Detoxifying humic agent

Abstract

FIELD: pharmaceuticals.SUBSTANCE: group of inventions relates to the field of pharmaceuticals, namely to a detoxifying humic agent and an application thereof as a preventive and therapeutic agent against poisoning and intoxication of the body. The detoxifying humic agent is produced from leonardite, lignin, coal, peat, sapropel by means of ultrasonic dispersion of pre-ground raw materials in a mixture with water at a certain temperature and a certain pressure, followed by cooling the solution to room temperature and diluting with water until reaching a content of humic substances of 1 to 20% wt., wherein the humic substances include humic and fulvic acids and salts thereof, as well as hydroquinone in an amount not exceeding 3% wt. of the weight of the humic substances.EFFECT: group of inventions ensures production of a detoxifying humic agent containing a wide range of humic substances and containing no chemical impurities, usable in the field of medicine and pharmaceuticals.2 cl, 3 tbl, 3 ex

Classifications

A61K35/10 Peat; Amber; Turf; Humus

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Inventor: Николай Иванович Милов

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Claims (2)

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translated from Russian

1. A detoxifying humic agent containing water and humic substances obtained from humic raw materials selected from the group including leonardite, lignin, coal, peat and / or sapropel, by the method of ultrasonic dispersion of pre-crushed raw materials in a mixture with water at a temperature of 30-80 ° C and a pressure of 0.05-0.8 MPa, after which the solution is cooled to room temperature and diluted with water until the content of humic substances is from 1 to 20 wt. %, while humic substances include humic and fulvic acids and their salts, as well as hydroquinone in an amount not exceeding 3 wt. % of the mass of humic substances. 2. The use of a humic agent according to claim 1 as a prophylactic and therapeutic agent in case of poisoning and intoxication of the body.

Description

translated from Russian

The invention relates to the field of medicine and pharmaceutics, namely to humic preparations, and can be used in the treatment of intoxication of the body.

Humic acids, fulvic acids have a powerful effect on any living organism due to their rich composition. They contain a full set of amino acids, macro- and microelements, minerals, as well as naturally occurring polysaccharides, vitamins, peptides, fatty acids, PGS ols, ketones, catechins, etc. There are about 70 useful components in total. This rich composition explains the positive biological effects of humic acid (see https://fb.ru/article/288472/guminovyie-kislotyi-chto-eto-takoe-i-kak-oni-vliyayut-na-organizm).

Salts of humic acids, like fulvic acids, have detoxification activity (Artemenko et al., 2009). Due to the chelating properties of carboxyl, phenolic, carbonyl, hydroxyl and amino groups, humic acids are able to bind heavy metal ions into strong complexes (Avvakumova et al., 2006; Bazhenova et al., 2004; Yang and Van den Berg, 2009; Pandey et al. , 2000; Orlov, 1997). It has been shown that humic acids bind arsenic ions (Buschmann et al., 2006), copper and lead ions (Christl et al., 2005), antimony ions (Meena et al., 2004), mercury ions (Haitzer et al., 2003), cadmium ions (Lind and Glynn, 1999). The increased permeability of cell membranes by fulvic acids facilitates the release of toxins from cells in the form of humic acid salts. Due to the fact that the mechanism of the detoxification action of humic acids and fulvic acids develops not only at the physical level (adsorption), but also at the level of physicochemical interactions (complexation, ion exchange), they are more effective and have a greater antitoxic spectrum of activity compared to simple ones. physical adsorbents (Kudryasheva and Tarasova, 2015; Buzlama et al., 2011).

It is known that salts of humic acids (lignohumate, leonardite humate and sapropel humate) are moderately toxic (class 3 toxicity and hazard in accordance with GOST 12.1.007-76 and according to the classification of I.V. Berezovskaya, 2003, 2010), do not cumulate, have a significant breadth of therapeutic action (index of breadth of therapeutic action> 45), do not have organotropic toxicity; when applied to the skin and mucous membranes, they have a weak irritant effect (1st class of irritant action); do not show embryotoxic and teratogenic effects in the experiment. At the same time, in the prior art, on 6 models of intoxication (psychotropic substances - clozapine, hexenal and medinal; prooxidants - oxidized oleic acid and mesoxalilourea; and in toxic hepatitis caused by carbon tetrachloride), the detoxification properties of humic acid salts due to the antioxidant function of the liver have been proved. antioxidant properties (Buzlama A.V. Experimental study of the pharmacological properties of salts of humic acids. Abstract of the thesis. for the degree of Doctor of Medical Sciences, Moscow 2015).

