Back to results humic; pharmaceutical; fulvic;

Application of modified fulvic acid in preparation of antitumor drugs

Abstract

The invention discloses application of modified fulvic acid in preparation of antitumor drugs. A preparation method of the modified fulvic acid comprises the following steps: (1) directionally degrading a raw material containing fulvic acid or fulvic acid in water through HNO3 and H2SO4 to obtain a fulvic acid degradation product; and (2) under a microwave condition, carrying out reaction between the fulvic acid degradation product obtained from the step (1) and kojic acid or extract containing kojic acid to obtain the modified fulvic acid. The application disclosed by the invention, compared to the existing treatment medicines, has the advantages in following three aspects: 1) the modified fulvic acid can be extracted from peat resource, thus realizing full use of resource and protecting environment; 2) the prepared antitumor drugs are rich in raw medicine resource, and although being same with the existing treatment medicines in curative effect, are higher in cost performance; and 3) the antitumor drugs, compared to other Western medicines, are good in curative effect and less in side reaction. The modified fulvic acid preparation disclosed by the invention is good in both social and economic benefits.

CN103720716A

CN Application

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Other languages: Chinese

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External links: Espacenet, Global Dossier, Discuss

Claims (9)

translated from Chinese

1. 1. Application of humic acid in the preparation of modified yellow antineoplastic, a modified method for preparing the yellow humic acid comprises the steps of: (1) a raw material containing the yellow or yellow humic acid humic acid in water by HN0jPH2S04S degradation to prepare humic acid degradation yellow; (2) microwave conditions of step (1) degradation of humic acid obtained in yellow, extracts containing kojic acid or kojic acid reaction, i.e., too.
2. 2. Huang humic acid modified according to claim 1 for the preparation of antitumor drugs cyclophosphamide and reduce injury application in immune organs.
3. The application of modified humic acid yellow 1 or claim 2 in preparing antitumor claim, wherein: said medicament is a dosage form of an oral dosage form.
4. The application of modified humic acid yellow 1 or claim 2 in preparing antitumor claim, wherein: said step (1), the feed containing humic acid-containing yellow yellow humic acid peat, lignite or weathered coal.
5. 5. The use of a modified humic acid yellow 1 or claim 2 in preparing antitumor claim, wherein: said step (1), HN03 H2S04 and the mass ratio of 5: 1 to 3 :1.
6. 6. Use according to claim 1 or 2 or a modified humic acid for the preparation of the yellow antineoplastic claim, wherein: said step (1), the amount of degradation agent and HN03 H2S04 is 20 to 30% in percent of the percentage of degradation agent concentration in water.
7. The application of modified humic acid yellow 1 or claim 2 in preparing antitumor claim, wherein: (1), the directional degrade under the conditions of the ultrasonic step, the ultrasonic frequency is 100 ~ 200KHZ, the temperature is 90-120. . , The time 100 to 140 minutes.
8. The application of modified humic acid yellow 1 or claim 2 in the preparation of antineoplastic claim, wherein: said step (2), the conditions for the microwave frequency microwave 2450Hz, the microwave power 450 under ~ 550W, the reaction 25 ~ 35min. `
9. 9. The application of modified humic acid yellow 1 or claim 2 in the preparation of antineoplastic claim, wherein: said step (2), the yellow humic acid degradation products containing kojic acid or kojic acid molar ratio of extract is 1: 1 to 1: 2.

Description

translated from Chinese

Application of humic acid in the preparation of modified yellow antineoplastic

FIELD

[0001] The present invention belongs to the pharmaceutical field, particularly relates to the use of peat extracts pharmaceutical modified humic acid yellow.

