			
	Valerian medicinal	Wormwood bitter	Peppermint	Belladonna
1. Analgesic	Expressed (essential oil)		Expressed (essential oil)	
2. Antihypertensive	essential oil, valepotriates, alkaloids			
3. Antihypoxic (enhances the body's resistance to a lack of oxygen, especially in megacities)	polyphenols	flavonoids and other polyphenols	flavonoids and other polyphenols	flavonoids and other polyphenols
4. Antidiabetic			triterpene saponins	Oxycumarins
5. Anticoagulant				Oxycumarins
6. Antioxidant	polyphenols	flavonoids and other polyphenols	flavonoids and other polyphenols	flavonoids and other polyphenols
7. Antiseptic	essential oil		essential oil	
6. Bactericidal		bitterness-sesquiterpenes, aromatic polyins	galenic preparations rats, terpenoids) - for all types pathogenic bacteria Gastrointestinal tract	
7. Influencing the activity of the heart indirectly through neuroregulatory mechanisms and a direct effect on automatism and the conducting system of the heart	galenic drugs			
8. Stimulating appetite		bitterness-sesquiterpenes		
9. Excitatory CNS		essential oil		alkaloids tropane
10. Removing sodium salts				flavonoids and other polyphenols
11. Hepatoprotective			triterpene saponins	
12. Diuretic	essential oil		essential oil, triterpene saponins	flavonoids and other polyphenols
13. Choleretic	essential oil, valepotriates	essential oil, bitterness-sesquiterpenes, flavonoids, etc. polyphenols, galenic drugs	essential oil, flavonoids, etc. polyphenols, galenic preparations	
14. Slower heart rate	galenic drugs			

15. Capillary strengthening				flavonoids and other poly-phenols
16. Coronary dilator	essential oil, valepotriates		galenic drugs, menthol and other terpenoids	
17. Coenzyme	macro and trace elements	macro and trace elements	macro and trace elements	macro and micro-the elements
18. Locally irritating (irritates the nerve endings of the mucous membranes shells)			galenic preparations	
19.M-anticholinergic				alkaloids, galenic drugs
20. Refreshing			essential oil	
21. Increasing appetite		galenic drugs		
22. Provitamin (vitamin A)			carotenoids	
23. Anti-inflammatory	essential oil	essential oil	essential oil, flavonoids, etc. polyphenols, triterpene saponins	steroids, fla-vonoids, etc. polyphenols
24. Antihelminthic (anthelmintic)		bitterness-sesquiterpenes		
25. Antifungal (antifungal)		bitterness-sesquiterpenes, aromatic polyins		
26. Antineoplastic		flavonoids and other polyphenols	triterpene saponins	flavonoids and other poly-phenols
27. Antiemetic			essential oil, galenic preparations	
28. Anticonvulsant	essential oil, valepotriates, alkaloids			
29. Irritant (local)	lung (etheric butter)		Lung (essential oil)	
30. Dilating coronary vessels	galenic drugs			
31. Dilating pupils				galenic drugs
32. Regulating cardiac activity	essential oil, valepotriates, alkaloids			
33. Wound healing			carotenoids	
34. Sedative	essential oil, valepotriates, alkaloids		essential oil, galenic preparations	oxycoumarins
35. Decreasing the reflex excitability of the central parts of the nervous system and increasing inhibitory processes in the neurons of the cortical and subcortical structures of the brain	essential oil, valepotriates, alkaloids			
36. Reducing photosensitivity			carotenoids	
37. Reducing the tone of smooth muscles of the intestine and gastrointestinal tract in general			galenic drugs, terpenoids	galenic drugs

