

METHOD FOR PRODUCING PRODUCTS BASED ON CORDYCEPS MILITARIS, ASTRAGALI RADIX AND CODONOPSIS RADIX AND PRODUCTS

The present disclosure claims priority of the Chinese Patent Application No.
5 201910770481.7, filed with the China National Intellectual Property Administration (CNIPA)
on August 20, 2019, and entitled "METHOD FOR PRODUCING PRODUCTS BASED ON
CORDYCEPS MILITARIS GROWN ON SILKWORM LARVAE, ASTRAGALI RADIX
AND CODONOPSIS RADIX", which is incorporated herein by reference in its entirety.

TECHNICAL FIELD

10 The present disclosure belongs to the technical field of dietary supplements, and
specifically relates to a method for producing products based on *Cordyceps militaris*,
Astragali Radix and *Codonopsis Radix*, and products.

BACKGROUND

Cordyceps militaris grown on silkworm larvae, as a fungus used for food and medicine,
15 contains cordycepin, cordycepic acid, cordyceps polysaccharides, anti-cancer ingredients such
as pentostatin and adenosine, and SOD active enzymes and the like. As a result, it can inhibit
tumors, lower blood sugar and improve immune function, and have anti-aging and other
effects. Detections of ingredients show that *Cordyceps militaris* grown on silkworm larvae
contains more cordycepin, cordycepic acid, SOD and the like than *Cordyceps militaris* grown
20 in artificial nutrient solution and *Cordyceps militaris* grown on *Antherea pernyi*, in particular,
the content of cordycepin is significantly higher than that of wild Cordyceps.

Astragali Radix and *Codonopsis Radix* are commonly used as warming and tonic herbs in

ancient Chinese prescriptions. They are rich in polysaccharides, folic acid, amino acids and other active ingredients which can enhance immunity. The *Astragali Radix* has been used as a medicinal material in China for more than 2,000 years. It has been highly appreciated in traditional Chinese medicine for its hepatoprotective, diuretic, anti-aging, anti-stress, anti-hypertensive and broad antibacterial effects. The *Codonopsis Radix* can invigorate qi and nourish spleen, body fluid and blood. It can also regulate and relieve symptoms of high blood fat, high blood pressure and high blood sugar to varying degrees.

Glutinous millet is a minor cereal mainly grown in cold mountainous area of the north in China. Its grain is called “wine rice” since it is mostly used to produce Chinese yellow rice wine based on glutinous millet. Glutinous millet grain contains rich proteins which can be degraded by microbial enzymes into peptides and amino acids that are easier to be absorbed and utilized by the human body. Fermentation products of glutinous millet grain include a relatively high content of functional oligosaccharides which can lower serum cholesterol. The fermentation products also include physiologically active ingredients such as phenolic substances and melanoidin which are excellent in scavenging free radicals, preventing cardiovascular diseases, and fighting against cancers and aging. A Chinese yellow rice wine based on fermentation products of glutinous millet is rich in γ -aminobutyric acid (GABA), an important inhibitory neurotransmitter involved in a variety of metabolic activities. The GABA can lower blood pressure, improve brain, liver and kidney functions, enhance long-term memory, relieve anxiety, increase weight loss, and promotes other physiological activities.

Quinoa is well-known for its comprehensive nutrition. It is rich in essential amino acids, polyunsaturated fatty acids, vitamins, minerals and other nutrients. As such, it can balance nutrient intake for health benefits. Compared with other cereal grains, the quinoa has a high

mass fraction of protein (140.0-220.0 g·kg⁻¹) and large amounts of a variety of amino acids in a ratio close to the ideal ratio proposed by the Food and Agriculture Organization of the United Nations (FAO). It also contains 20.0-100.0 g·kg⁻¹ of fat, rich dietary fibers, a variety of minerals and vitamins and no gluten. Moreover, the quinoa is rich in polyphenols, flavonoids and other active plant compounds.

Common buckwheat seeds have highly nutritional, medicinal and health values. Protein composition thereof is different from that of a general grain and includes water-soluble albumin in a highest content (31.8%-42.3%), glutelin in a moderate content (24.5%-26.1%), and gliadin in a lowest content (1.7%-2.3%). The buckwheat seeds have a dietary fiber content of 3.4%-5.2%, in which 20%-30% of the dietary fiber is soluble dietary fiber. Modern researches conclude that buckwheat dietary fiber may bind to peptides and other substances to promote digestion and gastrointestinal movement.

Red yeast rice includes *Monascus ruber*, a mold which has high temperature resistance and strong scarification ability and involves in alcohol fermentation. A metabolite of red yeast rice, lovastatin, can help avoid generation of reductase for cholesterol synthesis, thereby helping to regulate high cholesterol, high blood pressure and high blood lipids. The metabolite is regarded as the most promising substance which can help reduce fat.

The above raw materials are all agricultural products or microbial products with very powerful nutritional functions. Combination of the raw materials reasonably to maximize their functions is a goal for those skilled in the art.

SUMMARY

An objective of the present disclosure is to provide a method for producing products

based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix* and products to maximize utilization of functional ingredients of these valuable raw materials.

The present disclosure provides a method for producing products based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix*, including the following steps:

5 step (1): taking 80 parts of sorghum seed, soaking in clean water for 4-5 h, steaming to will-done, cooling naturally for 30-60 min to obtain prepared sorghum seed;

step (2): taking 2-5 parts of *Cordyceps militaris* grown on silkworm larvae, 2-10 parts of fresh *Codonopsis Radix* and 8-10 parts of fresh *Astragali Radix*, cutting into cubes with a 5-10 mm side to obtain a first prepared mixed raw material;

10 step (3): mixing raw materials prepared in step (1) and step (2), stirring uniformly, adding 8-10 parts of Daqu for liquor fermentation, stirring uniformly, sealing a container, fermenting at 20-25°C for 28 d, carrying out a first distillation, cooling fermented grains naturally to 30°C, further adding 8-10 parts of Daqu for liquor fermentation, fermenting in a tank for 28 d, carrying out a second distillation, and mixing wine bodies obtained after the first distillation
15 and the second distillation to prepare a Chinese white liquor based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix* and distillers' grains for later use;

step (4): taking 10-15 parts of common buckwheat seed and 10-20 parts of quinoa, mixing uniformly, submerging with clean water, adding water to maintain submerging when water is absorbed, soaking at 25°C for 6-10 h and draining to obtain a second prepared mixed
20 raw material;

step (5): mixing the distiller's grains obtained in step (3) and the raw material obtained in step (4) in a ratio of (3-4):1, autoclaving at 121°C for 30 min, cooling to 25°C, inoculating