Background technique

[0002] peat swamp is a natural product through thousands of years by the formation, the lowest coal rank coal, coal humic series is the most primitive state. Peat bog peat is formed in bulk, at a pressure after the overlying sediments and bacteria further boundary conditions, and dehydration becomes more compacted solid, become lignite, and then continued to be ground temperature and pressure, the over coalification role in the formation of bituminous coal or anthracite. Peat organic matter mainly of cellulose, hemicellulose, lignin, humic acid, Zhejiang green substances. Peat humic acid content is usually 10 to 30%, as high as up to 70%. Peat is widely used,

can be used in agriculture, such as an organic fertilizer and soil base and nursery flowers cultivated, also used in industry, such as fuel for power generation, chemical (extracted from a variety of raw materials), brewing, pharmaceuticals, ceramics and building materials . Its main active ingredient peat humic substances, have a variety of uses in the medical field, there are some reports may be used for gastrointestinal diseases, arthritis, having astringent, anti-inflammatory, analgesic, to rot myogenic effect on skin diseases, eczema have a certain effect.

[0003] Chinese Patent (Patent No. 200810205110.6) to "a method for modifying the yellow humic acid and the resulting product, and in the manufacture of a medicament immune response to HIV or improved applications" discloses a method of modifying yellow humic acid , comprising the steps of: (1) a raw material containing the yellow or yellow humic acid humic acid in water, under the action of degradation agent, degradation is oriented to prepare humic acid degradation yellow; the degrading agent is HN03 , HN03 and H2S04, or acetic acid, and H202; yellow (2) microwave conditions of step (1) obtained yellow humic acid degradation product, the reaction with the extract containing kojic acid or kojic acid, prepared according to the present invention, i.e. humic acid modifications thereof. The invention further relates to a medicament prepared by the above process was modified humic acid yellow and improve immunity in the manufacture of a medicament or in the prevention of HIV. Huang humic acid modified product of the invention has a significantly improved immunity, especially in immunocompromised patients the effect of improving HIV, and toxic side effects, drug resistance is small, specifically targeting and preparation method is simple, low cost .

`[0004] cancer is the most serious harm to human health of a class of common disease. Due to increasing environmental pollution, nutritional imbalance, aging population and increased life stress and other highly competitive factors, the current worldwide incidence of malignant tumors is increasing. At present, cancer incidence rate is about 200 / 100,000, our annual new cases of cancer of about 2.2 million more than a year in treatment of patients with more than 6 million, more than 150 billion in medical expenses, the number of cancer deaths each year more than 1.6 million.

[0005] Modern medical treatment for cancer include surgery, radiation therapy, chemotherapy and other three categories. However, these therapies in the treatment of tumors inevitably will bring adverse reactions in patients, affecting the quality of life of patients. Today, the concept of evaluating the clinical efficacy of moving from the "disease as the core, to maximize the anti-tumor" treatment model to a "patient centered, humane seek the best quality of life" treatment paradigm shift. This concept and theory of traditional chinese medicine, namely "the overall concept, diagnosis and treatment, yin and yang," consistent.

[0006] cancer prevention and treatment of traditional Chinese medicine for thousands of years, the tumor is a "build-up" in the category of traditional Chinese medicine, the ancient various home are discussed, such as "Classic fifty-five difficult." In "so the plot who were born five internal organs; poly who into the six internal organs also plot who also chi, which often have originated at the portion thereof separated from their disease ", Chinese medicine, the tumor is upright deficiency, coagulation cult poison invasion from early to actually evil Lord, in patients with advanced, there are still significant virtual image. The disease which occurs more emotional stagnation, diet injured, the outer passage of pathogenic cold and weak after the illness, or jaundice, hepatosplenomegaly malaria resulting in prolonged healing impaired, disharmony organs, air-block, the bleeding stop or stagnate and phlegm from the accumulation.