38. Reducing the tone of the bile and urinary tract			galenic drugs, terpenoids	galenic drugs
39. Sokogonnoe	terpenoids, valepotriates, galenic drugs	bitterness-sesquiterpenes, galenic drugs	essential oil, terpenoids, galle-new drugs	
40. Antispasmodic	expressed (essential oil, valepotriates)		Expressed (essential oil, flavonoids, etc. polyphenols), moderate (galenic drugs)	flavonoids and other polyphe-nols, alka-loids trail new - races laxative smooth musculature, oxycoumarins, galenic drugs
41.Stimulatory to peripheral neuroreceptors of mucous membranes	galenic drugs, terpenoids	galenic drugs, terpenoids	galenic drugs, terpenoids	
42. Stimulating the function of the gastrointestinal glands	essential oil, valepotriates, terpenoids	bitterness-sesquiterpenes	essential oil, terpenoids	
43. Stimulating the secretion of the digestive glands (glandular apparatus of the gastrointestinal tract)	essential oil, terpenoids, valepotriates	essential oil, bitterness-sesquiterpenes, galenic drugs	galenic drugs, terpenoids	
44. Toning		bitterness-sesquiterpenes		flavonoids and other poly-phenols
45. Tranquilizing	essential oil, valepotriates			
46. Increasing secretion of the gastrointestinal mucosa	galenic drugs			
47. Improves digestion	essential oil, terpenoids	bitterness-sesquiterpenes	flavonoids, etc. polyphenols, terpenoids	
48. Improves AV conduction				alene drugs
49. Reducing the secretion of gastric, salivary, bronchial, sweat glands				alkaloids tropane, galenic drugs
50. Enhancing capillary blood circulation	essential oil, terpenoids)		galenic drugs, terpenoids	
51. Enhancing intestinal motility			galenic drugs, terpenoids	

Table 5

Types of pharmacotherapeutic action of biologically active substances (BAS) of plant origin included in the drug Gastroguttal (stomach drops) according to data from bibliographic sources of a high degree of reliability [3, 11, 13, 39–41, 34, 36, 72, 75]

Name			Application of production	The main biologically active substances and groups of biologically active substances,	Pharmacotherapeutic
Component drug, its number per 100 ml drug	Producing plant, family		the leading plant and tinctures in the official medical practice	passing from the plant to the preparation Gastroguttal	the action of biologically active substances, passing in the drug Gastroguttal
	Russian.	Lat.			
Tincture valerian - Tinctura Valerianae (Valerianae officinalis rhizomatum cum radicibus tinctura) - 40 ml	Valerian medicinal vennaya, sem. Valerianovs	Valeria-na office-nalis L. sl, sem. Vale-riana ceae	Depressing central nervous system, antispasmodic (relieves spasms smooth musculature), reinforcing secretion gastrointestinal tract and bile indolence regulating heart activity	1. Essential oil - 0.3–2% in raw materials. Main components: bicyclic monoterpene bornilizalerianate, isovaleric acid, borneol, bicyclic monoterpene alcohol myrtenol and its ester with isovaleric acid. From bicyclic monoterpenes camphene, alpha and beta pinene are also present, from monocyclic terpenes - cymene, L-limonene and D-terpineol. Sesquiterpenes are also found in essential oil: beta-caryophyllene, valeranone, valerol, valerenic acid, valerenal, tricyclic cessyl alcohol	Pronounced antispasmodic, sedative, anti-inflammatory, antiseptic, pronounced analgesic, mild irritant, diuretic, choleretic
				2. Valepotriates (not part of the essential oil) - 0.5–5.0% in raw materials; belong to the group of iridoids (mo-noterpenes). As a rule, these are epoxy seeds of biiclic monoterpenes of iridoyls, in which cyclopentane-pyran skeleton (iridan) has 5 hydroxyl groups, with 2 hydroxyls forming an epoxide (CIK-lytic ether), and the remaining 3 are esterified with aliphatic acids - one acetic acid, and two - isovaleric acid or derivatives thereof. Found: valtrat, isovaltrat, acevaltrat, dihydrovaltrate, isovaleroxyhydrovaltrate, valeredin, valechlorin, 7-epideza-cetylisovaltrate.	Tranquilizing, sedative
				3. Alkaloids: valerin, hatinine	Sedative
				4. Polyphenolic compounds	Antioxidant, antihypoxic
				5. Macro and microelements	Enzyme coenzymes
Tincture wormwood - Tinctura Artemisiae absinthii (Artemisiae absinthii tinctura) - 30 ml	Sagebrush bitter, this. Astro-out	Artemisia absin-thium L., this Astera-ceae	Exciting appetite (bitterness), stimulating glandular function gastrointestinal path (due to increased excitability and neuroreceptor reactions mucosal pores membranes of the gastrointestinal tract for admission food products), improving digestion, choleretic,	1. Essential oil - 0.5–2% in raw materials. The composition is dominated by bicyclic monoterpenes - alpha-thujone and beta-thujone (3–10%), thujol (25–75%) and other terpenoids - monocyclic terpenes (fellandrene), bicyclic sesquiterpenes (cadinene, bisabolic)	Anti-inflammatory, choleretic, excitatory of the central nervous system
				2. Bitterness - sesquiterpenes, in particular, artabsin, absintin (dimer of artabsin, with splitting which arthabsin is formed).	Stimulating appetite, stimulating the function of the glands of the gastrointestinal tract (by increasing the excitability and response of neuroreceptors