Also, the prior art discloses the use of a preparation of natural origin olipiphate as a nonspecific detoxifier. This preparation contains the following components in a ratio by weight: products of hydrolysis and oxidation of lignin - 25, pyrophosphate in terms of pyrophosphate ion - 17, sodium chloride - 3, distilled water up to 1000. The main active ingredient of olipiphat are products of alkaline hydrolysis and oxidation lignin - humic acids (patent RU 2232024, 10.07.2004).

The objective of the present invention is to obtain a humic agent containing a wide range of humic substances and having detoxifying properties, without the use of chemical reagents.

The technical result of the claimed invention is to obtain a humic agent with detoxification properties, containing a wide range of humic substances and not having chemical impurities, which can be used in the field of medicine and pharmaceutics.

The specified technical result is achieved due to the fact that the claimed humic agent with detoxification properties contains water and humic substances obtained from humic raw materials, a selected group, including leonardite, lignin, coal, peat and / or sapropel, by ultrasonic dispersion at a temperature of 30 -80 ° C and a pressure of 0.05-0.8 MPa, while the mass of humic substances is from 1 to 20 wt. %, and humic substances include humic and fulvic acids and their salts, as well as hydroquinone in an amount not exceeding 3 wt. % of the mass of humic substances.

It is also proposed to use the obtained humic agent as a prophylactic and therapeutic agent in case of poisoning and intoxication of the body.

To obtain the claimed agent, pre-crushed raw materials (leonardite, lignin, coal, peat, sapropel) were used mixed with water, which was placed in an ultrasonic unit. Placed in the ultrasonic unit, a mixture of humic raw materials with water was heated to 30-80 ° C, and when the required temperature was reached, ultrasonic treatment was performed at a pressure of 0.05-0.8 MPa. After sonication, the solution was cooled to room temperature. The resulting product was diluted with water to the content of humic substances ranging from 1 to 20 wt. %.

The study of the composition of the obtained product was carried out by the GC-MS method on an analyzer "Chromatek", consisting of a gas chromatograph "Chromatek-Crystal 5000" and a liquid dispenser DAZH-2M. For the identification of derivatives, an automatic database for the search and identification of gas chromatography-mass spectrometry data NIST17MS Library was used.

Research conditions:

Капилярная колонка	Phenomenex ZB-DRUG-1 30 м*0.25 мм*0.25 мкм, (или аналогичная);
Условия МС-детектора:	Деление потока 5,0. Температура источника ионов = 200 °С. Температура переходной линии = 290 °С. Диапазон сканирования = 50-550 а.е.м., длительность скана = 0.3.
Объем пробы	1 мкл;
Условия ПИД-детектора	Температура, 270 °С. Расход водорода, мл/мин 20,0. Расход воздуха, мл/мин 200,0. Температура инжектора, °С 280,0 Колонка Agilent 5ms 30м×0,25мм×0,25мкм
Детектор	МС или ПИД;

Капилярная колонка	Phenomenex ZB-DRUG-1 30 м*0.25 мм*0.25 мкм, (или аналогичная);
Условия МС-детектора:	Деление потока 5,0. Температура источника ионов = 200 °С. Температура переходной линии = 290 °С. Диапазон сканирования = 50-550 а.е.м., длительность скана = 0.3.
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Детектор	МС или ПИД;

The results of the study are shown in table. 1

Перечень надёжно идентифицированных соединений в составе препарата гуминового напитка методом ГХ-МС