[0007] Since the 1950s, China's etiology and pathogenesis of tumors, cancer of ancient Chinese medicine theory, the ancient secret and private prescription basic methods and ideas systematic collation and research, the traditional Chinese medicine, integrative medicine swollen lame and cancer research under the guidance of diagnosis and treatment of traditional Chinese medicine theory and other laws of paying attention. Chinese scholars from the multi-level, multi-angle validate the unique role of TCM in tumor therapy, defined the role of medicine in treating patients with tumors, and the latest advances in modern medicine combination in using Chinese medicine to improve the quality of life of cancer patients, prevention of recurrence and metastasis, anti-multidrug resistance, Chinese medicine treatment on tumor angiogenesis and for radiotherapy and chemotherapy attenuated sensitization and other aspects of a series of studies. Study found that Chinese medicine treatment of tumors in a stable tumor, regulate body functions, increase immunity, improve clinical symptoms, reduce chemotherapy side effects, prolonging survival time with a unique effect. From natural products found novel antitumor medicine have good economic and social benefits.

SUMMARY

[0008] The object of the present invention is to provide a modified application in the preparation of humic acid yellow antineoplastic.

[0009] aspect of the present invention is implemented as follows: the application of modified humic acid yellow antineoplastic preparation, the method of preparing a modified yellow humic acid comprises the steps of: (1) A humic acid-containing yellow or yellow humic acid raw material, the degradation in water by HN0jPH2S04S prepared yellow humic acid degradation; (2) microwave conditions obtained in step (1) degradation yellow humic acid, kojic acid or kojic acid-containing extract reactants, i.e., too.

Application [0010] yellowing of the humic acid for the preparation of a modified anti-tumor immune organ damage and reduce cyclophosphamide medicament.

[0011] The pharmaceutical dosage form is an oral dosage form.

[0012] The step (1), the feed containing humic acid is peat containing yellow yellow humic acid, lignite or weathered coal.

[0013] The step (1), HN0jPH2S04 mass ratio of 5: 1 to 3: 1.

Said step [0014] (1), the amount of degradation agent and HN03 H2S04 is 20 to 30%, as a percentage of the percentage of degradation agent concentration in water.

[0015] The step (1), the directional degrade under ultrasonic conditions, the ultrasonic frequency is 100 ~ 200KHZ, the temperature is 90-120. . , The time 100 to 140 minutes.

[0016] The step (2), the conditions for the microwave frequency microwave 2450Hz, the microwave power 450 ~ 550W, the reaction 25 ~ 35min.

[0017] The step (2), the molar ratio of yellow humic acid degradation product containing kojic acid or kojic acid extract is 1: 1 to 1: 2.

[0018] The present invention is compared with conventional therapeutic agents, have the advantage of three aspects: 1) the resources available to extract peat humic acid-modified yellow, full use of resources and environment protection; 2) a pharmaceutical raw materials rich in resources, 3) compared with other medicine, a good effect but fewer side effects; the same effect, but the cost is higher compared with conventional treatments. Huang humic acid-modified formulations of the present invention will have good social and economic benefits.

detailed description

[0019] The present invention is the use in the manufacture of a modified humic acid yellow antineoplastic, said modified humic acid yellow product obtained Chinese patent 200810205110.6 discloses the method of preparation, specifically preparation method: (1) containing yellow yellow humic acid or humic acid raw material, in water at 03 and 504 after orientation Fo ^ degradation, to obtain yellow humic acid degradation;! (2) microwave conditions of step (1) obtained yellow humic acid degradation , kojic acid or kojic acid-containing extract reactions, i.e., too. Preferably, the step (1), the feed containing humic acid is peat containing yellow yellow humic acid, lignite or weathered coal. And a mass ratio of 03 & 504 ^^ 5: 1 to 3: 1. The amount of degradation agent and HN03 H2S04 is 20 to 30%, as a percentage of the percentage of degradation agent concentration in water. Oriented degraded under ultrasonic conditions, the ultrasonic frequency is 100 ~ 200KHz, a temperature of 90-120 ° C, the time 100 to 140 minutes. Step (2), the conditions for the microwave frequency microwave 2450Hz, the microwave power 450 ~ 550W, the reaction 25 ~ 35min. The molar ratio of yellow humic acid degradation product containing kojic acid or kojic acid extract is 1: 1 to 1: 2.