			choleretic, bacterium-cidal, antifungal, anti-inflammatory nodal, counter-helminthic	Sesquiterpene lactones are called azulenogenic, because under certain conditions they can a mixture is formed chamazulene, guaiazulene, and artemazulene (the essential oil turns green)	mucous membranes of the glands of the gastrointestinal tract for the intake of food products), choleretic, bactericidal, antifungal, antihelminthic
				3. Flavonoids (artemisin and others) and other polyphenols	Choleretic, antioxidant, antihypoxant, antineoplastic
				4. Aromatic polyins (capillin)	Bactericidal, antifungal
				5. Macro- and microelements (in particular, raw materials concentrates Mo, Se, B, turning into tincture)	Enzyme coenzymes
Tincture mint pepper - Tinctura Menthae piperitae (Men-thae piperitae foliorum tinctura) - 20 ml	Peppermint naya, this. I'm with-note-out	Mentha piperita L., family. Lamia-ceae	Mentha piperita L., family. Lamiaceae	1. Essential oil - 3-5% in raw materials. The main components: monocyclic monoterpene menthol (50–80%), menthone (10–20%), mentofuran (up to 5–10%), pulegon, menthol esters with acetic (methyl acetate) and isovaleric acids (5–20%). Associated terpenes: limonene, alpha fellandrene, alpha and beta pinene. In addition, acetic and isovaleric acids are contained in free form	Pronounced antispasmodic, sedative, anti-inflammatory, antiemetic, antiseptic, pronounced analgesic, mild irritant, diuretic, choleretic, refreshing
				2. Flavonoids: derivatives of apigenin (mentoside), luteolin, hesperidin, etc., as well as other polyphenols - tannins (5-10% in raw materials)	Choleretic, improving digestion, antioxidant, antispasmodic, anti-inflammatory
				3. Triterpene saponins (up to 0.5% in raw materials): ursolic and oleanolic acids	Oleanolic acid - hepatoprotective, for liver diseases (hepatitis). Ursolic acid - antineoplastic, diuretic, for metabolic disorders (diabetes), anti-inflammatory
				4. Carotenoids (up to 40 mg% in raw materials)	Provitamin A, wound healing, reducing photosensitivity
				5. Macro and microelements (concentrates Cu, Mn, Zn, Se, Sr, especially Mo)	Enzyme coenzymes
Tincture belladonna - Tinctura Belladonnae (Belladonna tinctura) - 10 ml	Belladonna com-noven-naya, beautiful Caucasian, this Pasle new	Atropa belladon-na L., Atropa cauca-sica Kreyer, this Solana-ceae	Anticholinergic, antispasmodic, analgesic; source of tropane alkaloids	1. Tropane alkaloids, mainly hyoscyamine (in the form of L and D-isomers, a mixture of which is atropine). In a small amount - scopolamine and volatile bases (N-methylpyrrolidine, hygrin, kuskgigrin, etc.). The total content of tropane derivatives is 0.05-0.8%	1. Tropane alkaloids, mainly hyoscyamine (in the form of L and D-isomers, a mixture of which is atropine). In a small amount - scopolamine and volatile bases (N-methylpyrrolidine, hygrin, cuskgygrin, etc.). In the sum, the content of derivatives tropane is 0.05-0.8%
				2. Steroids	Anti-inflammatory
				3. Flavonoids (derivatives of quercetin, kaempferol, etc.) and other polyphenols	Quercetin and its derivatives are antioxidant, antispasmodic, anti-inflammatory,