Cordyceps strains, cultivating in the dark at a constant temperature for 4-6 d, then cultivating for 18-20 d with 10 h in the light every day, and after hyphae cover a full area, breaking microbial pieces into pellets having a diameter of 5-8 mm to obtain microbial pellets;

5 step (6): taking 80 parts of glutinous millet, soaking in clean water for 4-5 h, steaming to will-done, cooling naturally for 30-60 min to obtain prepared glutinous millet;

10 step (7): mixing the microbial pellets prepared in step (5) with raw material prepared in step (6) in a ratio of 1:(2-3), adding 2-5 parts of red yeast rice and 1-2 parts of rice wine yeast, stirring uniformly, sealing, fermenting at 25-30°C for 3-4 d and then at 20-24°C for 24-28 h, pressing and filtering to obtain a supernatant which is a Chinese yellow rice wine based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix*, and a solid residue for later use;

step (8): drying the solid residue of step (7) at 60°C, and ultrafine pulverizing to obtain dietary fiber powders.

Preferably, the ratios for mixing in step (5) and step (7) are weight ratios.

15 The present disclosure further provides products based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix* obtained by the above method, including a Chinese white liquor based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix*, a Chinese yellow rice wine based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix*, and dietary fiber powders based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix*, where

20 the Chinese white liquor based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix* has an alcohol content of $63 \pm 3\%$ vol, acidity of pH6.0, an ester content of 0.2%-0.6%, a higher alcohol content of 0.15%-0.3%, a total acid content of 0.02%-0.13% and a furfuraldehyde content of 0.002%-0.003%;

the Chinese yellow rice wine based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix* has an alcohol content of 15%vol, aroma chemical components including esters in a relative content of 70.17%-86.09%, a polysaccharide content taking up 1.54%-2.81% of wine body, an adenosine content of 6.5 mg/L, a cordycepin content of 95 mg/L-166 mg/L, a lovastatin content of 30 ppm, a lobetyolin content of 1.4 mg/L, and a calycosin-7-glucoside content of 4.1 mg/L; in the present disclosure, the aroma chemical components preferably contain mainly esters preferably including ethyl butyrate and ethyl caproate;

the dietary fiber powders based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix* contain 51.7%-53.2% of total dietary fibers and microelements including magnesium, iron, selenium and strontium as nutrients.

The present disclosure further provides a method for producing a Chinese white liquor based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix*, including the following steps:

step (A): taking 80 parts of sorghum seed, soaking in clean water for 4-5 h, steaming to will-done, cooling naturally for 30-60 min to obtain prepared sorghum seed;

step (B): taking 2-5 parts of *Cordyceps militaris* grown on silkworm larvae, 2-10 parts of fresh *Codonopsis Radix* and 8-10 parts of fresh *Astragali Radix*, cutting into cubes with a 5-10 mm side to obtain a first prepared mixed raw material;

step (C): mixing raw materials prepared in step (A) and step (B), stirring uniformly, adding 8-10 parts of Daqu for liquor fermentation, stirring uniformly, sealing a container, fermenting at 20-25°C for 28 d, carrying out a first distillation, cooling fermented grains naturally to 30°C, further adding 8-10 parts of Daqu for liquor fermentation, fermenting in a

tank for 28 d, carrying out a second distillation, and mixing wine bodies obtained after the first distillation and the second distillation to prepare a Chinese white liquor based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix* and distillers' grains for later use.

The present disclosure further provides a method for producing a Chinese yellow rice wine based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix*, including the following steps:

step (a): taking 10-15 parts of common buckwheat seed and 10-20 parts of quinoa, mixing uniformly, submerging with clean water, adding water to maintain submerging when water is absorbed, soaking at 25°C for 6-10 h and draining to obtain a second prepared mixed raw material;

step (b): mixing the distiller's grains according to claim 1 and the raw material obtained in step (a) in a ratio of (3-4):1, autoclaving at 121°C for 30 min, cooling to 25°C, inoculating *Cordyceps* strains, cultivating in the dark at a constant temperature for 4-6 d, then cultivating for 18-20 d with 10 h in the light every day, and after hyphae cover a full area, breaking microbial pieces into pellets having a diameter of 5-8 mm to obtain microbial pellets;

step (c): taking 80 parts of glutinous millet, soaking in clean water for 4-5 h, steaming to will-done, cooling naturally for 30-60 min to obtain prepared glutinous millet;

step (d): mixing the microbial pellets prepared in step (b) with raw material prepared in step (c) in a ratio of 1:(2-3), adding 2-5 parts of red yeast rice and 1-2 parts of rice wine yeast, stirring uniformly, sealing, fermenting at 25-30°C for 3-4 d and then at 20-24°C for 24-28 h, pressing and filtering to obtain a supernatant which is a Chinese yellow rice wine based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix*, and a solid residue for later use.

Preferably, the ratios for mixing in step (b) and step (c) are weight ratios.

The present disclosure further provides a method for producing dietary fiber powders based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix*, including the following steps:

- 5 preparing a solid residue by the above method for producing a Chinese yellow rice wine based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix*, drying the solid residue at 60°C, and ultrafine pulverizing to obtain dietary fiber powders based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix*.

Preferably, the part is part by weight.

- 10 The present disclosure provides a method for producing a Chinese white liquor based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix*. The produced Chinese white liquor is colorless and clear, and has mild flavour and special medicinal aroma of *Astragali Radix*, *Codonopsis Radix* and *Cordyceps militaris*.

- 15 A crude Chinese white liquor based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix* produced by the present disclosure has stable physical and chemical indicators: alcohol content: $63 \pm 3\%$ vol, acidity: pH6.0, ester content: 0.2%-0.6%, higher alcohol content: 0.15%-0.3%, total acid content: preferably 0.02%-0.13%, more preferably 0.02%-0.05%, and furfuraldehyde content: 0.002%-0.003%.

