

PROCEDURE FOR MODULAR DETECTION, MEASUREMENT AND MONITORING OF CO₂ Y O₂ FOR BIODEGRADATION REACTORS

DESCRIPTION OF THE INVENTION

This invention is applicable for the determination and monitoring of CO₂ or O₂ concentrations (in %) during biological tests. In particular, this invention was developed for the determination of the above mentioned gases when produced during biodegradation of different materials used for footwear and leather goods production, such as hides and leathers. Afterwards, said % is used to determine the % of biodegradability of aforementioned materials. Nevertheless, the invention is also applicable to any process resulting in CO₂ emissions and a reduction in the O₂ concentration, which can be detected by the sensors, according to their accuracy range.

Biodegradation can be determined through the measurement of CO₂ produced and/or O₂ reduced during the degradation of collagen, which is the major

constituent of the skin, by the action of microorganisms - present in the culture medium – that can be from different sources, such as waste water or pure culture.

This procedure allows the direct detection or continuous monitoring of the concentration of one or both gases (CO₂ and O₂). It involves a reaction unit comprised of a closed system of one-way air recirculation tubes and an aerator, which is immersed in the reaction container or flask. Open-system operation is possible when the gas concentration is high enough to be within the sensor detection range.

BUSINESS APLICATION SECTORS

This invention is applicable to those industries that may require the measurement, determination or monitoring of CO₂ and O₂ emission or consumption during microbiological tests.

- Microbiological processes using reactors, where CO₂ or O₂ levels should be monitored during testing.
- Biodegradation tests on organic materials using the % of CO₂ or O₂ as an indirect measure of the biodegradation % of a specific material in the following industrial sectors:
- Leather industries, in general.
- Plastic industries.
- Paper industries.
- Textile industries.

TECHNICAL ADVANTAGES AND BUSINESS BENEFITS

- One advantage of the system is the possibility to continuously monitor the CO₂ and O₂ concentration during the tests.
- This equipment is capable of registering the gas concentration, at regular time intervals set by the operator, within a range from 5 seconds to several hours between readings.
- The system allows reducing the time to quantify the degradation of a material, such as leather, paper or textile. Estimated testing time using this equipment is 30 to 35 days, in contrast with traditional methods (compost) that take about 180 days.
- The system includes software for the real-time display of CO₂ emission and O₂ consumption, which can be represented in graph view or tables, and then exported to Excel.
- The system allows for the simultaneous operation of 64 sensors, a number that can be increased according to the client's specific needs.
- The equipment allows performing degradation tests on a specific organic compound, both in a closed-system (low CO₂ emission) or in an opensystem (higher CO₂ emission), provided that the % is within the equipment detection range (0.1 to 5%).

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DEVELOPMENT STATUS OF THE TECNOLOGY

This procedure has been successfully tested in a pilot plant, where several biodegradation tests were carried out using a system with 18 sensors operating simultaneously.

INTELLECTUAL PROPERTY RIGHTS

This technology is protected by patent application.

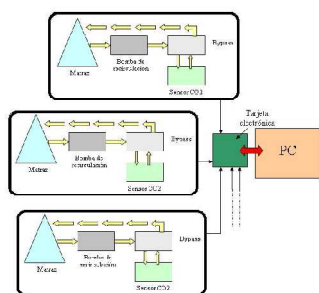
- Title: Procedure for modular detection, measurement and monitoring of CO₂ and O₂ concentrations for biodegradation reactors.
- Application Number: 201200663
- Application Date: 23/12/2013

COOPERATION SOUGHT

Companies interested in the following ways of cooperation:

- Patent licence agreement for the technology implementation and use.
- Cooperation agreement for the development of R&D project (technical cooperation) to conclude the development of the technology or transfer it to other sectors.

RELATED IMAGES



System Architecture



Testing in a pilot plant

CONTACT DATA

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