					diuretic, antineoplastic Kaempferol and its derivatives - tonic, capillary-strengthening, anti-inflammatory, diuretic, eliminating sodium salts
				4. Oxycoumarins	Anticoagulant, antispasmodic, sedative, hypoglycemic
				5. Macro and microelements (concentrates Fe, Cu, Zn, Mo, Se, Sr, Ba, Ni, Li)	Enzyme coenzymes

The national peculiarities of the selection of formulations when discussing the issue of phytokinetic synergy (Section 4) can most clearly be traced in herbal preparations of European and Eastern countries [2, 8, 16, 17, 25, 26, 67, 68].

Medicines of traditional European schools and modern herbal medicines, as a rule, are low in components. They are built according to a specific algorithm: 1–2 main ingredients, 1–2 - enhancing the effect of the main one, 1 flavoring agent, the action of which, as a rule, coincides with the main one, and 1 filler, which gives the drug an attractive appearance, acting also unidirectionally with the main ingredient [8 , 28, 30, 31, 34].

Oriental formulas take into account the national characteristics of the patient, the traditions of the local TM school and local raw materials. Until now, oriental medicine retains multicomponent drugs with up to 50 ingredients [2, 16, 17, 25, 28, 67, 69–71]. M.A. Grinevich [16, 17, 25, 28] explains this by the desire to complicate the natural complex in order to enrich it with information content in accordance with the theory of structural information and modern scientific ideas about the information content of food and medicinal plants [5–7].

This fact today finds its explanation in the works of physiologists and clinicians [1, 28, 46, 60, 66], as well as in the main provisions of modern neuroimmunoendocrinology [57, 58]. Since in the pathogenesis of most chronic diseases a significant place is occupied by disorders in the so-called “central regulatory triangle” (outdated): nervous, immune and endocrine systems, an independent task is the normalization of their functions in almost any disease [28, 46, 60, 66], for this purpose, the corresponding ingredients (pathogenetic herbal medicine) are introduced into the recipe, often with a “general” effect on the body [28, 34]. In contrast to European schools, oriental recipes demonstrate the predominant inclusion in them of agents with a general effect on the body (up to 60% of the ingredients), a smaller part is symptomatic and a very small part is of local action. And the most commonly used types of general action are antitoxic,

Duplication of a certain type of action in one recipe by several components operating according to different mechanisms to increase the reliability of a drug is also considered characteristic of oriental formulations [16, 17, 23–25, 28, 69–71]. For example, as a result of the analysis of more than 1000 oriental recipes (Japanese, Korean, Chinese medicines), 422 cases of duplication of the same action were found, and the tonic was duplicated 91 times, diuretic - 63, antitoxic - 46, expectorant - 44, antispasmodic - 27 times [16, 17, 25, 28].

Thus, both “western” and “eastern” traditional recipes demonstrate the practical implementation of the principles of phytokinetic synergy (section 4). Our preliminary results of the analysis of the formulation of gastric drops Gastroguttal (Table 4) also suggest the presence of a synergistic interaction of the ingredients of this popular herbal preparation. The issues of synergy and duplication of various types of pharmacotherapeutic action by the ingredients of Gastroguttal are discussed in detail in Sections 4–6 of this work.