[0020] Yellow modified humic acid is the active ingredient of the present invention, peat, according to the conventional preparation process, may be modified yellow humic acid as a main active ingredient, conventional excipients was added, flavoring agents, preservatives, lubricants , wetting agents, adhesives, thickeners, solubilizing

agents and other pharmaceutical adjuvants, into any oral dosage form suitable for clinical use, such as capsules, tablets, granules and the like. In general, the oral dosage formulation modified yellow humic acid was 4.5 grams per day, 3 times a day, each taking 1.5 g.

[0021] Since the present invention discloses for the first time the use of humic acid in the preparation of the yellow-modified antineoplastic, especially yellow humic acid-modified antitumor immune organ damage and reduce the cyclophosphamide in the manufacture of a medicament. The yellow-modified humate alone or in combination with other active ingredients, or pharmaceutical excipients fitting made, as long as the agent for treating tumors, whatever the mode of administration, belong to the scope of the present invention.

[0022] The present invention demonstrated for the first time have a modified humic acid yellow inhibition, in combination with cyclophosphamide and efficiency can be attenuated (lessen the damage to the immune organs), increasing the number of leukocytes in peripheral blood of mice, mice 60Co ray irradiation-induced bone marrow damage model has better protective effect of radiotherapy. The following embodiments with reference to specific embodiments of the present invention is further illustrated, but the present invention is not limited to this particular example.

[0023] Example 1

[0024] 100g of yellow natural peat humic acid, the degradation agent in an aqueous solution of H2S04 and the HN03 (100ml, the concentration of total degradation agent mass ratio is 25%,! 3 and Li 4504 1 4: 1) containing the temperature 110 ° under C, ultrasonic 150KHz, orientation degradation 120min, an average molecular weight of 140 as a yellow humic acid degradation. The humic acid degradation lmol yellow kojic acid extracts (including kojic acid 1.5mol) at microwave frequencies 2450Hz, the microwave power 500W, reaction 30min, and then by a medical activated carbon adsorption to the complex, i.e., prepared according to the present embodiment of the humic acid yellow modified powder.

Example 2 Preparation of modified humic acid yellow Capsules [0025] Embodiment

[0026]

K 1 side of the solid resulting modified humic acid yellow 450 g

Starch 10 g

Hydroxypropyl cellulose (L-HPC) 30 g

Aerosil 5 g

Hard money sprinkle acid 5 g

[0027] Preparation process: The modified yellow humic acid, starch and L-HPC were mixed uniformly mixing; adding an appropriate amount of starch made of soft material, with a 16 mesh granulated, dried and sieved, added silica powder, stearate magnesium mixed to prepare 1,000.

[0028] oral dose of 3 times a day, each taking three.

Modified Example 3 Preparation of humic acid yellow tablets [0029] Embodiment

`[0030] Formulation: 450g modified humic acid obtained in Example 1 Yellow embodiment

[0031] 5g of magnesium stearate

[0032] Dextrin 40g [0033] Preparation: Take the main drug humic acid-modified yellow dextrin thoroughly mixed and passed through a 60 mesh screen, made of soft material, 24-mesh sieve granulated, dried, sieved, tabletting magnesium stearate was added before the thoroughly mixed, the particle content Determination qualified, to obtain tablets, made 1000.

[0034] oral dose of 3 times a day, each taking three.

[0035] Antitumor effects of Experimental Example 1 of humic acid-modified yellow

[0036] 1. Experimental Materials

[0037] 1.1 Animals SPF KM mice, male, weighing 18 ~ 22 g, 72 rats mouse sarcoma cell line S180.

[0038] 1.2 Experimental Yellow pharmaceutical modified humic acid (FA). Were accurately weighed 1 embodiment modified humic acid obtained in Example yellow powder 2.32g, 4.64g, 9.28g, was dissolved, the volume to 100ml, the FA respectively as low, medium, high concentration of liquid, frozen for future use.

[0039] 1.3 Reagents injection of cyclophosphamide (the CTX), product lot number: 12040925, Jiangsu Hengrui Medicine Company.

