



FAO European Cooperative  
Research Network



## **Recycling of Agricultural, Municipal and Industrial Residues in Agriculture**

Network Coordinator: José Martinez, Cemagref, Rennes (France)

### **RAMIRAN 2002**

**Proceedings of the 10<sup>th</sup> International Conference  
of the RAMIRAN Network**

**General Theme: Hygiene Safety**

**Štrbské Pleso, High Tatras, Slovak Republic  
May 14 - 18, 2002**

**Edited by Ján Venglovský and Gertruda Gréserová**

ISBN 80-88985-68-4



University of Veterinary Medicine  
Research Institute of Veterinary Medicine  
Hlinkova 1/A  
040 01 Košice  
Slovak Republic

## PERFORMANCES OF A NOVEL SYSTEM FOR DRYING LAYING HENS MANURE WITHOUT EXOGENOUS HEATING SUPPLY

*Fabrice GUIZIOU, Pascal PEU & Christophe GUILCHER*

*Cemagref, Livestock and municipal waste management research unit  
Rennes Regional Center - 17, Avenue de Cucillé - CS 64427,  
F - 35044 Rennes cedex.*

*Tel. + 33 (0) 223 48 21 36*

*Fax + 33 (0) 223 48 21 15*

*E-mail : fabrice.guiziou@cemagref.fr*

A new concept to optimise manure management in eggs production farms was developed. It consists in using exhaust air from hens building as drying air flux. Droppings were collected on belts under animals and were moved out of the building twice a day. These droppings were mixed with dried manure obtained during a previous sequence, to achieve a manure dry matter of 50% and a well-structured product to maintain large air porosity. The mixed material was disposed in bed layer of 0.25 m. deep on a floor which allows at once, (i) an upward ventilation using exhaust air from hens building, and (ii) a downward extraction of dried manure.

To achieve high performances, the drying system was designed with at least 1.4 m<sup>2</sup> of floor for 1000 animals, and a ventilation rate between 0.9 and 2.6 m<sup>3</sup>.h<sup>-1</sup> per animal.

To quantify the performances of this new system, as regards as the quality of end product and the impact on the air pollution, sampling strategy of manure and gas was developed (mass balance); samples of solids were analysed to determine Dry Matter, Ashes, Total Organic and Ammonium Nitrogen contents. Gas samples were analysed on Ammonia content. The drying system (40 m<sup>2</sup>) was settled on a weighing equipment, which allowed determination of masses for the different steps of the process and the kinetics of drying sequences. Air parameters (Relative Humidity, Temperature and velocity) at different points of the process were continuously recorded on data logger.

Observations carried out during contrasted meteorological seasons showed an hourly vaporisation potential of 3 kg H<sub>2</sub>O.m<sup>-2</sup>.h<sup>-1</sup>, which reached to approximately 70 kg H<sub>2</sub>O.m<sup>-2</sup>.d<sup>-1</sup> (22 hours working).

After drying, manure dry matter content is close 80%, which authorise new long time storage without any significant biological activity, or an utilisation as new fertiliser away from farm. In optimised conditions ammonia emissions can be reduce to 60.10<sup>-3</sup> kg of N-NH<sub>3</sub> per animal and per year. Economical considerations led to conclude to a total cost less than 0.4 € per animal and per year.