- 20 The present disclosure provides a method for producing a Chinese yellow rice wine based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix*. The produced Chinese yellow rice wine including glutinous millet as a raw material has the same color, fragrance, taste and style as a traditional Chinese yellow rice wine. In the method, fermentation substrates are

added with distillers' grains of Chinese white liquor, quinoa and common buckwheat seed fermented with *Cordyceps* fungi. The *Cordyceps militaris* (and *Cordyceps* mycelium), *Codonopsis Radix* and *Astragali Radix* in the distiller's grains which have been fermented by a variety of microorganisms in Daqu for liquor fermentation for a long time, once again experience fermentation with red yeast rice for Chinese yellow rice wine, where large molecules are broken down into small molecules to an extent as large as possible.

The Chinese yellow rice wine based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix* produced by the present disclosure has an alcohol content of 15% vol and aroma chemical components mainly including esters. A total of 32 chemical components have been identified, of which 20 are esters with a relative content of 70.17%-86.09%, including mainly ethyl butyrate and ethyl caproate. The Chinese yellow rice wine includes a polysaccharide content taking up 1.54%-2.81% of the wine body, an adenosine content of 6.5 mg/L, a cordycepin content reaching up to 95 mg/L-166 mg/L, a lovastatin content reaching 30 ppm, a lobetyolin content of 1.4 mg /L, and a calycosin-7-glucoside content of 4.1 mg/L. It can improve cellular immune functions and lower blood sugar and blood lipids.

The present disclosure provides a method for producing dietary fiber powders based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix*. According to the method, after two fermentation processes for the Chinese white liquor and the Chinese yellow rice wine, solubles and extracts of the distiller's grains are at a relatively low level.

The dietary fiber powders based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix* produced by the present disclosure contain 51.7%-53.2% of dietary fibers and microelements such as magnesium, iron, selenium, and strontium, and other nutrients.

Compared with the prior art, the present disclosure uses a variety of valuable edible fungi

and health-care medicinal materials as raw materials to strengthen health-care function of the product. The present disclosure adopts some technical parts of ordinary production processes of Chinese white liquor and Chinese yellow rice wine, and creatively develops a new process for successive productions of Chinese white liquor and Chinese yellow rice wine. Moreover, the distiller's grains are finally processed into dietary fiber powders, so that all raw materials are fully used. The products of the present disclosure based on valuable edible fungi and medicinal materials make consumers feel like they are taking food and drink instead of taking medicine to strengthen health. During production, multiple strains in the Daqu for liquor fermentation degrade *Codonopsis Radix*, *Astragali Radix* and *Cordyceps militaris* grown on silkworm larvae. In a subsequent step, buckwheat, quinoa and distiller's grains are further fermented with *Cordyceps* strains. Then a fermentation product was combined with cereal grains and fermented with red yeast rice and yeast for a third time. After multiple fermentations, all soluble substances derived from plants or fungi being both food and medicine finally enter the body of the Chinese yellow rice wine. The products of the present disclosure have nutritional tonic functions and a gradually nourishing effect, which can meet health needs of modern consumers.

DETAILED DESCRIPTION

The present disclosure provides a method for producing products based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix*, including the following steps:

step (1): taking 80 parts of sorghum seed, soaking in clean water for 4-5 h, steaming to will-done, cooling naturally for 30-60 min to obtain prepared sorghum seed;

step (2): taking 2-5 parts of *Cordyceps militaris* grown on silkworm larvae, 2-10 parts of fresh *Codonopsis Radix* and 8-10 parts of fresh *Astragali Radix*, cutting into cubes with a

5-10 mm side to obtain a first prepared mixed raw material;

step (3): mixing raw materials prepared in step (1) and step (2), stirring uniformly, adding 8-10 parts of Daqu for liquor fermentation, stirring uniformly, sealing a container, fermenting at 20-25°C for 28 d, carrying out a first distillation, cooling fermented grains naturally to 30°C, further adding 8-10 parts of Daqu for liquor fermentation, fermenting in a tank for 28 d, carrying out a second distillation, and mixing wine bodies obtained after the first distillation and the second distillation to prepare a Chinese white liquor based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix* and distillers' grains for later use;

step (4): taking 10-15 parts of common buckwheat seed and 10-20 parts of quinoa, mixing uniformly, submerging with clean water, adding water to maintain submerging when water is absorbed, soaking at 25°C for 6-10 h and draining to obtain a second prepared mixed raw material;

step (5): mixing the distiller's grains obtained in step (3) and the raw material obtained in step (4) in a ratio of (3-4):1, autoclaving at 121°C for 30 min, cooling to 25°C, inoculating *Cordyceps* strains, cultivating in the dark at a constant temperature for 4-6 d, then cultivating for 18-20 d with 10 h in the light every day, and after hyphae cover a full area, breaking microbial pieces into pellets having a diameter of 5-8 mm to obtain microbial pellets;

step (6): taking 80 parts of glutinous millet, soaking in clean water for 4-5 h, steaming to will-done, cooling naturally for 30-60 min to obtain prepared glutinous millet;

step (7): mixing the microbial pellets prepared in step (5) with raw material prepared in step (6) in a ratio of 1:(2-3), adding 2-5 parts of red yeast rice and 1-2 parts of rice wine yeast, stirring uniformly, sealing, fermenting at 25-30°C for 3-4 d and then at 20-24°C for 24-28 h,

pressing and filtering to obtain a supernatant which is a Chinese yellow rice wine based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix*, and a solid residue for later use;

step (8): drying the solid residue of step (7) at 60°C, and ultrafine pulverizing to obtain dietary fiber powders.

5 The present disclosure may be implemented by taking 80 parts of sorghum seed, soaking in clean water for 4-5 h, steaming to will-done, cooling naturally for 30-60 min to obtain prepared sorghum seed. The present disclosure has no special requirements on a soaking method, and a method well known to those skilled in the art can be used. In the present disclosure, steaming sorghum seed to will-done is beneficial to fermentation with
10 microorganisms in the Daqu for liquor fermentation, and at the same time, is possible to prevent waste of energy due to excessively long steaming time.

 The present disclosure may be implemented by taking 2-5 parts of *Cordyceps militaris* grown on silkworm larvae, 2-10 parts of fresh *Codonopsis Radix* and 8-10 parts of fresh *Astragali Radix*, cutting into cubes with a 5-10 mm side to obtain a first prepared mixed raw
15 material. In the present disclosure, the parts may be preferably parts by weight. The present disclosure has no special requirements on a cutting method, and a cutting method well known to those skilled in the art can be used. In the present disclosure, cutting into cubes of a certain size facilitates full water absorption of material, maintains shape of the material, and also helps support fermented grains.

