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PATENTS ACT, 1978

# CERTIFICATE

In accordance with section 44 (1) of the Patents Act, No. 57 of 1978, it is hereby certified that:

**INSTITUTE OF SUBTROPICAL AGRICULTURE, CHINESE ACADEMY OF SCIENCES;  
HUNAN REED INDUSTRY AGRICULTURAL ECOLOGICAL TECHNOLOGY CO., LTD.**

Has been granted a patent in respect of an invention described and claimed in complete specification deposited at the Patent Office under the number

**2022/05820**

A copy of the complete specification is annexed, together with the relevant Form P2.

In testimony whereof, the seal of the Patent Office has been affixed at Pretoria with effect from the 31<sup>st</sup> day of **August 2022**



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PATENTS ACT, 1978  
REGISTER OF PATENTS**

FORM P2

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71	Full name(s) of applicant(s)/Patentee(s):				
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71	Applicant(s) substituted:			Date registrered	
71	Assignee(s):			Date registrered	
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Priority claimed:		Country	Number	Date	
54	Title of invention				
	Pleurotus geesteranus cultivation substrate and preparation method thereof				
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Sibanda and Zantwijk, Oaktree Corner, 9 Kruger Street, Oaklands (PO Box 1615 Houghton 2041), Johannesburg, 2192, SOUTH AFRICA Reference no.: PT_CP_ZA00004580 ([InsID: ])					
61	Patent of addition No.			Date of any change	
Fresh application based on.			Date of any change		

**REPUBLIC OF SOUTH AFRICA**  
**PATENTS ACT, 1978**  
**COMPLETE SPECIFICATION**  
[Section 30(1) - Regulation 28]

FORM P7

OFFICIAL APPLICATION NO.

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22	26 May 2022
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INTERNATIONAL CLASSIFICATION

51	A01G
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FULL NAME(S) OF APPLICANT(S)

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TITLE OF INVENTION

54	Pleurotus geesteranus cultivation substrate and preparation method thereof
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*Pleurotus geesteranus* cultivation substrate and preparation method thereof

## **TECHNICAL FIELD**

5 The invention belongs to the technical field of edible fungi cultivation, particularly related to *Pleurotus geesteranus* cultivation substrate with reed as main raw material. Moreover, the invention provides a preparation method of *Pleurotus geesteranus* cultivation substrate.

## **BACKGROUND**

10 The most common cultivation materials of *Pleurotus geesteranus* are cottonseed hull, sawdust, corncob, etc. The price of cottonseed hull is high for most edible fungi cultivation areas, because the cotton planting areas are usually far away from the fungi cultivation areas, and the use of sawdust consumes forest resources, which is not conducive to the protection of ecological environment protection. Furthermore, corncob from farmland has pesticide residues.

Reeds are widely distributed, with large biomass, without pesticide pollution. In order to broaden the source of *Pleurotus geesteranus* cultivation raw materials and promote the utilization of reed resources, the invention provides a *Pleurotus geesteranus* cultivation substrate with reed as the main raw material, which can replace or reduce the consumption of sawdust, cottonseed hull and corncob, and it is conducive to promoting the sustainable and healthy development of edible fungi industry.

## **SUMMARY**

25 This invention provides *Pleurotus geesteranus* cultivation substrate with reeds as main raw material. The method has reasonable compatibility and convenient use, can meet the growth requirements of *Pleurotus geesteranus*, and can replace or reduce the consumption of sawdust, cottonseed hull and corncob.

30 In order to achieve the above purpose, this invention provides the following technical solutions:

*Pleurotus geesteranus* cultivation substrate comprises the following raw materials in percentage by mass: reed chips 29-49%, cottonseed hull 29-49%, bran 20%, gypsum 1%, and lime 1%.

The sum of the mass percentages of the reed crumbs and cottonseed hulls is 78%, and the sum of the mass percentages of the raw materials is 100%.

*Pleurotus geesteranus* cultivation substrate comprises the following raw materials in percentage by mass: reed chips 29%, cottonseed hull 49%, bran 20%, gypsum 1%, and lime 1%.

*Pleurotus geesteranus* cultivation substrate comprises the following raw materials in percentage by mass: reed chips 39%, cottonseed hull 39%, bran 20%, gypsum 1% and lime 1%.