[0040] 1.4 Instrument analytical balance; electronic balance.

[0041] 2. Experimental method

An animal model of the tumor [0042] 2.1

[0043] Take the inoculated tumor-bearing mice. 7d of S180, off white sacrificed. Extracted under sterile conditions intraperitoneal tumor cells and washed three times with saline, 2500r / min centrifugal 3min, the supernatant discarded, with sterile saline to adjust the cell concentration to tumor 1.0X107 / mL, seeded in each small mouse subcutaneously into the right armpit, inoculation of 0.2ml / only.

Effect on tumor growth in mice [0044] 2.2FA combination with CTX

[0045] Mice were randomly divided into 6 groups. Model group, cyclophosphamide (CTX) group, Huang oral modified humic acid (FA) middle dose group, CTX + FA low dose group, CTX + FA dose group, CTX + FA high dose group. Model group in distilled water, at a dose of 25ml / kg; cyclophosphamide (CTX) group to CTX intraperitoneal injection of physiological saline solution, a dose of 20mg / kg; oral dose group FA to FA irrigation liquid concentration stomach, a dose of 1.lg / kg; CTX + FA low dose group, CTX + FA dose group, CTX + FA begin while the high dose group 20mg / kg intraperitoneal injection of cyclophosphamide, low FA respectively, , the high concentration chemical intragastric administration, dosage were 0.55g / kg, 1.lg / kg, 2.2g / kg. For 7 consecutive days after the last administration 24h dislocation tumor-bearing mice were sacrificed, the tumors and the quality and said, relatively simple and treated with CTX plus FA group, single-serving difference between the inhibitory effect of FA, FA was observed for CTX antitumor synergistic effect, and the inhibitory rate was calculated in each group, calculated as:

[0046]

$$脾脏指数\ (\%)=\frac{脾脏质量}{小鼠质量}\times 100\%$$

$$胸腺指数\ (\%)=\frac{胸腺质量}{小鼠质量}\times 100\%$$

Effect on immune organs in mice [0047] 2.3FA associated with CTX and

Create [0048] mouse tumor model, packets are administered with 3.2. 24h after the last administration dislocation killed tumor-bearing mice were

Spleen, thymus and were saying that the quality, spleen and thymus were calculated using the following formula index, observed attenuation FA.

[0049]

$$抑瘤率\ (\%)=\frac{模型组平均瘤质量-给药组平均瘤质量}{模型组平均瘤质量}\times 100\%$$

[0051] 2.4 Statistical Methods [0052] All the results of this experiment represented by mean ± standard deviation (X ± s). SPSS13.0 statistical software using single ANOVA (One-Way AN0VA) Comparison between group differences between every two groups was significant compared with LSD method, or 0.05

0.01 as a significant difference flag.

[0053] 3. Experimental results

Effect on tumor growth in mice [0054] 3.1FA combination with CTX

[0055] Compared with the model group (Table 1), cyclophosphamide (CTX) group, Huang oral modified humic acid (FA) middle dose group, CTX + FA low dose group, CTX + FA dose group, the CTX + FA high dose group had significant anti-tumor effect. But with cyclophosphamide (CTX) compared to group, CTX alone application antitumor effect ships, CTX + FA low dose group, CTX + FA high dose inhibition rate could increase to some extent.

[0056] Table 1FA combination with CTX (X Soil s) Inhibitory effect of tumor-bearing mice

[0057]

	给药剂量/（g/kg）	瘤重/g	抑瘤率（%）
模型组		0.400±0.184	
CTX组	20mg/kg	0.152±0.097 **	62
单服FA中剂量	1.1g/kg	0.274±0.118 *	31
CTX+FA低剂量组	CTX(20mg/kg)+FA（0.55g/kg）	0.143±0.061 **	64
CTX+FA中剂量组	CTX(20mg/kg)+FA（1.1g/kg）	0.165±0.119 **	59
CTX+FA高剂量组	CTX(20mg/kg)+FA（2.2g/kg）	0.144±0.091 **	69

