Practical use research on sewage sludge carbonization technology to secure phosphoric acid fertilizer raw material

Whole term	2006.3～2007.3	

(Research Background)

A carbonization of sludge at relatively low temperature was selected as promising among many proposals called for by Gunma Prefecture and a new research project was initiated for the demonstration and improvement in the fiscal year of 2002. As the result, it was confirmed that the sludge carbonated at the temperature of a. 500℃ contains the C-P_2O_5 as well as the phosphorus soluble and of the other miscellaneous kinds, by 5% or more in total. This is equivalent to the melted phosphoric silicates), raw material of fertilizers. Moreover, the problem of tar, which retards the plant growth, could be solved by the sludge carbonization method, adopting two-step carbonization system which consists of carbonization and tar removal processes.

At the 2nd technological committee in the fiscal year of 2005, the two-step system was conceived as innovative method to produce phosphates out of sewage sludge and selected for the technology applicable to the governmental promoting system of innovative sewerage of new generation (category of function upgrading by means of new technologies).

※. C-P_2O_5 is phosphoric acid (fertilizer element) that melts by the citric acid 2% liquid.

(Technological outline)

The two-step sludge carbonization system aims for tar separation/removal as well as usual carbonization. The gas exhausted from the carbonization furnace is burned in the complete combustion furnace and conveyed to the heat exchange process to utilize the heat energy and to save the fuel for drying sludge. Dust, dioxin and other harmful substances contained in the exhausted gas are removed in the gas processing facility in order to fulfill the environmental regulation.

This system has the following features:

○C-P_2O_5 which is easily available for plants could be obtained from sludge effectively.

○The products are excellent in handling in that they are light-weighted and free from odor and decay.

(Research purpose)

This research is conducted in cooperation with Gunma Prefecture in order to set the parameters and demonstrate the practical function of the two-step sludge carbonization system. The demonstration project was started in the fiscal year of 2006, on the basis of the program formulated in the previous year.

(Research item)

Establishment of the optimum conditions of basic facility and operating systems

Investigation of the seasonal variation of the quality of dewatered sludge and carbonated sludge product

Evaluation of the difficulty of operation/maintenance and the environmental impact assessment

Economic analysis of the system

(Schedule for the future)

Demonstration experiment initiated in April, 2006 is conducted for the purpose of acquiring the data of 4 seasons so that the result may be reported at the beginning of the fiscal year of 2007

Collaborators : Gunma Prefecture and JIWET

Researchers : Nobuyuki Horie, Masahiro Kabata, Takashi Masuta, Toshiyuki Unishi and Shigeru Ikarugi

key words	two step carbonization system of "Tar removal Carbonization" the C solubleness phosphorus