Notice

DESCRIPTION CN221752470U

A rapid extraction kit for starch from small duckweed particles

---

一种浮萍小颗粒淀粉快速提取试剂盒

[0001]

Technical Field

技术领域

[n0001]

This utility model relates to the field of extraction device technology, and in particular to a rapid extraction kit for small starch particles from duckweed.

本实用新型涉及提取装置技术领域，尤其是涉及一种浮萍小颗粒淀粉快速提取试剂盒。

[0003]

Background Technology

背景技术

[n0002]

Duckweed is an ideal energy plant due to its high starch content and rapid reproduction rate; however, its starch granules are relatively small.

浮萍具有淀粉含量高，繁殖速度快等特点，是一种理想的能源植物，然而浮萍淀粉颗粒较小。

In the prior art, centrifuges are usually used to centrifuge starch solutions to remove impurities and extract starch. However, centrifugation requires repeated centrifugation steps to extract starch from the starch solution, and the starch may contain impurities, so the purity of the starch cannot be guaranteed.

现有技术中，通常使用离心机对淀粉溶液进行离心，从而去除掉淀粉中的杂质并提取淀粉，但是采用离心机进行离心需要多次重复进行离心步骤才能使淀粉从淀粉水溶液中提取出来，并且淀粉中可能含有杂质，不能保证淀粉的纯度。

[0005]

Utility Model Content

实用新型内容

[n0003]

The purpose of this invention is to provide a rapid extraction kit for small starch particles from duckweed. This kit can obtain high-quality starch in a short time without the need for a centrifuge, saving energy and eliminating the need for manual maintenance. It also avoids the

problem of centrifuge equipment malfunctioning, thus reducing costs. Furthermore, the kit is small in size, saving experimental space, and can quickly and conveniently remove impurities from the extracted starch.

本实用新型的目的是提供一种浮萍小颗粒淀粉快速提取试剂盒，本试剂盒可以在短时间内获得高质量淀粉，无需使用离心机，节约能源，无需人力维护，不会出现离心设备工作失效的情况，一方面可以降低成本，另一方面试剂盒体积小，节省实验空间，能够快速便捷除去所提取的淀粉中含有的杂质。

[n0004]

To achieve the above objectives, this utility model provides a rapid extraction kit for small starch particles from duckweed, comprising a kit body, wherein a grinding component, an extraction solution, and a purification device are placed inside the kit body. The purification device includes a pressurizing mechanism and a filtration mechanism. The filtration mechanism includes a first filtration component and a second filtration component. The first filtration component includes a first adsorption column, and a first filter membrane is provided at the bottom of the first adsorption column. The second filtration component includes a second adsorption column, and a second filter membrane is provided at the bottom of the second adsorption column.

为实现上述目的，本实用新型提供了一种浮萍小颗粒淀粉快速提取试剂盒，包括试剂盒本体，所述试剂盒本体内部放有研磨组件、提取液和纯化装置，所述纯化装置包括加压机构和过滤机构，所述过滤机构包括第一过滤组件和第二过滤组件，所述第一过滤组件包括第一吸附柱，所述第一吸附柱内部底端设有第一滤膜，所述第二过滤组件包括第二吸附柱，所述第二吸附柱内部底端设有第二滤膜。

[n0005]

Preferably, the pore size of the first filter membrane is larger than that of the second filter membrane.

优选的，所述第一滤膜的孔径大于所述第二滤膜的孔径大小。

[n0006]

Preferably, the pressurizing mechanism includes a piston, which is placed inside the tube.

优选的，所述加压机构包括活塞，所述活塞置于管筒内。

[n0007]

Preferably, a rubber ring is provided between the tube of the pressurizing mechanism and the first adsorption column.

优选的，所述加压机构的所述管筒与所述第一吸附柱之间设有橡胶圈。

[n0008]

Preferably, the first adsorption column is placed above the second adsorption column.

优选的，所述第一吸附柱置于所述第二吸附柱的上方。

[n0009]

Preferably, both the first adsorption column and the second adsorption column are provided with a discharge port at the bottom.

