Institut "Jožef Stefan" Ljubljana, Slovenija

TECHNOLOGY OFFER

SIMPLE AND ACCURATE MEASUREMENTS OF BIOCHEMICAL OXYGEN DEMAND IN ENVIRONMENTAL SAMPLES

Fields of use

Research and industry institutions involved in BOD measurements (e. g. biogas plants, waste / wastewater treatment facilities)

Current state of technology

The solution has been demonstrated and tested in the laboratory

Type of cooperation

License agreements and/or technical cooperation agreements with industry or research partners performing routine BOD measurements, commercial agreements for carrying out BOD measurements by request, manufacturing agreements with industry partners with the capacity for manufacturing the apparatus (e. g. plastics manufacturers).

Intellectual property

Patent application has been filed.

Contact

Jožef Stefan Institute,
Jamova cesta 39,
1000 Ljubljana,
Slovenija
Phone: + 386 1 47 73 224
E-mail: tehnologije@ijs.si
Web site: http://tehnologije.ijs.si/

Summary

An apparatus is presented which allows measurements of biochemical oxygen demand (BOD) based on gas pressure equalization. It may be used for simultaneous analysis of multiple solid or liquid samples of different volumes, and incubation temperatures, without pretreatment. It simplifies and reduces the costs of BOD determination.

Description of the invention

Biochemical oxygen demand (BOD) is the most widely used parameter for determining levels of organic pollution of wastewater and surface water. In the process of aerobic microbial degradation organic matter is converted into microbial biomass, H_2O, CO_2, and other trace gases whereas oxygen is consumed. The dynamics of oxygen consumption by microorganisms reflect the level of organic pollution. In most assays the tests are conducted on small volume laboratory scales, which do not necessarily reflect the full-scale reactor environments. Biomass and solid substrate particles are usually homogenized, reducing particle size, consequently affecting oxygen consumption. In addition, these solutions do not have sufficiently high through-put in order to analyze large numbers of samples.

The invention, based on pressure equalization, solves these problems by allowing for large-scale (up to 10 L) samples to be analyzed, with no need for homogenization of the sample. The apparatus is attached to an existing gas volume measuring device, and at the other end, connected to a sample container. As the oxygen in the sample is consumed, CO_2 is produced. The CO_2 is absorbed in a gas trapping unit, resulting in a gas pressure drop in the sample container. This pressure drop is transferred to the gas volume measuring device, which is, in turn, connected to an air inlet. The pressure drop causes air to be taken up by the gas volume measuring device (pressure equalization). From the amount of air taken up, the dynamics of oxygen consumption, and thus BOD, can be determined.

The technology is suitable for research and industry institutions involved in BOD measurements (e. g. biogas plants, waste / wastewater treatment facilities), expanding the range of parameters that can be measured, and consequently improving the monitoring and quality control processes.

Main Advantages

- technically simple; does not contain fine and sensitive components which often deteriorate and require regular servicing; reduces maintenance and majority of components are affordable
- large-volume samples (10 L or even greater) may be analyzed, giving results comparable to industry environments

KONZORCIJ ZA PRENOS TEHNOLOGIJ IZ JRO V GOSPODARSTVO

EUROPEAN UNION
EUROPEAN REGIONAL DEVELOPMENT FUND

REPUBLIC OF SLOVENIA
MINISTRY OF EDUCATION, SCIENCE AND SPORT

The investment is co-financed by the Republic of Slovenia and the European Union under the European Regional Development Fund.

Institut
"Jožef Stefan"
Ljubljana, Slovenija

- no pretreatment of samples is necessary
- applicable to both solid (e.g. soil) and liquid (e.g. waste-water) samples
- allows analysis of realistic samples, at various reactor volumes, and a range of incubation temperatures (from 4°C to 60°C) that may be regulated
- simultaneous measurements of several samples is possible
- apparatus may be connected to an existing gas volume measuring device, expanding its use, allowing for the possibility of determining several process parameters using the same apparatus within the same laboratory
- measurements may be short-term or long-term (two weeks or more)
- suitable for laboratory research and industrial use

KONZORCIJ ZA PRENOS TEHNOLOGIJ IZ JRO V GOSPODARSTVO

EUROPEAN UNION
EUROPEAN REGIONAL DEVELOPMENT FUND

REPUBLIC OF SLOVENIA
MINISTRY OF EDUCATION, SCIENCE AND SPORT

The investment is co-financed by the Republic of Slovenia and the European Union under the European Regional Development Fund.