20 The present disclosure may be implemented by mixing the prepared sorghum seed and the first prepared mixed raw material obtained above, stirring uniformly, adding 8-10 parts of Daqu for liquor fermentation, stirring uniformly, sealing a container, fermenting at 20-25°C for 28 d, carrying out a first distillation to obtain a first wine body and fermented grains,

cooling the fermented grains naturally to 30°C, further adding 8-10 parts of Daqu for liquor fermentation, fermenting in a tank for 28 d, carrying out a second distillation to obtain a second wine body, and mixing the first wine body and the second wine body to prepare a Chinese white liquor based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix* and distillers' grains for later use. In the present disclosure, the parts may be preferably parts by weight. In the present disclosure, *Astragali Radix*, *Cordyceps militaris* and *Codonopsis Radix* are involved in two fermentations with microorganisms in Daqu for liquor fermentation, where sugars, proteins and other substances which can be used by the microorganisms in the Daqu for liquor fermentation are fully hydrolyzed. After two distillations, volatile substances enter the Chinese white liquor, while soluble and insoluble non-volatile substances are left in distiller's grains which further experience fermentation with *Cordyceps* strains.

The present disclosure may be further implemented by taking 10-15 parts of common buckwheat seed and 10-20 parts of quinoa, mixing uniformly, submerging with clean water, adding water to maintain submerging when water is absorbed, soaking at 25°C for 6-10 h and draining to obtain a second prepared mixed raw material. In the present disclosure, the parts may be preferably parts by weight. The present disclosure has no special requirements on a mixing method, and a mixing method well known to those skilled in the art can be used. In the present disclosure, common buckwheat seed and quinoa are submerged to allow materials to fully contact with water, thereby increasing infiltration extent.

The present disclosure may be further implemented by mixing the distiller's grains obtained in the above method for producing a Chinese white liquor based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix* and the second prepared mixed raw material in a ratio of (3-4):1, autoclaving at 121°C for 30 min, cooling to 25°C, inoculating *Cordyceps*

strains, cultivating in the dark at a constant temperature for 4-6 d, then cultivating for 18-20 d with 10 h in the light every day, and after hyphae cover a full area, breaking microbial pieces into pellets having a diameter of 5-8 mm to obtain microbial pellets.

5 The present disclosure may be further implemented by taking 80 parts of glutinous millet, soaking in clean water for 4-5 h, steaming to will-done, cooling naturally for 30-60 min to obtain prepared glutinous millet. In the present disclosure, the parts may be preferably parts by weight. The present disclosure has no special requirements on a soaking method, and a soaking method well known to those skilled in the disclosure art can be used. The present disclosure may be further implemented by mixing the microbial pellets with the glutinous
10 millet in a ratio of 1:(2-3), adding 2-5 parts of red yeast rice and 1-2 parts of rice wine yeast, mixing uniformly, sealing, fermenting at 25-30°C for 3-4 d and then at 20-24°C for 24-28 h, pressing and filtering to obtain a supernatant which is a Chinese yellow rice wine based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix*, and a solid residue for later use. In the present disclosure, the parts may be preferably parts by weight, and the ratio for mixing
15 may be weight ratio. The present disclosure has no special requirements on the pressing and the filtering, and pressing and filtering methods well known to those skilled in the art can be used.

After the solid residue is obtained, the present disclosure may be further implemented by drying the solid residue obtained by the method for producing a Chinese yellow rice wine
20 based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix* at 60°C, and ultrafine pulverizing to obtain dietary fiber powders based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix*.

The present disclosure also provides products obtained by the method of the above

technical solution, including a Chinese white liquor based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix*, a Chinese yellow rice wine bade on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix*, and dietary fiber powders based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix*.

5 The Chinese white liquor based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix* has an alcohol content of $63 \pm 3\%$ vol, acidity of pH6.0, an ester content of 0.2%-0.6%, a higher alcohol content of 0.15%-0.3%, a total acid content of preferably 0.02%-0.13%, more preferably 0.02%-0.05%, and a furfuraldehyde content of 0.002%-0.003%, where contents are preferably mass-volume contents.

10 The Chinese yellow rice wine based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix* produced by the present disclosure has an alcohol content of 15%vol and aroma chemical components including esters in a relative content of 70.17%-86.09%. The Chinese yellow rice wine includes a polysaccharide content taking up 1.54%-2.81% of the wine body, an adenosine content of 6.5 mg/L, a cordycepin content reaching up to 95
15 mg/L-166 mg/L, a lovastatin content reaching 30 ppm, a lobetyolin content of 1.4 mg /L, and a calycosin-7-glucoside content of 4.1 mg/L. It can improve cellular immune functions and lower blood sugar and blood lipids. In the present disclosure, the aroma chemical components may preferably include mainly esters. A total of 32 chemical components have been identified, of which 20 are esters including mainly ethyl butyrate and ethyl caproate. In the present
20 disclosure, fermentation substrates are added with distillers' grains of Chinese white liquor, quinoa and common buckwheat seed fermented with *Cordyceps* fungi. The *Cordyceps militaris* (and *Cordyceps* mycelium), *Codonopsis Radix* and *Astragali Radix* in the distiller's grains which have been fermented with a variety of microorganisms in Daqu for liquor

fermentation for a long time, further experience fermentation with red yeast rice for Chinese yellow rice wine, where large molecules are broken down into small molecules to an extent as large as possible.

The dietary fiber powders based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix* contain 51.7%-53.2% of total dietary fibers and microelements such as magnesium, iron, selenium, and strontium as nutrients. In the present disclosure, after two fermentation processes for the Chinese white liquor and the Chinese yellow rice wine, solubles and extracts of the distiller's grains are at a relatively low level while dietary fibers take a major part.

The present disclosure provides a method for producing a Chinese white liquor based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix*, including the following steps:

step (A): taking 80 parts of sorghum seed, soaking in clean water for 4-5 h, steaming to will-done, cooling naturally for 30-60 min to obtain prepared sorghum seed;

step (B): taking 2-5 parts of *Cordyceps militaris* grown on silkworm larvae, 2-10 parts of fresh *Codonopsis Radix* and 8-10 parts of fresh *Astragali Radix*, cutting into cubes with a 5-10 mm side to obtain a first prepared mixed raw material;

step (C): mixing raw materials prepared in step (A) and step (B), stirring uniformly, adding 8-10 parts of Daqu for liquor fermentation, stirring uniformly, sealing a container, fermenting at 20-25°C for 28 d, carrying out a first distillation, cooling fermented grains naturally to 30°C, further adding 8-10 parts of Daqu for liquor fermentation, fermenting in a tank for 28 d, carrying out a second distillation, and mixing wine bodies obtained after the first distillation and the second distillation to prepare a Chinese white liquor based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix* and distillers' grains for later use.