优选的，所述第一吸附柱与所述第二吸附柱的底部均设有出料口。

[n0010]

Preferably, the grinding component is a mortar and pestle.

优选的，所述研磨组件为研钵。

[n0011]

Therefore, this utility model adopts the above-mentioned rapid extraction kit for small starch particles of duckweed. This kit can obtain high-quality starch in a short time without the need for a centrifuge, saving energy. It does not require manual maintenance and will not experience the failure of centrifuge equipment. On the one hand, it can reduce costs, and on the other hand, the kit is small in size, saving experimental space and can quickly and conveniently remove impurities contained in the extracted starch.

因此，本实用新型采用上述一种浮萍小颗粒淀粉快速提取试剂盒，本试剂盒可以在短时间内获得高质量淀粉，无需使用离心机，节约能源，无需人力维护，不会出现离心设备工作失效的情况，一方面可以降低成本，另一方面试剂盒体积小，节省实验空间，能够快速便捷除去所提取的淀粉中含有的杂质。

[n0012]

The technical solution of this utility model will be further described in detail below with reference to the accompanying drawings and embodiments.

下面通过附图和实施例，对本实用新型的技术方案做进一步的详细描述。

[0016]

Attached Figure Description

附图说明

[n0013]

Figure 1 is a schematic diagram of the main structure of the reagent kit body of an embodiment of the rapid extraction kit for small starch particles of duckweed according to this utility model;

图1是本实用新型一种浮萍小颗粒淀粉快速提取试剂盒实施例的试剂盒本体结构示意图；

[n0014]

Figure 2 is a schematic diagram of the purification device structure of an embodiment of the rapid extraction kit for small starch particles of duckweed according to this utility model.

图2是本实用新型一种浮萍小颗粒淀粉快速提取试剂盒实施例的纯化装置结构示意图。

[n0015]

Figure Labels

附图标记

[n0016]

1. Piston; 2. Tube; 3. First adsorption column; 4. Second adsorption column; 5. Rubber ring; 6. First filter membrane; 7. Second filter membrane; 8. Reagent kit body.

1、活塞；2、管筒；3、第一吸附柱；4、第二吸附柱；5、橡胶圈；6、第一滤膜；7、第二滤膜；8、试剂盒本体。

[0021]

Detailed Implementation

具体实施方式

[n0017]

The technical solution of this utility model will be further described below with reference to the accompanying drawings and embodiments.

以下通过附图和实施例对本实用新型的技术方案作进一步说明。

[n0018]

Unless otherwise defined, the technical or scientific terms used in this invention shall have the ordinary meaning as understood by one of ordinary skill in the art to which this invention pertains.

除非另外定义，本实用新型使用的技术术语或者科学术语应当为本实用新型所属领域内具有一般技能的人士所理解的通常意义。

The terms "first," "second," and similar terms used in this invention do not indicate any order, quantity, or importance, but are merely used to distinguish different components.

本实用新型中使用的“第一”、“第二”以及类似的词语并不表示任何顺序、数量或者重要性，而只是用来区分不同的组成部分。

Words such as "include" or "contain" mean that the element or object preceding the word covers the element or object listed after the word and its equivalents, without excluding other elements or objects.

“包括”或者“包含”等类似的词语意指出现该词前面的元件或者物件涵盖出现在该词后面列举的元件或者物件及其等同，而不排除其他元件或者物件。

The word “connection” or “link” is not limited to physical or mechanical connections, but can include electrical connections, whether direct or indirect.

“连接”或者“相连”等类似的词语并非限定于物理的或者机械的连接，而是可以包括电性的连接，不管是直接的还是间接的。

"Up," "down," "left," and "right" are only used to indicate relative positional relationships. When the absolute position of the object being described changes, the relative positional relationship may also change accordingly.

