

Novel Greentech wet scrubber for purifying discharge air from organic waste – improved efficiency

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Technical Field

Agro-industry
Environmental technology

Business opportunity

Licensing opportunity

Current state of technology

A wet scrubber prototype has been developed and tested to clean the discharge air from a pig barn. The prototype is still undergoing testing. However preliminary performance tests have shown promising efficiencies:

- Reduction of ammonia concentration: Ca. 80% (down to about 200 OUE/m³)
- Reduction of dust concentration: > 90%.

Applications

- Animal houses
- Biogas plants
- Composting plants
- Municipal waste treatment plants and other waste treatment facilities.

Advantages

- Use of recycled water reduces the water consumption to the minimum
- The pollutants are treated by biological processes and with no use of chemical additives ctr. competitive products
- Flexible installation possibilities
- Low water/air ratio.

Commercial Value

Ammonia emission has been one of major environmental issues in the last decades. Estimates indicates that total ammonia emission from Danish pig and poultry houses, to the surroundings, amounts to about one third of the total nitrogen loss from livestock manure.

Buffer zone requirement concerning the odour nuisance from animal houses has strong influence on the development of the countryside, i.e. development of agricultural structure, content and implementation of zone plans and regulations. Dust from livestock buildings contains from 5.000 to 10.000 ppm (mass basis) of ammonia^{*1} and a large number of odorous components^{*2}.

In the vicinity of animal production facilities in the USA, increased frequencies of health symptoms, i.e. irritations in nose, eyes and throat, respiratory disorders, headaches and drowsiness, have been reported^{*5, 6} - symptoms likely to be induced by odour annoyances^{*7}, which in turn, is affected by odour emissions and transport.

Consequently, effective and practical applicable methods for the reduction of the odour, ammonia and dust emissions from livestock buildings are highly desirable and calls the need for new and advanced technologies.

The Technology

The unique Greentech wet scrubber consists of scrubber units and a central water treatment unit. The scrubber removes pollutants from the discharge air and transform/decompose them to biomass, water, CO₂ and N₂ by means of biological processes. The unique two unit design allows a very flexible installation, which improves stability and applicability of the system compared to other bio scrubbers on the market.

In addition treatment capacity per m³ water is many folds greater than comparable scrubbers - a unique and important feature when a large amount of air is needed to be purified, like the case for cleaning of exhaust air from animal houses.

Disadvantages of bio scrubbers in general are that they are only suitable for use in treatment of gasses, which comprises compounds having a high solubility in water. The present invention solves this problem by its intelligent design carefully controlling the pH. Finally, the present innovation doesn't produce chemical waste and requires only limited amount of water. All liquid absorbing agent is purified to such an extent that reuse of the agent is possible allowing no spent absorbing agent to be disposed.

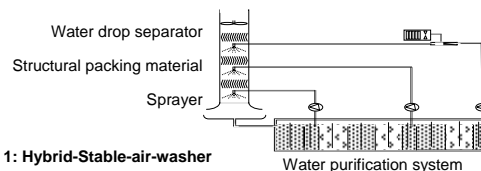


Figure 1: Hybrid-Stable-air-washer

Intellectual Property Rights

The Technology (Patent application number 2008 00694 filed May 20 2008) is owned by Tamagawa University, Japan and Aarhus University, Denmark.

Inventors

The current invention is a product of a Japan-Denmark collaboration.

Dr. Ogawa is a leading scientist in the field of waste water management technology in Japan.

The Danish group has long been working with environmental issues, particularly with technologies to reduce ammonia and dust emission from agriculture.

❖ **Jan Johnsen**, Institute of Agricultural Engineering, University of Aarhus

An agricultural Engineer with many years experience with experimental studies, a variety of measuring methods and instrument development within the research field of agricultural buildings and environment.

❖ **Steffen G. Christensen**, Institute of Agricultural Engineering, University of Aarhus

Master cabinetmaker: A skilled and creative physical-model builder, who has many years experience with developing and building physical models and experimental setups.

❖ **Peter Ravn**, Institute of Public Health, University of Aarhus

B.S. in Mechanical Engineering: Specialist in measuring methods and instruments. Vast knowledge on and experience with measurement and analyses of ventilation systems, airflow, energy, noise etc.

❖ **Preben Jensen Dahl**, Institute of Agricultural Engineering, University of Aarhus

B.S. in Chemical Engineering with vast knowledge about analytical methods and chemical process engineering.

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Ph.D. in Agricultural Engineering. Senior scientist. Research areas: Work environment, air quality, gas and dust emission control in animal houses.

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PhD in Agricultural Chemistry. Associate professor. Specialist in waste water treatment. Wide knowledge about the applied chemistry.

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