4. Synergistic aspects of modern phytopharmacotherapy

In the 60s of the twentieth century, after long creative tossing between the theoretical concepts of Galen and Paracelsus, scientific thought came to the idea of the advisability of returning to galenic preparations that preserve the native (natural) natural complex of biologically active substances [25-28, 34, 46, 81]. In 1979, the president and founder of the French National Institute of Herbal Medicine in Paris, P. Belaiche, categorically stated that “the desire to treat with a single component, discarding the whole plant or neglecting complex herbal preparations, is definitely a serious mistake” [28, 76, 77] ...

In his opinion, “some specialists, due to lack of information, still have

desire to conclude therapeutic truth in one chemical formula at any cost. " “However, life develops thanks to a variety of enzymatic reactions. A pathological state is created in the likeness of a physiological state, that is, a complex, polymorphic, multidirectional. It is illogical to show that the action of a single pure molecule is sufficient to regulate a multitude of perturbed reactions. A pathological condition cannot be reduced or eliminated only by a chemical agent, since it is not monomorphic ”[28, 76, 77].

The theoretical developments of P. Belaiche in the 90s of the last century led to a number of successful clinical trials of herbal preparations in accordance with the principles of GCP. In particular, in 1991 the results of scientific research (PRC) were published, which reliably showed that “due to the mutual restraint or symbiotic action of the constituent elements of the same plant or different plants [28, 76, 77]. Today, synergy or synergy (Greek συνεργία, from Greek syn - together + ergos - acting, action) is understood as the summing effect of the interaction of two or more factors, characterized by the fact that their action significantly exceeds the effect of each individual component in the form of their simple sum [22, 28, 64].

In accordance with modern scientific concepts, the interaction of several ingredients exhibiting a synergistic effect is one of the reliable ways to increase the efficiency of any multicomponent system [22, 28], in this case, a multicomponent herbal drug. At the same time, there are three types of implementation of the mechanism of synergy (synergism) of ingredients: kinetic (absence of any interaction between the components of the mixture), chemical (chemical interaction of ingredients or products of their transformation) and physical (due to the influence of physical factors or physical interaction of components) [28] ...

5. Implementation of the principles of phytokinetic synergism in the preparation Gastroguttal (gastric drops)

From the standpoint of modern ideas about biologically active substances of natural origin, Gastroguttal has a wide spectrum of pharmacotherapeutic action, characteristic of standardized galenic preparations. Scientifically grounded ideas about the pharmacotherapeutic action of biologically active substances that make up Gastroguttal are compiled by us in table. 4-6. From the data table. 4 that the multicomponent composition of the drug determines not only different mechanisms of action of its ingredients, but also ensures the reliability of therapy due to duplication of unidirectional modes of action using compounds belonging to different groups of biologically active substances (Section 3 of this work). In particular, from the data table. 4 it can be seen that:

- anti-inflammatory action is duplicated 4 times, which can be attributed to the main, as well as antioxidant and antihypoxant action (they can be classified as general types of action);

- The main types of action are also duplicated 3 times - choleretic, stimulating the function and secretion of the digestive glands (sokogonic), stimulating peripheral neuroreceptors of the mucous membranes, improving digestion, sedative-antispasmodic, and also diuretic (in this case it can be classified as general types actions - detoxifying);

- The main types of action are duplicated 2 times - analgesic, bactericidal, reducing the tone of the bile and urinary tract, smooth muscles of the intestine and the gastrointestinal tract in general, as well as enhancing capillary blood circulation and tonic (they can be classified as general types of action).

Table 6

Groups of biologically active substances, turning into tinctures from the original medicinal herbal raw materials and causing their pharmacotherapeutic action [3, 11, 13, 39–41, 34, 36, 72, 75]

BAS and BAS groups	BAS, turning into tincture				Basic pharmacotherapeutic action and role in the body
	Valerian medicinal venous	Wormwood bitter	Mint pere- Noah	Krasav- ki	
Alkaloids	+				Sedative
Tropane alkaloids				+	Anticholinergic, antispasmodic