Название	Время	Высота	Площадь	Площадь, %	Вероятность	Match	R.Match
Oxalic acid, 2TMS derivative	10.62	41756018.01	75477275.30	58.40	81.54	825	938
Propanedioic acid, 2TMS derivative	11.90	11728138.47	21050841.43	16.29	83.53	890	917
Octanoic acid, TMS derivative	12.82	229615.86	486664.98	0.38	72.55	672	786
Benzoic Acid, TMS derivative	13.43	608462.64	1014714.07	0.79	82.5	832	854
Butanedioic acid, 2TMS derivative	14.12	3406595.08	6833765.55	5.29	69.77	851	880
2-Butenedioic acid, (E)-, 2TMS derivative	14.50	126856.29	129195.54	0.10	52.71	589	747
Nonanoic acid, TMS derivative	14.73	213604.31	280904.71	0.22	85.17	732	799

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Methylmaleic acid, 2TMS derivative	15.51	309845.22	715036.39	0.55	65.56	606	910
Pentanedioic acid, 2TMS derivative	15.87	447922.11	887009.07	0.69	81.75	730	807
Decanoic acid, TMS derivative	16.54	117241.98	169249.45	0.13	51.7	600	766
Hexanedioic acid, 2TMS derivative	17.77	150364.36	230696.13	0.18	78.78	665	768
Undecanoic acid, TMS derivative	18.26	37835.19	24699.79	0.02	17.02	492	618
Dodecanoic acid, 1-methylethyl ester	19.96	65527.21	132130.63	0.10	42.75	541	685
4-Hydroxybenzoic acid, 2TMS derivative	20.11	120423.53	216000.55	0.17	74.89	714	774
Suberic acid, 2TMS derivative	21.32	82365.63	206289.69	0.16	56.5	542	769
Phthalic acid, 2TMS derivative	22.06	669813.68	1639401.99	1.27	96.52	877	916
Isophthalic acid, 2TMS derivative	23.05	208118.73	508161.57	0.39	89.98	795	872
Phthalic acid, 2TMS derivative	23.47	226871.03	553823.23	0.43	61.17	642	808
Palmitic Acid, TMS derivative	28.50	458588.18	1253716.69	0.97	93.57	822	844
Stearic acid, TMS derivative	32.42	340967.87	837880.68	0.65	88.01	697	759
Nonadecanoic acid, TMS derivative	33.96	61947.42	105976.86	0.08	64.98	572	731
Arachidic acid, TMS derivative	35.37	155566.96	309909.97	0.24	34.83	478	600
Lignoceric acid, TMS derivative	40.06	75749.44	134757.72	0.10	23.12	480	695
3-Methylsalicylic acid, 2TMS derivative	19.49	205157.78	339556.30	0.26	14.58	557	659

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Aspirin, TMS derivative	15.43	156868.92	273560.52	0.21	65.54	662	722
Salicylic acid, 2TMS derivative	18.05	1479568.33	2487460.30	1.92	68.27	837	886
Chrysin, 2TMS derivative	**27.78**	**898312.04**	**2813053.44**	**2.18**	**40.97**	**655**	**659**
(Sulfanediylbis(4,6-dichlorobenzene-2,1-diyl)oxy}bis(trimethylsilane)	33.29	189131.42	417511.42	0.32	25.5	479	495
(Sulfanediylbis(4,6-dichlorobenzene-2,1-diyl)oxy}bis(trimethylsilane)	33.51	217405.45	546563.44	0.42	12.11	474	482
Hydroquinone, 2TMS derivative	**11.72**	**894863.99**	**3817475.25**	**2.95**	**61.48**	**807**	**813**
Benzaldehyde, 2,5-dimethyl-	14.43	113845.60	114932.74	0.09	41.7	712	833
2,6-Dihydroxyacetophenone, 2TMS derivative	19.40	54077.75	91889.63	0.07	10.64	444	584
2-Hydroxyphenethyl alcohol, 2TBDMS derivative	24.30	178719.73	364271.15	0.28	15.2	623	667
1-(2-Thienyl(2-((trimethylsilyl)oxy)-1-naphthyl)methyl)piperidine	25.99	70043.12	267004.05	0.21	11.72	525	576
1-Phenyl-1,2-ethanediol, 2TBDMS derivative	26.87	54016.05	139548.81	0.11	20.12	498	713
Trimethylsilyl O,O'-bis(trimethylsilyl)vanilpyruvate	31.31	1126005.84	2801566.68	2.17	33.03	554	724
4-Hydroxy-3-ethoxyphenylpyruvic acid, tri-TMS	32.27	114537.34	361005.20	0.28	16.11	481	748
9,10-Anthracenedione, 2-methyl-1,6-bis(trimethylsilyl)oxy-	**27.10**	**203564.35**	**664701.54**	**0.51**	**24.61**	**669**	**884**

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According to the above data, in addition to humic and fulvic acids, the composition of the claimed agent also includes phenolic derivatives, in particular hydroquinone, flavanoids (chrysin) and other active substances. Therefore, the claimed agent is characterized by a wide range of active substances.