“上”、“下”、“左”、“右”等仅用于表示相对位置关系，当被描述对象的绝对位置改变后，则该相对位置关系也可能相应地改变。

[n0019]

Example 1

实施例一

[n0020]

As shown in Figure 1, this utility model provides a rapid extraction kit for small starch particles from duckweed, including a kit body 8. The kit body 8 is made of paper, which is readily available and easy to process and handle.

如图1所示，本实用新型提供了一种浮萍小颗粒淀粉快速提取试剂盒，包括试剂盒本体8，试剂盒本体8为纸质材质，材料易得，且纸质材质便于加工和处理。

The reagent kit body 8 contains a grinding component, extraction solution, and purification device. The grinding component is used to grind the duckweed tissue to facilitate the thorough mixing of starch granules in the duckweed tissue.

试剂盒本体8内部放有研磨组件、提取液和纯化装置，研磨组件用于对浮萍组织进行研磨，便于将浮萍组织中的淀粉颗粒充分混合。

The extract is used to dissolve substances such as proteins in the duckweed powder that are soluble in the extract, thereby removing impurities such as proteins that are soluble in the extract.

提取液用于将浮萍粉末中的蛋白质等可溶解在提取液中的物质进行溶解，起到去除蛋白质等可溶解在提取液中的杂质的作用。

The purification device is used to filter the remaining solution layer by layer, as shown in Figure 2.

纯化装置用于逐层对剩余的溶液进行过滤，如图2所示。

[n0021]

The grinding component is a mortar and pestle, which is used to grind the duckweed tissue until no complete duckweed tissue is visible.

研磨组件为研钵，研钵用于对浮萍组织进行研磨，直至看不到完整的浮萍组织为止。

The purification device includes a pressurizing mechanism and a filtration mechanism. The pressurizing mechanism is used to provide pressure to the filtration mechanism to facilitate the downward filtration of the solution layer by layer.

纯化装置包括加压机构和过滤机构，加压机构用于对过滤机构提供压力，便于使溶液向下进行逐层过滤。

The filtration mechanism includes a first filtration component and a second filtration component. The first filtration component is used to perform a first filtration of the duckweed tissue extract, and the second filtration component is used to perform a second filtration of the duckweed tissue extract.

过滤机构包括第一过滤组件和第二过滤组件，第一过滤组件用于对浮萍组织提取液进行第一次过滤，第二过滤组件用于对浮萍组织提取液进行第二次过滤。

[n0022]

The first filtration assembly includes a first adsorption column 3, and a first filter membrane 6 is provided at the bottom of the first adsorption column 3. The first filter membrane 6 is used to remove large particulate impurities from the duckweed tissue extract.

第一过滤组件包括第一吸附柱3，第一吸附柱3内部底端设有第一滤膜6，第一滤膜6用于将浮萍组织提取液中的大颗粒杂质。

The second filtration assembly includes a second adsorption column 4. The bottom of the second adsorption column 4 is provided with a second filter membrane 7. The second filter membrane 7 is fixed in the first adsorption column 3 by a snap-fit. The second filter

membrane 7 is used to filter out starch. The waste liquid is directly discarded. The starch on the second filter membrane 7 is the final product. It can be removed with tweezers and the starch can be taken out.

第二过滤组件包括第二吸附柱4，第二吸附柱4内部底端设有第二滤膜7，第二滤膜7以卡扣的方式固定在第一吸附柱3内，第二滤膜7用于将淀粉滤出，废液直接丢弃，第二滤膜7上的即为最终产物淀粉，可用镊子将其取下并取出淀粉。

The pore size of the first filter membrane 6 is larger than that of the second filter membrane 7, which can prevent starch from being filtered out at the first filter membrane 6 and thus avoid waste.

第一滤膜6的孔径大于第二滤膜7的孔径大小，能够防止淀粉在第一滤膜6处被滤出，造成浪费。

The first adsorption column 3 is placed above the second adsorption column 4. Both the first adsorption column 3 and the second adsorption column 4 are provided with discharge ports at their bottoms. The discharge port of the first adsorption column 3 is used to discharge the extract containing starch but without large particulate impurities, and the discharge port of the second adsorption column 4 is used to discharge the waste liquid.