[0058] Compared with model group, * P <0.05, ** P <0.01; compared with the CTX group, # P <0.05

Effects on immune organs of tumor-bearing mice [0059] 3.2FA combined with CTX

Spleen Index of [0060] 3.2.1 of tumor-bearing mice

[0061] Compared with the model group (see Table 2), spleen index in each administration group have different degrees of decline. Wherein cyclophosphamide (CTX) group, CTX + FA low dose group, CTX + FA dose group, CTX + murine splenic index of the high dose group FA decline was particularly pronounced (P <0.01), significant

described cyclophosphamide resulting in tumor-bearing mice spleen shrinking role. Spleen index compared with the CTX group, CTX + FA low dose group, CTX + FA dose group, CTX + FA high dose group had a significant increase (P <0.05), yellow oral modified humic acid (FA) spleen index difference is more obvious dose group (P <0.01), spleen atrophy described FA can be improved by CTX caused.

Thymus index [0062] 3.2.2 of tumor-bearing mice

[0063] Compared with the model group (see Table 2), thymus index of each administration group have different levels decreased, indicating a significant cyclophosphamide tumor bearing mice results in thymus atrophy effect. Spleen index compared with the CTX group, CTX + FA high dose group of significant increase (P <0.05), thymus atrophy described FA can be improved by the CTX caused.

[0064] Table 2FA combined with CTX (X soil s) on the immune organs of tumor-bearing mice

[0065]

	给药剂量/（g/kg）	脾脏指数	胸腺指数
模型组		5.54±1.01	3.82±0.400
CTX 组	20mg/kg	2.46±0.70	1.60±1.310
单服 FA 中剂量	1.1g/kg	4.62±0.97	2.89±1.463
CTX+ FA 低剂量组	CTX(20mg/kg)+FA（0.55g/kg）	3.32±1.09#	1.28±0.505
CTX + FA 中剂量组	CTX(20mg/kg)+FA（1.1g/kg）	3.38±0.77##	1.42±0.330
CTX+ FA 高剂量组	CTX(20mg/kg)+FA（2.2g/kg）	3.40±1.26#	2.10±2.186##

[0066]

[0067] Compared with model group, * p <0.05, ** p <0.01; compared with the CTX group, # ρ <0.05, ## ρ <0.01

[0068] 4. Conclusion

[0069] Cyclophosphamide has a broad-spectrum anti-cancer effect, is the treatment of malignant tumors most commonly used alkylating agents on behalf of drug, but the drug's main side effects has been a prominent issue in clinical use. As described experiments, the drug can cause the spleen, thymus and other immune organs severe atrophy. So how to reduce radiotherapy, chemotherapy side effects in cancer therapy, to improve the condition of cancer patients has become the key to the treatment of tumors. It was found that the modified yellow humic acid has a strong inhibitory effect, in combination with cyclophosphamide, modified yellow humic acid can improve cyclophosphamide caused by the animal spleen and thymus atrophy, suggesting that humic acid can be modified yellow large reducing the amplitude of anticancer drugs damage the immune system.

[0070] Attenuated bone marrow damage model Experimental Example 2 Modification of yellow humic acid 60Co Irradiation Induced Mouse

[0071] 1. Experimental Materials

[0072] 1.1 Animals SPF grade KM mice, male, weighing 18 ~ 22 g, 72 only (Production License: SCXK (Guangdong) 2008-0002; controlled breeding room temperature 20 ~ 25 ° C, humidity of 40 to 70% free access to water, feeding.

[0073] 1.2 Drug yellow modified humic acid (FA). Obtained in Example 1 modified humic acid yellow powder were accurately weighed embodiment

2.32g, 4.64g, 9.28g, was dissolved, the volume to 100ml, the FA respectively as low, medium, high concentration chemical, cold standby.

[0074] 1.3 Reagents Diyu white film (Zhunzi Z20026497; batch number: 130504)

[0075] 1.4 Instrument electronic balance; Microscopy

[0076] 2. Experimental method

[0077] 2.1 60 randomly modeling C57BL / 6 mice, whole body irradiation by one-time 60Co radiation, the irradiation dose of 3.0Gy, 4min.