Toxicity study.

Determination of indicators of acute toxicity included experiments on mice. Animals were randomly assigned to groups by randomization. The criteria for the acceptability of randomization were the absence of external signs of diseases and the homogeneity of groups by body weight (± 10%). The drug was administered intragastrically in increasing doses according to Litchfield-Wilcoxon. The highest dose was limited to the maximum possible volume of drug administration. To study each dose of the drug, groups of 10 animals of different sex were used. The observation period was 14 days. With the introduction of the drug in doses of 4000-8000 mg / kg (for humic acid), the animals showed a change in the response to picking up, changes in respiration, motor activity, and muscle tone; in some animals, a change in the consistency of feces was observed. When the drug was administered at a dose of up to 4000 mg / kg (for humic acid), all animals survived, when the drug was administered at a concentration of 6000 mg / kg (for humic acid), 5 animals out of 10 died, and when the drug was administered at a dose of 8000 mg / kg (for humic acid), 8 animals out of 10 died. The surviving animals tolerated intoxication satisfactorily and after the end of the drug action for 14 days of observation, no signs of delayed influence were noted. There were no signs of prolonged clinical intoxication. The dynamics of the body weight of the experimental animals did not differ from the control. At the end of the observation period - on day 14, the surviving animals were slaughtered in order to determine possible pathological changes after a single dose of the drug. Examination of the experimental and control groups showed that all the animals in them were normally well-fed, had the correct constitution, smooth and shiny hair, shiny mucous membranes of normal color, clean and tidy natural openings. Macroscopic examination of the internal organs did not reveal any peculiarities. The analysis of the values of the mass coefficients did not reveal any significant differences between the groups of animals that received different doses of the drug. Thus, the results obtained allow us to assume that the obtained drug can be attributed to the V class, i.e. practically non-toxic medicinal substances.

The study of the detoxification properties of the claimed agent is demonstrated in the following examples, confirming the effectiveness of nonspecific therapy of acute poisoning with neuroleptics using the preparation of a humic agent (HS) according to the invention.

Example 1. Survival of animals on the background of HS therapy at various dosage regimens.

Evaluation of the effectiveness of therapy for HS was carried out on an experimental model of acute poisoning with azaleptin. The experiments were carried out on 40 male white rats (Wistar line) weighing 180-200 g under standard conditions. Azaleptin was administered to animals intragastrically using a metal probe after a preliminary 12-hour food deprivation in the form of a 2.5% propylene glycol solution obtained from tablet forms by the method of 5-fold percolation. The resulting model of toxicosis reflected the severity of poisoning that develops when taking azaleptin orally at a dose corresponding to the LD50. The clinical picture of azaleptin poisoning in the experiment largely corresponded to the picture of acute poisoning in humans.

On the above-described model of azaleptin poisoning in rats, various dosage regimens of GS were screened for this purpose, 5 experimental groups of 12 animals in each were created, of which 3 experimental groups were injected with GS in 3 doses: 20.0 mg / kg , 5.0 mg / kg and 1.0 mg / kg IV 2, 24, 48 hours after azaleptin poisoning. GS was administered against the background of basic hemodez therapy at a dose of 6 mg / kg IV 2, 24, 48 hours after poisoning. The criterion for the effectiveness of the therapy in the experimental groups was the survival of the animals in comparison with the control group and the group of animals on basic therapy. The survival rate of

animals in the control group was 32%, in the group of animals receiving basic therapy - 47% (see table 2). Additional administration of GS at a dose of 20 mg / kg increased the survival rate to 56%, at a dose of 5 mg / kg to 68%, and the use of GS at a dose of 1 mg / kg to 78%).

Таблица 2. Выживаемость животных на фоне терапии ГС при различных режимах дозирования.