*Pleurotus geesteranus* cultivation substrate comprises the following raw materials in percentage by mass: reed chips 49%, cottonseed hull 29%, bran 20%, gypsum 1%, and lime 1%.

The sum of the mass percentages of the raw materials is 100%.

The above five raw materials reed can provide abundant carbon sources such as cellulose and lignin, cottonseed hull is rich in nutrients and has good water retention, bran can provide nutrients quickly, and gypsum can provide elements such as sulfur and calcium, which can improve the cohesiveness of cultivation substrates, lime is used to adjust the pH of cultivation substrate. The ratio and compatibility of the raw materials are reasonable, which can meet the growth requirements of *Pleurotus geesteranus*.

The preparation method of *Pleurotus geesteranus* cultivation substrate comprises the following steps:

(1) after harvesting, the reeds are sun-dried to the moisture content of less than 10% and ground, and the reeds are pulverized and screened with a 3 mm mesh to obtain reed chips for later use;

(2) weigh the reed chips in proportion, add water to full saturation, pre-wet for 1-15 days, and fully absorb water for softening;

(3) weigh the cottonseed hulls in proportion, add water to full saturation, pre-wet for 1 day, and fully absorb water;

(4) weigh bran, gypsum and lime in proportion, mix them with the above-mentioned processed reed crumbs and cottonseed hulls, stir evenly, and adjust  
5 the water content of the cultivation substrate to be 62-65%;

(5) bagging and sterilizing: use  $17 \times 33$ cm polypropylene bags and sterilize under high pressure at  $121^{\circ}\text{C}$  for 2.5 h.

Compared with the prior art, the beneficial effects of the present invention are as followings:

10 This invention provides a cultivation substrate of *Pleurotus geesteranus*, and provides a new source of raw material and matrix formula for cultivation of *Pleurotus geesteranus*. The cultivation substrate of the invention has reasonable compatibility and convenient use, and can meet the growth requirements of *Pleurotus geesteranus*; the reeds grown in the natural  
15 environment have no pesticide residues, can protect forest resources, reduce pesticide pollution, decrease production cost, and have better ecological and economic benefits. The sustainable and healthy development of edible fungi industry can be promoted by replacing or reducing the amount of sawdust, corncob and cottonseed hull with reeds as the raw materials for the cultivation  
20 substrate of *Pleurotus geesteranus*.

### **BRIEF DESCRIPTION OF THE FIGURES**

Fig. 1 is a comparison chart of the biological efficiency (fresh mushroom mass/culture medium mass $\times$  100%) of *Pleurotus geesteranus* cultivated with different formulas.

25 Wherein, the raw material ratio of Embodiment 1 is as follows: reed chips 68%, cottonseed hull 10%, bran 20% , gypsum 1% and lime 1%; the raw material ratio of Embodiment 2 is as follows: reed chips 58%, cottonseed hull 20%, bran 20% , gypsum 1% and lime 1%; the raw material ratio of Embodiment 3 is as follows: reed chips 49%, cottonseed hull 29%, bran 20% ,  
30 gypsum 1% and lime 1%; the raw material ratio of Embodiment 4 is as follows:

reed chips 39%, cottonseed hull 39%, bran 20% , gypsum 1% and lime 1%; the raw material ratio of Embodiment 5 is as follows: reed chips 29%, cottonseed hull 49%, bran 20% , gypsum 1% and lime 1%; the raw materials of the control group are cottonseed hull 78%, bran 20%, gypsum 1% and lime 1%. Different lowercase letters on the column indicate significant differences ( $P < 0.05$ ).

## DETAILED DESCRIPTION OF THE INVENTION

The following examples will be used to describe the specific Embodiments of the present invention in detail.

*Pleurotus geesteranus* cultivation substrate comprises the following raw materials in percentage by mass: reed chips 68%, cottonseed hull 10%, bran 20% , gypsum 1% and lime 1%.

