Research on the evaluation of the performances of the sewage sludge desiccation using oil-temperature and pressure reduction		
Whole term	1996. 4~ 2004.3	

(Purpose)

Followed by the increase of sludge from Mikasagawa Purification Center in 1981, the future sludge treatment and disposal were evaluated. The disposal methods were ocean disposal, landfilling and utilization as compost. However, because of the prohibition of ocean disposal and the shortage of landfill areas, perpetual treatment and disposal were not possible. Therefore, the pyrolysis/gasification and sludge desiccation system that would aim to reduce and utilize sludge effectively were decided to be installed for perpetual treatment and disposal.

After mixing sewage-dewatered sludge with medium oil (wasted edible oil from hotels and restaurants); the pressure reducing- dryer that heats by reducing pressure, desiccates sludge within a short time. The dried sludge (sludge dried by the oil-temperature) could be effectively utilized as a supplement for the combustion in cement factories or as fertilizer. This study was conducted on the oil-temperature- pressure reducing-dryer constructed at Mikasagawa Purification Center, Fukuoka Prefecture.

(Results)

1) Water content of the sludge dried by the oil-temperature was 3 % over a year and drying efficiency was stable.
2) Water content of the dried sludge was below 3 % and the calorific value was high as 20,000 kJ/kg
3) The desiccating efficiency was not affected by the characteristics of the medium oil. Though the re-separated medium oil mixed with dewatered sludge was acidic, the viscosity and the solid content rose together.
4) The utilities were electricity, medium oil, kerosene, water supply, chemicals and etc. The most influencing item were kerosene and the heat source of the boiler; however the digestion gas could be partly used as a substitute for the kerosene.
5) The utility cost was ￥4,000 per 1 ton of dried sludge that made it possible to reduce half the cost, as compared to the case which does not use the digestion gas.
6) In case of the usage as a heat energy source, supplement of cement for combustion, substitution for fossil fuel; CO_2 reduction was very high.
7) The sludge dried by the oil-temperature could generate heat and fire. Therefore, an appropriate maintenance would be required.
8) The demanded quantity, required characteristics, cost and reduction in greenhouse gas in each effective type of utilization are summarized in the table below.

	Use to Agricultural and grasslands	Use to Heat energy	Cement and supplement for combustion
Method for effective use	Supplement for fermentation, fertilizer	Substitution for fossil fuel	Raw material supplement for fuel
Demand at present	○	○	○
Location of Demander	△	△	△
Condition of demand (Receivable Price)	△	◎	△
Receivable characteristic	△	○	○
Types of demander	◎	◎	◎
Stability of demander	mid-term : △ long-term : △	mid-term : ○ long-term : △	mid-term : ○ long-term : △
Effectiveness for CO_2 reduction	△	◎	○
Total evaluation	△	◎	○

(Future task)

Information of this research will be summarized as a document on the evaluation of the performance, and it is expected that this system could be used extensively.

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Keywords	Desiccation using oil-temperature and pressure reduction, Tenpura, Substitution of fuel, CO_2, Dried sludge, Effective use