	Азалептин	Азалептин + Гемодез	Азалептин + Гемодез + ГС (20 мг/кг)	Азалептин + Гемодез + ГС (5 мг/кг)	Азалептин + Гемодез + ГС (1 мг/кг)
Выживаемость, %	32	47	56	68	78
Летальность, %	68	53	44	32	22

Таблица 2. Выживаемость животных на фоне терапии ГС при различных режимах дозирования.

	Азалептин	Азалептин + Гемодез	Азалептин + Гемодез + ГС (20 мг/кг)	Азалептин + Гемодез + ГС (5 мг/кг)	Азалептин + Гемодез + ГС (1 мг/кг)
Выживаемость, %	32	47	56	68	78
Летальность, %	68	53	44	32	22

Example 2. The influence of HS on the motor activity and emotional behavior of animals in the "open field".

For the experiment, 48 white male rats weighing 180-200 g were used, divided into 4 groups: group 1 - healthy animals, group 2 - animals that received only azaleptin (control group), group 3 - azaleptin + basic hemodez therapy, group 4 (experimental) - animals that were injected with azaleptin + hemodez + GS in an optimally selected dose (1 mg / kg). Each animal was placed in the corner of the actograph and for 10 minutes the number of peeks through the holes (holes), horizontal and vertical activity were recorded visually using a stopwatch. In addition, the number of fecal boluses and grooming (self-licking and scratching) was counted. The studied parameters were determined 48 hours after the administration of azaleptin. As the results of the study showed, in the group of animals that were injected with azaleptin and in the group of animals that received basic therapy, the number of head dips into the "burrows" to the level of the animal's eyes was statistically significantly less by 44% and 32%, respectively, compared with healthy animals. , whereas in the experimental group, when using GS at a dose of 1 mg / kg, the determined indicator was below the norm by only 17%.

When assessing the motor activity of animals, the following data in the number of transitions along the squares of the actograph (horizontal activity): in the control group by 41%, in animals on basic therapy by 27%, and in the experimental group only by 11%.

Determination of vertical motor activity (vertical stands) had a similar tendency in the control group and with basic therapy, the decrease in the determined indicator by 61% and 48%, respectively, in animals receiving GS - only by 29%.

The number of grooming acts decreased in the control group by 73%, in animals on basic therapy - by 62%, in the experimental group - by 39%. The minimum number of fecal boluses was noted in the control group (47% less than the norm), in relation to the indicators of healthy animals, a decrease in acts of anxiogenic defecation was simultaneously recorded in the group on basic therapy by 31%, while in the experimental group - only by 14%.

Thus, the declared HS has a high biological activity, which is due to a wide and harmonious combination of biologically active substances in the declared HS, while providing not only an adequate effect on the main links of the pathological process in case of poisoning and / or intoxication, but also contributing to the pharmacological regulation of all functional systems and increasing the adaptive capabilities of the body as a whole. Therefore, the claimed HS can be used as a detoxifying agent in the treatment and prevention of poisoning and intoxication of the body, which confirms the achievement of the claimed technical result.

Patent Citations (4)

Publication number	Priority date	Publication date	Assignee	Title
RU2205166C1 *	2001-12-19	2003-05-27	Общество с ограниченной ответственностью "Научно-производительное объединение "Реализация комплексных технологий"	Method for preparing humic acid salts
RU2357741C1 *	2007-10-15	2009-06-10	Государственное Научное Учреждение Сибирский Научно-Исследовательский Институт Сельского Хозяйства И Торфа Сибирского Отделения Россельхозакадемии (Гну Сибниисхит Со Россельхозакадемии)	Method of stomach and duodenum ulcer treatment
US20190183760A1 *	2016-06-30	2019-06-20	Symrise Ag	Medicament and cosmetic composition comprising resorcinol derivatives
RU2717659C1 *	2019-04-30	2020-03-24	Видави Инт. Лтд.	Humic preparation and method for production thereof
Family To Family Citations				