					(relaxing smooth muscles), analgesic, reducing the secretion of gastric, salivary, bronchial, sweat glands, exciting to the nervous system. Atropine sulfate is used for gastric ulcer and duodenal ulcer, colic and spasms of the intestines, stomach, gall bladder and urinary tract
Amino acids free	+	+	+	+	Regulating absorption of biologically active substances in the intestine. Provide the body with plastic process material - synthesis of proteins, peptides and other physiologically active substances, - implementation of breathing by with the formation of ATP.
Aromatic polyins		+			Bactericidal, antifungal
Valepotriates	+				Tranquilizing, sedative
Bitterness (sesquiterpenes)		+			Stimulating appetite, stimulating the function of the glands of the gastrointestinal tract (by increasing excitability and reaction neuroreceptors of the mucous membranes of the gastrointestinal tract for the intake of food), choleretic, bactericidal, antifungal, antihelminthic
Carotenoids			+		Provitamin A, wound healing, reducing photosensitivity
Macro- and microele-cops in biologically available forms	+	+	+	+	Coenzyme (provide all enzymatic processes in the body), normalizing metabolism
Oxycoumarins				+	Anticoagulant, antispasmodic, sedative, hypoglycemic
Steroids				+	Anti-inflammatory
Terpenoids	+	+	+	+	Antispasmodic, sedative, sokogonic, bactericidal, enhancing secretion digestive glands
Triterpene saponins			+		Hepatoprotective, for liver diseases (including hepatitis), antineoplastic, diuretic, metabolic disorders (diabetes), anti-inflammatory
Flavonoids and others polyphenols	+	+	+	+	Antioxidant, antihypoxant, choleretic, antitumor, anti-inflammatory, improving digestion, antispasmodic, diuretic, capillary-strengthening
Essential oil	+	+	+		Antispasmodic, sedative, stimulating the central nervous system, choleretic,

					anti-inflammatory, antiseptic, analgesic, mild irritant, diuretic, bactericidal, enhances the secretion of the digestive glands, improves appetite, reduces the tone of intestinal smooth muscles

When analyzing the formulation of Gastroguttal, we also found a duplication of various groups of biologically active substances, passing from 4 types of raw materials to the finished drug (Table 6). From the data table. 6 it can be seen that terpene components are present in all 4 ingredients of Gastroguttal gastric drops, 3 of them contain essential oil.

Terpenoids of essential oils of various structures, which are part of Gastroguttal (Tables 4-6), reduce the severity of inflammatory processes, help increase the blood supply to the gastrointestinal tract, liver and kidneys, have a mild irritant (sokogonny, enhance the secretion of the digestive glands, improve digestion), choleretic, diuretic , and bactericidal effect, as well as normalize the tone (reduce spasm) of the gallbladder, intestinal smooth muscles and upper urinary tract. By stimulating the renal and hepatic circulation, terpenoids cause an increase in bile and urination. Due to the same group of biologically active substances, sedative-antispasmodic action is also realized.

In addition to terpenoids, BAS of a polyphenolic nature are also duplicated in all 4 ingredients of Gastroguttal. For polyphenols, and in particular flavonoids, the proven anti-inflammatory, choleretic, antispasmodic, diuretic, capillary-strengthening, antioxidant, antihypoxant, and antitumor effects (Table 4-6).

Due to the synergism of terpenoids and flavonoid polyphenols, the antispasmodic and mild sedative effects are enhanced, which is very important in the treatment of gastrointestinal diseases, especially those accompanied by pain, including of a spastic nature.

An important role in the therapy of gastrointestinal diseases is played by free amino acids of medicinal plants (they participate in biosynthesis, transport and increase the bioavailability of other groups of biologically active substances) [26, 27, 34, 37, 42, 43], as well as macro- and microelements that normalize metabolism and coenzyme action (provide all enzymatic processes in the body) [26, 27, 34, 44, 59, 63]. These two groups of biologically active substances are also duplicated in all 4 ingredients of the Gastroguttal drug.