The technical solution of the method for producing a Chinese white liquor based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix* of the present disclosure is the same as that disclosed in a section of preparation of Chinese white liquor based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix* in the above solution of method for producing products based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix*, and is not repeated here.

The present disclosure provides a method for producing a Chinese yellow rice wine based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix*, including the following steps:

step (a): taking 10-15 parts of common buckwheat seed and 10-20 parts of quinoa, mixing uniformly, submerging with clean water, adding water to maintain submerging when water is absorbed, soaking at 25°C for 6-10 h and draining to obtain a second prepared mixed raw material;

step (b): mixing the distiller's grains obtained in claim 1 and the raw material obtained in step (a) in a ratio of (3-4):1, autoclaving at 121°C for 30 min, cooling to 25°C, inoculating *Cordyceps* strains, cultivating in the dark at a constant temperature for 4-6 d, then cultivating for 18-20 d with 10 h in the light every day, and after hyphae cover a full area, breaking microbial pieces into pellets having a diameter of 5-8 mm to obtain microbial pellets;

step (c): taking 80 parts of glutinous millet, soaking in clean water for 4-5 h, steaming to will-done, cooling naturally for 30-60 min to obtain prepared glutinous millet;

step (d): mixing the microbial pellets prepared in step (b) with raw material prepared in step (c) in a ratio of 1:(2-3), adding 2-5 parts of red yeast rice and 1-2 parts of rice wine yeast, stirring uniformly, sealing, fermenting at 25-30°C for 3-4 d and then at 20-24°C for 24-28 h,

pressing and filtering to obtain a supernatant which is a Chinese yellow rice wine based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix*, and a solid residue for later use.

The technical solution of the method for producing a Chinese yellow rice wine based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix* of the present disclosure is the same as that disclosed in a section of preparation of Chinese yellow rice wine based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix* in the above solution of method for producing products based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix*, and is not repeated here.

The present disclosure provides a method for producing dietary fiber powders based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix*, including the following steps:

drying the solid residue obtained by the method for producing a Chinese yellow rice wine based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix* at 60°C, and ultrafine pulverizing to obtain dietary fiber powders based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix*.

To further describe the disclosure, the method for producing products based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix*, and the series of products, the Chinese white liquor, the Chinese yellow rice wine and the dietary fiber powders based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix* provided by the disclosure are described in detail below with reference to specific embodiments. However, these embodiments should not be construed as limitations to the protection scope of the disclosure.

Example 1

The following materials were prepared in parts by mass: 80 parts of sorghum seed, 2 parts

of *Cordyceps militaris* grown on silkworm larvae, 2 parts of fresh *Codonopsis Radix*, 8 parts of fresh *Astragali Radix*, 16 parts of Daqu for liquor fermentation, 10 parts of common buckwheat seed, 10 parts of quinoa, 80 parts of glutinous millet, 2 parts of red yeast rice and 1 part of rice wine yeast. The parts were parts by weight, and ratio for mixing was weight ratio.

5 A method for producing products based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix* included the following steps:

Step (1): 80 parts of sorghum seed were taken, soaked in clean water for 4 h, steamed to will-done, and cooled naturally for 30 min to obtain prepared sorghum seed.

Step (2): 2 parts of *Cordyceps militaris* grown on silkworm larvae, 2 parts of fresh
10 *Codonopsis Radix* and 8 parts of fresh *Astragali Radix* were taken, cut into cubes with a 5 mm side to obtain a first prepared mixed raw material.

Step (3): raw materials prepared in step (1) and step (2) were mixed and stirred uniformly. 8 parts of Daqu for liquor fermentation were added and stirred uniformly. A container was sealed. Fermentation was carried out at 20-25°C for 28 d. A first distillation was carried out.
15 Fermented grains were cooled naturally to 30°C. 8 parts of Daqu for liquor fermentation were added. Fermentation was carried out in a tank for 28 d, and then a second distillation was carried out. Wine bodies obtained after the first distillation and the second distillation were mixed to prepare a Chinese white liquor based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix* and, and distillers' grains for later use

20 Step (4): 10 parts of common buckwheat seed and 10 parts of quinoa were taken, mixed uniformly, and submerged in clean water. Water was added to maintain submerging when water was absorbed. Soaking was carried out at 25°C for 6 h. Draining was carried out to

obtain a second prepared mixed raw material.

Step (5): the distiller's grains obtained in step (3) and the raw material obtained in step (4) were mixed in a ratio of 3:1, autoclaved at 121°C for 30 min and cooled to 25°C. *Cordyceps* strains were inoculated, cultivated in the dark at a constant temperature for 4 d, and then
5 cultivated for 18 d with 10 h in the light every day. After hyphae covered a full area, microbial pieces were broken into pellets having a diameter 5 mm to obtain microbial pellets.

Step (6): 80 parts of glutinous millet were taken, soaked in clean water for 4 h, steamed to will-done, and cooled naturally for 30 min to obtain prepared glutinous millet.

Step (7): the microbial pellets prepared in step (5) were mixed with raw material prepared
10 in step (6) in a ratio of 1:2. 2 parts of red yeast rice and 1 part of rice wine yeast were added, stirred uniformly and sealed. Fermentation was carried out at 25°C for 4 d and then at 20°C for 24 h. Pressing and filtering were carried out to obtain a supernatant which was a Chinese yellow rice wine based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix*, and a solid residue for later use.

15 Step (8): the solid residue of step (7) was dried at 60°C, and ultrafine pulverized to obtain dietary fiber powders.

Example 2

The following materials were prepared in parts by mass: 80 parts of sorghum seed, 5 parts of *Cordyceps militaris* grown on silkworm larvae, 10 parts of fresh *Codonopsis Radix*, 10
20 parts of fresh *Astragali Radix*, 20 parts of Daqu for liquor fermentation, 15 parts of common buckwheat seed, 20 parts of quinoa, 80 parts of glutinous millet, 5 parts of red yeast rice and 2 part of rice wine yeast. The parts were parts by weight, and ratio for mixing was weight ratio.