* Cited by examiner, † Cited by third party

Similar Documents

Publication	Publication Date	Title
Sheng et al.	2005	An active ingredient of Cat's Claw water extracts: Identification and efficacy of quinic acid
US10821144B2	2020-11-03	Algal extract comprising sulphated and non-sulphated polyanionic polysaccharides and uses thereof
RU2756354C1	2021-09-29	Detoxifying humic agent
EP2065045A1	2009-06-03	Antioxidant for preventing and treating diseases caused by oxidative stress
Fujii et al.	2011	Genotoxicity and subchronic toxicity evaluation of Active Hexose Correlated Compound (AHCC)
RU2342857C2	2009-01-10	Dietary supplement "migikalgin"
RU2447886C1	2012-04-20	Preparation for correcting metabolic processes and improving natural body resistance in animals
DE69832722T2	2006-09-07	IRON-L-THREONATE, PHARMACEUTICAL COMPOSITIONS AND ITS USE FOR IMPROVING AND TREATING ANEMIA IN HUMANS
JP2664111B2	1997-10-15	Pharmaceutical formulations containing a mixture of higher primary fatty alcohols for use in treating hypercholesterolemia and hyperlipoprotein type II disease and sexual behavior irritation in animals and humans
RU2281957C1	2006-08-20	Water-soluble sodium-, calcium-, iron-polygalactouronate stimulating hemopoiesis
RU2283114C1	2006-09-10	Composition with hepatoprotective and metabolism normalizing activity
RU2392956C1	2010-06-27	Antihypoxic agent

JPH06199690A	1994-07-19	Agent for promoting cerebral metabolism and improving cerebral function
JPH06199695A	1994-07-19	Agent for amelioration and treatment of diabetes
WO2019163437A1	2019-08-29	Osteoclast differentiation inhibitor containing urolithin
WO2019163176A1	2019-08-29	Osteoclast differentiation inhibitor containing urolithin
RU2294209C1	2007-02-27	Immunomodulating preparation
RU2756363C1	2021-09-29	Anti-inflammatory humic agent
WO2015131421A1	2015-09-11	Selenylated tea polyphenol preparation with high content of selenium
Saranya et al.	2017	Assessment of heavy metal induced organ toxicity in marketed ayurvedhic formulation and report its LD50 value with brine shrimp lethality assay
RU2311191C2	2007-11-27	Lucerne extract
RU2564949C1	2015-10-10	Pharmacological composition for increasing body adaptability under exercise conditions
RU2775079C1	2022-06-28	Adaptogenic humic agent
JPH06199692A	1994-07-19	Agent for amelioration and treatment of cataract
CN104056252A	2014-09-24	Auxiliarily anti-radiation composition

Priority And Related Applications

Priority Applications (1)

Application	Priority date	Filing date	Title
RU2020134035A	2020-10-16	2020-10-16	Detoxifying humic agent

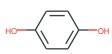
Applications Claiming Priority (1)

Application	Filing date	Title
RU2020134035A	2020-10-16	Detoxifying humic agent

Concepts

machine-extracted

Download Filter table

Name	Image	Sections	Count	Query match
substance		claims,abstract,description	23	0.000
Poisoning		claims,abstract,description	19	0.000
drug		claims,abstract,description	19	0.000
humic acid		claims,abstract,description	19	0.000
chemical substances by application		claims,abstract,description	15	0.000
poisoning		claims,abstract,description	10	0.000
poisoning		claims,abstract,description	10	0.000
Intoxication		claims,abstract,description	9	0.000
intoxication		claims,abstract,description	9	0.000
intoxication		claims,abstract,description	9	0.000
sodium chloride		claims,abstract,description	9	0.000
water		claims,abstract,description	9	0.000
benzohydroquinone		claims,abstract,description	8	0.000

fulvic acid	claims,abstract,description	8	0.000
mixture	claims,abstract,description	8	0.000
salts	claims,abstract,description	8	0.000
lignin	claims,abstract,description	6	0.000
raw material	claims,abstract,description	6	0.000
carbon	claims,abstract,description	4	0.000
coal	claims,abstract,description	4	0.000
peat	claims,abstract,description	4	0.000
ultrasonic dispersion	claims,abstract,description	3	0.000
effects	abstract,description	9	0.000
impurity	abstract,description	2	0.000
cooling	abstract	1	0.000
diluting	abstract	1	0.000
manufacturing process	abstract	1	0.000
preventive	abstract	1	0.000

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