TO-156 • PT 1.2839
Institute of Bio- and Geosciences
Plant Sciences (IBG-2)

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Volume and porosity determination of bulk solids

The measurement of volume and porosity is particularly suitable for objects with an irregular shape or surface.

Technology Description

A method for determining volume and porosity by compressing and expanding a gas space in a closed measuring chamber by a membrane displacement. A type of acoustic volumeter.

Problem

Existing methods for determining volume and porosity have various disadvantages. Computer tomography is very time-consuming and expensive, gas volumeters require external inert gases and cannot measure porosity, and currently presented on the market acoustic volumeters only work in a small frequency range and cannot measure porosity. Optical methods and liquid displacement have low accuracies.

Solution

The alternating compression and expansion of air or any inert gas in a closed measuring chamber caused by the displacement of a membrane by applying a defined periodic force to it leads to the change in movements of the membrane when the chamber is empty or with a measured object inside. The volume or porosity of the object can be deduced from the measurement of this change. The porosity determination can be limited to the properties of the measured object itself. This method is simple, inexpensive, scalable, accurate, and flexible.

Potential Use

The invention can be used to determine the volume and porosity of objects with irregular surfaces or shapes and of bulk materials.

Development Status and Next Steps

The process has been tested and used on a laboratory scale, particularly for different seed varieties, and is currently being further developed for field trials. The wired, wireless, simple, and advanced versions were also tested at different levels.

Interesting for the following sectors
» Analytic

IP
WO2020125828A1
View on Espacenet

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Keywords
Volume, porosity, measurement

More Information
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As of 03/2024