A method for producing products based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix* included the following steps:

Step (1): 80 parts of sorghum seed were taken, soaked in clean water for 5 h, steamed to will-done, and cooled naturally for 60 min to obtain prepared sorghum seed.

5 Step (2): 5 parts of *Cordyceps militaris* grown on silkworm larvae, 10 parts of fresh *Codonopsis Radix* and 10 parts of fresh *Astragali Radix* were taken, cut into cubes with a 7 mm side to obtain a first prepared mixed raw material.

Step (3): raw materials prepared in step (1) and step (2) were mixed and stirred uniformly. 10 parts of Daqu for liquor fermentation were added and stirred uniformly. A container was
10 sealed. Fermentation was carried out at 20-25°C for 28 d. A first distillation was carried out. Fermented grains were cooled naturally to 30°C. 10 parts of Daqu for liquor fermentation were added. Fermentation was carried out in a tank for 28 d, and then a second distillation was carried out. Wine bodies obtained after the first distillation and the second distillation were mixed to prepare a Chinese white liquor based on *Cordyceps militaris*, *Astragali Radix*
15 and *Codonopsis Radix*. Distillers' grains were kept for later use.

Step (4): 15 parts of common buckwheat seed and 20 parts of quinoa were taken, mixed uniformly, and submerged in clean water. Water was added to maintain submerging when water was absorbed. Soaking was carried out at 25°C for 10 h. Draining was carried out to obtain a second prepared mixed material.

20 Step (5): the distiller's grains obtained in step (3) and the raw material obtained in step (4) were mixed in a ratio of 4:1, autoclaved at 121°C for 30 min and cooled to 25°C. *Cordyceps* strains were inoculated, cultivated in the dark at a constant temperature for 6 d, and then

cultivated for 20 d with 10 h in the light every day. After hyphae covered a full area, microbial pieces were broken into pellets having a diameter 5-8 mm to obtain microbial pellets.

Step (6): 80 parts of glutinous millet were taken, soaked in clean water for 5 h, steamed to will-done, and cooled naturally for 60 min to obtain prepared glutinous millet.

5 Step (7): the microbial pellets prepared in step (5) were mixed with raw material prepared in step (6) in a ratio of 1:3. 5 parts of red yeast rice and 2 parts of rice wine yeast were added, stirred uniformly and sealed. Fermentation was carried out at 28°C for 3 d and then at 23°C for 28 h. Pressing and filtering were carried out to obtain a supernatant which was a Chinese yellow rice wine based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix*. A
10 solid residue was kept for later use.

Step (8): the solid residue of step (7) was dried at 60°C, and ultrafine pulverized to obtain dietary fiber powders.

Example 3

The following materials were prepared in parts by mass: 80 parts of sorghum seed, 3 parts
15 of *Cordyceps militaris* grown on silkworm larvae, 6 parts of fresh *Codonopsis Radix*, 8 parts of fresh *Astragali Radix*, 20 parts of Daqu for liquor fermentation, 12 parts of common buckwheat seed, 15 parts of quinoa, 80 parts of glutinous millet, 3 parts of red yeast rice and 1 part of rice wine yeast. The parts were parts by weight, and ratio for mixing was weight ratio.

A method for producing products based on *Cordyceps militaris*, *Astragali Radix* and
20 *Codonopsis Radix* included the following steps:

Step (1): 80 parts of sorghum seed were taken, soaked in clean water for 5 h, steamed to will-done, and cooled naturally for 50 min to obtain prepared sorghum seed.

Step (2): 3 parts of *Cordyceps militaris* grown on silkworm larvae, 6 parts of fresh *Codonopsis Radix* and 8 parts of fresh *Astragali Radix* were taken, cut into cubes with an 8 mm side to obtain a first prepared mixed raw material.

Step (3): raw materials prepared in step (1) and step (2) were mixed and stirred uniformly.
5 10 parts of Daqu for liquor fermentation were added and stirred uniformly. A container was sealed. Fermentation was carried out at 20-25°C for 28 d. A first distillation was carried out. Fermented grains were cooled naturally to 30°C. 8 parts of Daqu for liquor fermentation were added. Fermentation was carried out in a tank for 28 d, and then a second distillation was carried out. Wine bodies obtained after the first distillation and the second distillation were
10 mixed to prepare a Chinese white liquor based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix*. Distillers' grains were kept for later use.

Step (4): 12 parts of common buckwheat seed and 15 parts of quinoa were taken, mixed uniformly, and submerged in clean water. Water was added to maintain submerging when water was absorbed. Soaking was carried out at 25°C for 8 h. Draining was carried out to
15 obtain a second prepared mixed raw material.

Step (5): the distiller's grains obtained in step (3) and the raw material obtained in step (4) were mixed in a ratio of 3.5:1, autoclaved at 121°C for 30 min and cooled to 25°C. *Cordyceps* strains were inoculated, cultivated in the dark at a constant temperature for 5 d, and then cultivated for 19 d with 10 h in the light every day. After hyphae covered a full area, microbial
20 pieces were broken into pellets having a diameter of 8 mm to obtain microbial pellets.

Step (6): 80 parts of glutinous millet were taken, soaked in clean water for 4 h, steamed to will-done, and cooled naturally for 40 min to obtain prepared glutinous millet.

Step (7): the microbial pellets prepared in step (5) were mixed with raw material prepared in step (6) in a ratio of 1:2.5. 3 parts of red yeast rice and 1 part of rice wine yeast were added, stirred uniformly and sealed. Fermentation was carried out at 25-27°C for 4 d and then at 20-23°C for 24 h. Pressing and filtering were carried out to obtain a supernatant which was a Chinese yellow rice wine based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix*. A solid residue was kept for later use.

Step (8): the solid residue of step (7) was dried at 60°C, and ultrafine pulverized to obtain dietary fiber powders.

Example 4

The following materials were prepared in parts by mass: 80 parts of sorghum seed, 2 parts of *Cordyceps militaris* grown on silkworm larvae, 2 parts of fresh *Codonopsis Radix*, 8 parts of fresh *Astragali Radix*, 16 parts of Daqu for liquor fermentation, 10 parts of common buckwheat seed, 10 parts of quinoa, 80 parts of glutinous millet, 2 parts of red yeast rice and 1 part of rice wine yeast. The parts were parts by weight, and ratio for mixing was weight ratio.