Due to the repeated duplication of both the main and general types of action on the body, and the groups of biologically active substances passing from the raw materials into tinctures, the formula of the drug Gastroguttal can be attributed to quite reliable. Some types of action and groups of biologically active substances are characteristic only for one of the ingredients. They bring some uniqueness (specific pharmacological action) to the total pharmacotherapeutic effect (Table 6). Therapeutically significant non-duplicated types of action of the ingredients of Gastroguttal include hepatoprotective, antiemetic, enhancing intestinal motility and provitamin (mint), mild tranquilizing (valerian), M-anticholinergic and improving AV-conductivity (belladonna), antihelminthic (Table 4 –6).

An interesting feature of oriental formulations is the presence in them of 1–2 ingredients that have the opposite effect in relation to the main direction of the pharmacotherapeutic action of drugs, that is, they act as if in the same direction as the disease. This is due to the fact that the main effect of the drug should not be too pronounced and, because of this, be damaging to the body. Therefore, a counter-acting ingredient is added to the formulation to help the body achieve the balance it needs to heal [67]. In modern "western" herbal medicine, this phenomenon is also known as the "principle of Pavlov's medicine." In 1932, having named the human body a highly self-regulating system that “supports itself, corrects itself, improves itself” [1, 56], academician I.P. Pavlov proposed a mixture (used to this day), which simultaneously includes caffeine (exciting) and sodium bromide (sedative). This pair of counter-acting ingredients helps the body regain balance and helps it adapt better to environmental changes, which is extremely important for recovery.

In the drug Gastroguttal we are investigating, pairs of ingredients, at first glance, of the opposite action, also draw attention to themselves. For example, valerian (valepotriates, essential oil) has a mild tranquilizing and sedative effect, reduces the reflex excitability of the central parts of the nervous system, enhances inhibitory processes in the neurons of the cortical and

subcortical structures of the brain. At the same time, for wormwood (essential oil) and belladonna (tropane alkaloids), an exciting CNS effect is described, and for wormwood it is also tonic due to bitterness-sesquiterpenes (Tables 4, 6). Table 6 you can find examples of other counter-directed actions. In general, the combination of such pairs in the formulation of the drug helps to improve the adaptive capabilities of the body.

Thus, all the ingredients of the Gastroguttal preparation demonstrate a synergistic effect, and their combination - the practical implementation of the principles of creating both Western and Eastern formulations, which probably explains the effectiveness and safety of this herbal medicinal product, as well as its long-term demand on the market.

6. Evaluation of the rationality of the drug Gastroguttal

for the treatment of gastrointestinal diseases

Considering the pharmacotherapeutic effects of the individual ingredients of Gastroguttal (Tables 4-6), as well as their synergistic interaction, the traditional 4-component formulation of this drug, which has a wide range of applications, should be recognized as rational and scientifically grounded.

Due to the contribution to the total effect of each group of biologically active substances, Gastroguttal has an antispasmodic, sedative, anti-inflammatory, bactericidal, sokogonic, choleretic and mild diuretic effect, helps to normalize metabolic processes, improve food digestion and relieve pain.

Gastroguttal gastric drops are used as an antispasmodic agent for diseases of the gastrointestinal tract, accompanied by spasms of smooth muscles, including: hypo- and anacid gastritis, chronic colitis, chronic cholecystitis, biliary dyskinesia. It is recommended to use the drug with caution in case of alcoholism, traumatic brain injury, brain diseases, liver diseases.

Adults are prescribed by mouth 20-30 drops per dose, if necessary, up to 3 times a day.

CONCLUSION

Thus, the information and analytical study carried out made it possible to establish that the composition of the plant medicinal product Gastroguttal clearly demonstrates the principle of kinetic synergism of components, well known in phytotherapy, when unidirectional types of pharmacotherapeutic action are reliably implemented in the body by various mechanisms using biologically active substances of various structures. The practical implementation of this principle, along with the natural origin and standard quality of the investigated OTC phytopharmaceutical agent, determines the reliability of therapy, including during the period of establishing an accurate diagnosis, as well as the long-term demand for the investigated drug by both specialists and the population.

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