The preparation method of *Pleurotus geesteranus* cultivation substrate comprises the following steps:

(1) after harvesting, the reeds are sun-dried to the moisture content of less than 10% and ground, and the reeds are pulverized and screened with a 3 mm mesh to obtain reed chips for later use;

(2) weigh the reed chips in proportion, add water to full saturation, pre-wet for 1 day, and fully absorb water for softening;

(3) weigh the cottonseed hulls in proportion, add water to full saturation, pre-wet for 1 day, and fully absorb water;

(4) weigh bran, gypsum and lime in proportion, mix them with the above-mentioned processed reed crumbs and cottonseed hulls, stir evenly, and adjust the water content of the cultivation substrate to be 62-65% (holding the cultivation substrate in hand, there is a watermark instead of water drops falling);

(5) bagging and sterilizing: use  $17 \times 33$ cm polypropylene bags, sterilize under high pressure at  $121^{\circ}\text{C}$  for 2.5 h.

Embodiment 2

*Pleurotus geesteranus* cultivation substrate comprises the following raw materials in percentage by mass: reed chips 58%, cottonseed hull 20%, bran 20%, gypsum 1% and lime 1%.

The preparation steps are the same as those of Embodiment 1.

5 Embodiment 3

*Pleurotus geesteranus* cultivation substrate comprises the following raw materials in percentage by mass: reed chips 49%, cottonseed hull 29%, bran 20%, gypsum 1% and lime 1%.

The preparation steps are the same as those of Embodiment 1.

10 Embodiment 4

*Pleurotus geesteranus* cultivation substrate comprises the following raw materials in percentage by mass: reed chips 39%, cottonseed hull 39%, bran 20%, gypsum 1% and lime 1%.

The preparation steps are the same as those of Embodiment 1.

15 Embodiment 5

*Pleurotus geesteranus* cultivation substrate comprises the following raw materials in percentage by mass: reed chips 29%, cottonseed hull 49%, bran 20%, gypsum 1% and lime 1%.

The preparation steps are the same as those of Embodiment 1.

20 Control group

The control group comprises the following raw materials in percentage by mass: reed chips 0%, cottonseed hull 78%, bran 20%, gypsum 1% and lime 1%.

25 Except for the step of adding reed, the preparation procedure is the same as in Embodiment 1.



Using the above-mentioned cultivation substrate, under the same environmental conditions, the cultivation experiment of *Pleurotus geesteranus* is carried out at the same time. The method is as follows:

5 (1) Inoculation: it is carried out in a sterile operating table, the cultivation bag is put in the clean bench, the glass door is closed, and the sodium dichloroisocyanurate is fumigated and disinfected for half an hour; Inoculating, and sealing with mushroom ring;

(2) Mycelium culture: put the inoculated cultivation bag into a culture room for dark culture, and keep the ambient temperature at 22-24°C and the humidity  
10 at 60-65%;

(3) Management of fruiting: after the mycelium is full of bags, it is placed in a fruiting room with a temperature of 25-30°C and a humidity of 85-95%.

(4) It can be seen from the above specific Embodiments that the biological efficiency of *Pleurotus geesteranus* in Embodiment 1 and Embodiment 2 is  
15 48.45% and 53.29% respectively, which is significantly lower than that of the control group (66.08%); the biological efficiency of *Pleurotus geesteranus* in Embodiment 3, Embodiment 4 and Embodiment 5 is 64.80%, 63.27% and 66.88% respectively, which is similar to that of the control group (66.08%), with no significant difference. It can be seen that the proportion of reed crumbs is  
20 29-49%, that is, reed chips can replace 29-49% of cottonseed hull. Therefore, reeds can be used as an alternative raw material when cottonseed hull is in short supply or the price is high.

## CLAIMS

25 1. *Pleurotus geesteranus* cultivation substrate is characterized by comprising the following raw materials in percentage by mass: reed chips 29-49%, cottonseed hull 29-49%, bran 20%, gypsum 1%, and lime 1%.

2. *Pleurotus geesteranus* cultivation substrate, according to claim 1, is characterized by comprising the following raw materials in percentage by mass:  
30 reed chips 29%, cottonseed hull 49%, bran 20%, gypsum 1%, and lime 1%.

3. *Pleurotus geesteranus* cultivation substrate, according to claim 1, is characterized by comprising the following raw materials in percentage by mass: reed chips 39%, cottonseed hull 39%, bran 20%, gypsum 1%, and lime 1%.

5 4. *Pleurotus geesteranus* cultivation substrate, according to claim 1, is characterized by comprising the following raw materials in percentage by mass: reed chips 49%, cottonseed hull 29%, bran 20%, gypsum 1%, and lime 1%.