A method for producing products based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix* included the following steps:

Step (1): 80 parts of sorghum seed were taken, soaked in clean water for 4 h, steamed to will-done, and cooled naturally for 30 min to obtain prepared sorghum seed.

Step (2): 2 parts of *Cordyceps militaris* grown on silkworm larvae, 2 parts of fresh *Codonopsis Radix* and 8 parts of fresh *Astragali Radix* were taken, cut into cubes with a 5 mm side to obtain a first prepared mixed raw material.

Step (3): raw materials prepared in step (1) and step (2) were mixed and stirred uniformly.

8 parts of Daqu for liquor fermentation were added and stirred uniformly. A container was sealed. Fermentation was carried out at 20-25°C for 28 d. A first distillation was carried out. Fermented grains were cooled naturally to 30°C. 8 parts of Daqu for liquor fermentation were added. Fermentation was carried out in a tank for 28 d, and then a second distillation was carried out. Wine bodies obtained after the first distillation and the second distillation were mixed to prepare a Chinese white liquor based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix* and distillers' grains for later use.

Step (4): 10 parts of common buckwheat seed and 10 parts of quinoa were taken, mixed uniformly, and submerged in clean water. Water was added to maintain submerging when water was absorbed. Soaking was carried out at 25°C for 6 h. Draining was carried out to obtain a second prepared mixed raw material.

Step (5): the distiller's grains obtained in step (3) and the raw material obtained in step (4) were mixed in a ratio of 3:1, autoclaved at 121 °C for 30 min and cooled to 25°C. *Cordyceps* strains were inoculated, cultivated in the dark at a constant temperature for 4 d, and then cultivated for 18 d with 10 h in the light every day. After hyphae covered a full area, microbial pieces were broken into pellets having a diameter of 5 mm to obtain microbial pellets.

Step (6): 80 parts of glutinous millet were taken, soaked in clean water for 4 h, steamed to will-done, and cooled naturally for 30 min to obtain prepared glutinous millet.

Step (7): the microbial pellets prepared in step (5) were mixed with raw material prepared in step (6) in a ratio of 1:3. 2 parts of red yeast rice and 1 part of rice wine yeast were added, stirred uniformly and sealed. Fermentation was carried out at 25°C for 4 d and then at 20°C for 24 h. Pressing and filtering were carried out to obtain a supernatant which was a Chinese yellow rice wine based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix*, and a

solid residue for later use.

Step (8): the solid residue of step (7) was dried at 60 °C, and ultrafine pulverized to obtain dietary fiber powders.

Alcohol contents of the Chinese white liquor prepared in Examples 1-4 and a Chinese white liquor prepared by a traditional process were converted to 65 degrees to determine liquor yield with weight ratio of wine body to cereal material in percentages. Results were shown in Table 1. Examples 1-4 were denoted as test groups 1-4, and a product prepared by the traditional process was denoted as CK group.

Table 1 Liquor yield of Chinese white liquor obtained in Examples 1-4 and Chinese white liquor prepared by a traditional process

	Liquor yield %
CK	36
Example 1	38
Example 2	41
Example 3	39
Example 4	36

According to a preliminary test of the present disclosure with results shown in Table 1, the Chinese white liquor based on *Cordyceps militaris* grown on silkworm larvae, *Astragali Radix* and *Codonopsis Radix* had a total ester content which was 39% higher than a traditional mild flavour Chinese white liquor, and other indicators within reasonable ranges as defined in the Chinese national standard for mild flavour Chinese white liquor. Sensory evaluation was carried out by wine tasters on randomly selected samples. Results showed that, the Chinese

white liquor based on *Cordyceps militaris* grown on silkworm larvae, *Astragali Radix* and *Codonopsis Radix* was significantly better than the control group in terms of aroma and taste. Moreover, the Chinese white liquor of the present disclosure had a liquor yield increased by 15% compared to the control group. In the present disclosure, the *Cordyceps militaris* grown on silkworm larvae and other materials entered production processes to form Chinese white liquor, Chinese yellow rice wine, and dietary fiber powders. There was no waste residue in the production process. These materials improved ester fragrance of the liquor, and provided cordycepin for Chinese yellow rice wine. All the entire materials were involved in the products in various forms, so that functional components of these valuable materials were utilized to a maximum extent.

The Chinese yellow rice wine prepared in Examples 1-4 and the rice wine prepared by the traditional process were detected by high performance liquid chromatography (according to NY/T 2116-2012 “Determination of Cordycepin and Adenosine in Cordyceps Products”) for cordycepin content. Results were shown in Table 2. Examples 1-4 were denoted as test groups 1-4, and a product prepared by the traditional process was denoted as CK group.

Table 2 Detection results of the Chinese yellow rice wine obtained in Examples 1-4 and Chinese yellow rice wine prepared by a traditional process (mg/L)

	Cordycepin content mg/L
Traditional process	Not Detected
Example 1	95
Example 2	166
Example 3	112
Example 4	82

Compared with the control group, the Chinese yellow rice wine based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix* had a highest cordycepin content of 166 mg/100 ml which was significantly better than that of the traditional yellow rice wine.

5 The above contents cannot be recognized as that the specific embodiments of the disclosure are only limited to these descriptions. All equivalent changes and modifications made within the scope of the disclosure should fall within the scope of disclosure determined by the claims submitted in the disclosure.