[0078] 2.2 The packet 12 is divided into non-irradiated control group, irradiated mice were randomly divided into five groups, namely, model group, positive control group, low humic acid-modified yellow, medium and high dose groups.

[0079] 2.3 administered control group and model group fed with distilled water, intragastric administration Diyu white film, a dose of 0.15g / kg; yellow humic acid-modified low, medium and high dose groups oral administration, administration doses were: 0.55g / kg, 1.lg / kg, 2.2g / kg. Groups of mice administered once a day for consecutive 12 days, are by 0.25ml / 10g orally administered. Fasted water one day before the end of the experiment morning.

[0080] WBC count 2.4 [0081] After the administration to the last 24 hours, the mice eyeball blood count WBC count with a hemocytometer. Leukocyte count number four large squares with a low magnification under a microscope WBC, then multiplied by 50, to obtain (1 l) per cubic millimeter.

[0082] 2.5 Statistical analysis

[0083] Data were analyzed using SPSS13.0 software, measurement data using One-Way AN0VA analysis of variance, LSD comparison between groups, the average results of soil standard deviation (X ± 5), said to P <0.05 was statistically significance.

[0084] 3. Results

[0085] The results showed (see Table 3), with the control group of mice the number of peripheral blood leukocytes compared to the model group was significantly decreased, significant differences (P <0.01), it shows successful modeling. Compared to the number in mice peripheral blood leukocytes model group, the treatment groups were significantly different data with the model group, wherein the modified humic acid yellow low dose group, there was a significant difference ([rho] dose group and high dose group < 0.01), humic acid can be modified to increase the number of yellow WBC of mice, of bone marrow induced mice 60CO ray irradiation injury model has better protection. [0086] TABLE 3 Number of white blood cell groups of mice (n = 12, X ± s)

[0087]

组别	剂量(g/kg)	外周血白细胞数（个/μl）
正常对照组	——	4866±834
模型组	——	1111±378
阳性对照药组	0.15	1872±542*
改性黄腐植酸低剂量组	0.55	1912±699**#
改性黄腐植酸中剂量组	1.1	2085±605**#
改性黄腐植酸高剂量组	2.2	2005±617**#

[0088] Compared with model group, * P <0.05, ** P <0.01; compared to the positive control group, # P <0.05.

Patent Citations (1)

Publication number	Priority date	Publication date	Assignee	Title
CN101475605A *	2008-12-30	2009-07-08	华东理工大学;石屏县科学技术局	Modification method of yellow humic acid, product obtained therefrom, and use thereof in preparation of immunity improving or HIV preventing medicaments
Family To Family Citations				

* Cited by examiner, † Cited by third party

Non-Patent Citations (1)

Title
绍兴地区腐植酸治癌科研协作组: "应用腐植酸钠治癌的初步探讨(附典型病例介绍)", 《浙江肿瘤通讯》, 2 April 1978 (1978-04-02), pages 135 - 138 *

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Cited By (1)

Publication number	Priority date	Publication date	Assignee	Title

CN105106235A *	2015-08-18	2015-12-02	河南科技大学	Sodium fulvate pharmaceutical composition, and sodium fulvate capsule preparation and preparation method thereof
Family To Family Citations				

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CN104257704A	2015-01-07	Novel application of eurycoma longifolia extracts
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Priority And Related Applications

Priority Applications (1)

Application	Priority date	Filing date	Title
CN 201310711250	2013-12-20	2013-12-20	Application of modified fulvic acid in preparation of antitumor drugs

Applications Claiming Priority (1)

Application	Filing date	Title
CN 201310711250	2013-12-20	Application of modified fulvic acid in preparation of antitumor drugs

Legal Events

Date	Code	Title	Description
2014-04-16	C06	Publication	

2014-05-14	C10	Entry into substantive examination
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