第一吸附柱3置于第二吸附柱4的上方，第一吸附柱3与第二吸附柱4的底部均设有出料口，第一吸附柱3的出料口用于排出含有淀粉但不含大颗粒杂质的提取液，第二吸附柱4的出料口用于排出废液。

[n0023]

A rubber ring 5 is provided between the tube 2 of the pressurizing mechanism and the first adsorption column 3. The rubber ring 5 is used to connect the pressurizing mechanism and the filtering mechanism and can prevent air leakage.

加压机构的管筒2与第一吸附柱3之间设有橡胶圈5，橡胶圈5用于连接加压机构和过滤机构，并且可防止漏气。

The pressurizing mechanism includes a piston 1, which is placed inside the tube 2. The piston 1 is used to apply downward pressure, which enables the extract to be filtered layer by layer.

加压机构包括活塞1，活塞1置于管筒2内，活塞1用于向下加压，能够使提取液逐层过滤。

[n0024]

Working principle: First, the filter mechanism is assembled. Then, the duckweed tissue is quick-frozen with liquid nitrogen. After quick-freezing, it is ground with a mortar and pestle until no complete duckweed tissue is visible, so that the starch granules are fully released.

工作原理：首先将过滤机构组装完成，之后先用液氮对浮萍组织进行速冻，速冻后使用研钵研磨，直至看不到完整的浮萍组织为止，使淀粉颗粒充分释放。

Then add the extract to the duckweed powder and mix thoroughly.

之后向浮萍粉末中加入提取液，充分混合。

Use a pipette to transfer the starch-containing extract into the first adsorption column 3. Fix the pressurizing mechanism above the first adsorption column 3 and manually press the piston 1 to apply pressure, so that the extract passes through the first filter membrane 6 to remove large particulate impurities in the extract. Then, the extract with impurities removed enters the second adsorption column 4. Under pressure, the extract passes through the second filter membrane 7, which filters out the starch and discards the waste liquid.

用移液枪将含有淀粉的提取液转移到第一吸附柱3内，将加压机构固定在第一吸附柱3上方，手动按动活塞1进行加压，使提取液穿过第一滤膜6将提取液中的大颗粒杂质去除掉，之后除去掉杂质的提取液进入第二吸附柱4内，在加压的作用下，提取液通过第二滤膜7，第二滤膜7将淀粉滤出，并将废液丢弃。

[n0025]

Therefore, this utility model adopts the above-mentioned rapid extraction kit for small starch particles of duckweed. This kit can obtain high-quality starch in a short time without the need for a centrifuge, saving energy. It does not require manual maintenance and will not experience the failure of centrifuge equipment. On the one hand, it can reduce costs, and on the other hand, the kit is small in size, saving experimental space and can quickly and conveniently remove impurities contained in the extracted starch.

因此，本实用新型采用上述一种浮萍小颗粒淀粉快速提取试剂盒，本试剂盒可以在短时间内获得高质量淀粉，无需使用离心机，节约能源，无需人力维护，不会出现离心设备工作失效的情况，一方面可以降低成本，另一方面试剂盒体积小，节省实验空间，能够快速便捷除去所提取的淀粉中含有的杂质。

[n0026]

Finally, it should be noted that the above embodiments are only used to illustrate the technical solution of this utility model and not to limit it. Although the utility model has been described in detail with reference to preferred embodiments, those skilled in the art should understand that modifications or equivalent substitutions can still be made to the technical solution of this utility model, and these modifications or equivalent substitutions cannot cause the modified technical solution to deviate from the spirit and scope of the technical solution of this utility model.

最后应说明的是：以上实施例仅用以说明本实用新型的技术方案而非对其进行限制，尽管参照较佳实施例对本实用新型进行了详细的说明，本领域的普通技术人员应当理解：其依然可以对本实用新型的技术方案进行修改或者等同替换，而这些修改或者等同替换亦不能使修改后的技术方案脱离本实用新型技术方案的精神和范围。