What is claimed is:

1. A method for producing products based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix*, comprising the following steps:

5 step (1): taking 80 parts of sorghum seed, soaking in clean water for 4-5 h, steaming to will-done, cooling naturally for 30-60 min to obtain prepared sorghum seed;

 step (2): taking 2-5 parts of *Cordyceps militaris* grown on silkworm larvae, 2-10 parts of fresh *Codonopsis Radix* and 8-10 parts of fresh *Astragali Radix*, cutting into cubes with a 5-10 mm side to obtain a first prepared mixed raw material;

10 step (3): mixing raw materials prepared in step (1) and step (2), stirring uniformly, adding 8-10 parts of Daqu for liquor fermentation, stirring uniformly, sealing a container, fermenting at 20-25°C for 28 d, carrying out a first distillation, cooling fermented grains naturally to 30°C, further adding 8-10 parts of Daqu for liquor fermentation, fermenting in a tank for 28 d, carrying out a second distillation, and mixing wine bodies obtained after the first distillation and the second distillation to prepare a Chinese white liquor based on *Cordyceps militaris*,
15 *Astragali Radix* and *Codonopsis Radix* and distillers' grains for later use;

 step (4): taking 10-15 parts of common buckwheat seed and 10-20 parts of quinoa, mixing uniformly, submerging with clean water, adding water to maintain submerging when water is absorbed, soaking at 25°C for 6-10 h and draining to obtain a second prepared mixed raw material;

20 step (5): mixing the distiller's grains obtained in step (3) and the raw material obtained in step (4) in a ratio of (3-4):1, autoclaving at 121°C for 30 min, cooling to 25°C, inoculating *Cordyceps* strains, cultivating in the dark at a constant temperature for 4-6 d, then cultivating

for 18-20 d with 10 h in the light every day, and after hyphae cover a full area, breaking microbial pieces into pellets having a diameter of 5-8 mm to obtain microbial pellets;

step (6): taking 80 parts of glutinous millet, soaking in clean water for 4-5 h, steaming to will-done, cooling naturally for 30-60 min to obtain prepared glutinous millet;

5 step (7): mixing the microbial pellets prepared in step (5) with raw material prepared in step (6) in a ratio of 1:(2-3), adding 2-5 parts of red yeast rice and 1-2 parts of rice wine yeast, stirring uniformly, sealing, fermenting at 25-30°C for 3-4 d and then at 20-24°C for 24-28 h, pressing and filtering to obtain a supernatant which is a Chinese yellow rice wine based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix*, and a solid residue for later use;

10 step (8): drying the solid residue of step (7) at 60°C, and ultrafine pulverizing to obtain dietary fiber powders.

2. The method for producing products based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix* according to claim 1, wherein the ratios for mixing in step (5) and step (7) are weight ratios.

15 3. Products based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix* obtained by the method according to claim 1, comprising a Chinese white liquor based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix*, a Chinese yellow rice wine based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix*, and dietary fiber powders based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix*, wherein

20 the Chinese white liquor based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix* has an alcohol content of $63 \pm 3\%$ vol, acidity of pH6.0, an ester content of 0.2%-0.6%, a higher alcohol content of 0.15%-0.3%, a total acid content of 0.02%-0.13% and a

furfuraldehyde content of 0.002%-0.003%;

the Chinese yellow rice wine based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix* has an alcohol content of 15%vol, aroma chemical components comprising esters in a relative content of 70.17%-86.09%, a polysaccharide content taking up 1.54%-2.81% of wine body, an adenosine content of 6.5 mg/L, a cordycepin content of 95 mg/L-166 mg/L, a lovastatin content of 30 ppm, a lobetyolin content of 1.4 mg/L, and a calycosin-7-glucoside content of 4.1 mg/L; in the present disclosure, the aroma chemical components preferably contain mainly esters preferably comprising ethyl butyrate and ethyl caproate;

the dietary fiber powders based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix* contain 51.7%-53.2% of total dietary fibers and microelements comprising magnesium, iron, selenium and strontium as nutrients.

4. A method for producing a Chinese white liquor based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix*, comprising the following steps:

step (A): taking 80 parts of sorghum seed, soaking in clean water for 4-5 h, steaming to will-done, cooling naturally for 30-60 min to obtain prepared sorghum seed;

step (B): taking 2-5 parts of *Cordyceps militaris* grown on silkworm larvae, 2-10 parts of fresh *Codonopsis Radix* and 8-10 parts of fresh *Astragali Radix*, cutting into cubes with a 5-10 mm side to obtain a first prepared mixed raw material;

step (C): mixing raw materials prepared in step (A) and step (B), stirring uniformly, adding 8-10 parts of Daqu for liquor fermentation, stirring uniformly, sealing a container, fermenting at 20-25°C for 28 d, carrying out a first distillation, cooling fermented grains naturally to 30°C, further adding 8-10 parts of Daqu for liquor fermentation, fermenting in a

tank for 28 d, carrying out a second distillation, and mixing wine bodies obtained after the first distillation and the second distillation to prepare a Chinese white liquor based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix* and distillers' grains for later use.

5. A method for producing a Chinese yellow rice wine based on *Cordyceps militaris*,
5 *Astragali Radix* and *Codonopsis Radix*, comprising the following steps:

step (a): taking 10-15 parts of common buckwheat seed and 10-20 parts of quinoa, mixing uniformly, submerging with clean water, adding water to maintain submerging when water is absorbed, soaking at 25°C for 6-10 h and draining to obtain a second prepared mixed raw material;

10 step (b): preparing distillers' grains by the method for producing a Chinese white liquor based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix* according to claim 4, mixing the distiller's grains and the raw material obtained in step (a) in a ratio of (3-4):1, autoclaving at 121°C for 30 min, cooling to 25°C, inoculating *Cordyceps* strains, cultivating in the dark at a constant temperature for 4-6 d, then cultivating for 18-20 d with 10 h in the
15 light every day, and after hyphae cover a full area, breaking microbial pieces into pellets having a diameter of 5-8 mm to obtain microbial pellets;

step (c): taking 80 parts of glutinous millet, soaking in clean water for 4-5 h, steaming to will-done, cooling naturally for 30-60 min to obtain prepared glutinous millet;

step (d): mixing the microbial pellets prepared in step (b) with raw material prepared in
20 step (c) in a ratio of 1:(2-3), adding 2-5 parts of red yeast rice and 1-2 parts of rice wine yeast, stirring uniformly, sealing, fermenting at 25-30°C for 3-4 d and then at 20-24°C for 24-28 h, pressing and filtering to obtain a supernatant which is a Chinese yellow rice wine based on

Cordyceps militaris, *Astragali Radix* and *Codonopsis Radix*, and a solid residue for later use.

6. The method according to claim 5, wherein the ratios for mixing in step (b) and step (c) are weight ratios.

7. A method for producing dietary fiber powders based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix*, comprising the following steps:

preparing a solid residue by the method for producing a Chinese yellow rice wine based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix* according to claim 5 or claim 6, drying the solid residue at 60°C, and ultrafine pulverizing to obtain dietary fiber powders based on *Cordyceps militaris*, *Astragali Radix* and *Codonopsis Radix*.

8. The method according to any of claims 1, 4, 5 and 7, wherein the part is part by weight.