10 5. The preparation method of *Pleurotus geesteranus* cultivation substrate, according to claim 1 is characterized by comprising the following steps: (1) after harvesting, the reeds are sun-dried to the moisture of less than 10% and ground, and the reeds after the pulverization are screened with a 3 mm mesh to obtain reed chips for later use; (2) weigh reed chips in proportion, add water to full saturation, pre-wet for 1-15 days, and fully absorb water for softening, (3) weigh cottonseed hulls in proportion, add water to full saturation, pre-wet for 1 day, and fully absorb water; (4) weigh bran, gypsum and lime in proportion, mix  
15 them with the above-mentioned processed reed crumbs and cottonseed hulls, stir evenly, and adjust the water content of the cultivation substrate to be 62-65%; (5) Bagging and sterilizing: use 17 × 33 cm polypropylene bags, sterilize under high pressure at 121°C for 2.5 h.

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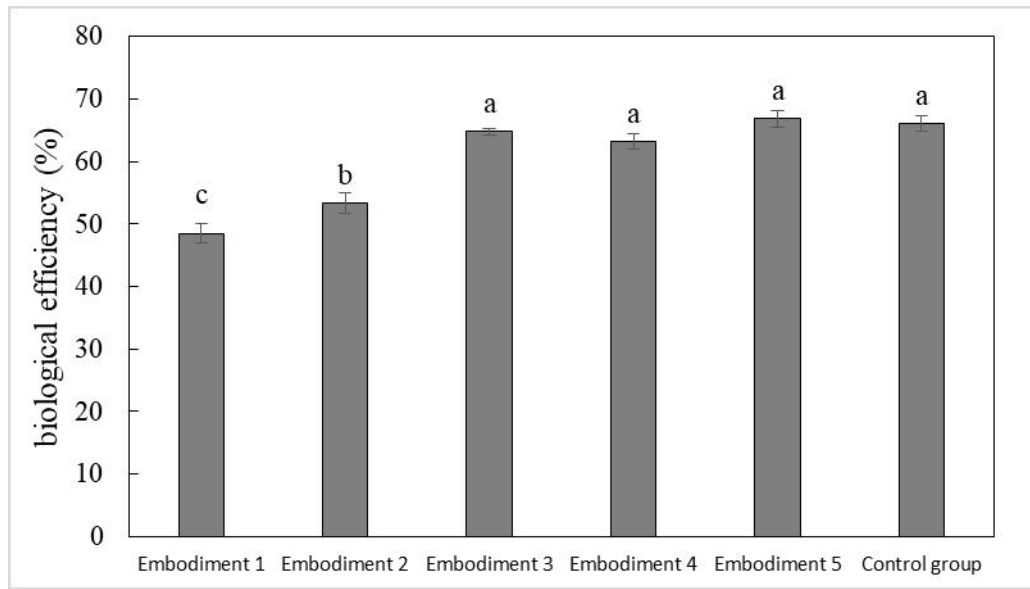
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**FIGURE**

5



**Figure 1**

10

## **ABSTRACT**

This invention provides *Pleurotus geesteranus* cultivation substrate and its preparation method, and the culture substrate consists of reed chips, cottonseed hull, bran, gypsum and lime in a certain proportion, its preparation method is described as follows: (1) harvesting reeds, drying in the sun, so that  
15 the dried reeds can be ground by a grinder and made into reed chips for later use; (2) weighing reed chips according to the proportion, adding water to full saturation, pre-wetting for 1-15 days to fully absorb water for softening; (3) weighing cottonseed hull according to the proportion, adding water to full saturation, and pre-wetting for 1 day to fully absorb water; (4) weighing bran,  
20 gypsum and lime in proportion, mixing them with the above-mentioned processed reed chips and cottonseed hulls, and stirring evenly; adjusting the water content of the cultivation substrate; (5) bagging with polypropylene bags, and sterilizing at high temperature and high pressure. This invention has reasonable compatibility and convenient to use, and can meet the growth requirements of *Pleurotus geesteranus*. Moreover, it can reduce pesticide pollution, lower production costs, and have better ecological and economic benefits, and help to promote the sustainable and healthy development of edible fungi industry.