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BIOGAS PROJECT
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PARASITES OF HEALTH SIGNIFICANCE
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Background :

Where sludge is to be applied to the soil, particularly on land used for growing edible crops that are eaten raw, disinfection of the sludge is important.

Digestion is effective in reducing the number of pathogens but will not necessarily eliminate them completely. The ova of parasitic worms and the cysts of protozoa may be particularly troublesome, since they can survive for long periods of time.

From a public health stand point, the problem of the potential for human or animal disease as a result of parasites being transmitted from improperly managed municipal sludge is probably the most important. It is expected that sewage sludge applied to the land surface or incorporated into the soil must receive pretreatment in order to provide protection of public health.

Natural environmental conditions will reduce the density of microorganisms. A number of factors, such as sunlight, soil moisture and temperature, affect the persistence of the organisms and the ability to survive. Bacteria, protozoa and viruses generally are inactivated in a few days to a few months but helminth ova, under conditions of high moisture and shade, could survive several years. Air drying of digested sludge reduces the number of pathogens but cannot ensure complete safety. Heat drying of either digested or fresh sludges is virtually the only process that ensures complete disinfection. However, the cost of the process

is so high that its use is seldom justified. Chlorine can be used to disinfect sludge. However, the dose must be high and the sludge must be well digested and homogenized to permit access of the chlorine to all the pathogens.

However, the improper use of contaminated sludge results in worm infestations and protozoal infections.

Objectives :

- * Isolation and identification of the prevailing ova of parasitic worms and cysts of protozoa before and after the digestion of the sludge.
- * Application of the most suitable inactivation methods for irradiation of these pathogens both under the laboratory and field conditions.

Methodology :

- I- Isolation and identification of ova of parasitic worms and cysts of protozoa.
1. Collection of samples : Samples from inlets and outlets of the digestors were collected at regular intervals.
 2. Processing of the collected samples for examination
 - a- Direct (unpreserved) film
 - b- Preserved stained film :
 - Faust's iron Haematoxyline stain
 - Velat, Weinstein and otto stain
 3. Concentration-Floatation Techniques
 - a- Zinc sulphate centrifugal-floatation
 - b- Saturated common salt solution technique.
 4. Quantitative Egg-count techniques
 - a- Stoll's dilution egg count technique
 - b- MacMaster's egg count technique.

5. Faecal cultures techniques : sludge samples were cultured to mature the ova of helminth to larvae which harvested by Baermann apparatus.

II. The viability and infectivity of the detected ova and cysts are examined both in vitro and in vivo.

Results

A. Manawat Digester (Month : Feb.)

Table 1 : Parasites of Veterinary and Medical Importance detected through the sludge

Source	Parasite	Stage	Number/gm
Inlet	Paramphistomum sp.	Ova	4 E.P.G.
Outlet	" "	Ova	2 E.P.G.
Inlet	Ascaris lumbricoides	Ova	6 E.P.G.
Outlet	" "	Ova	6 E.P.G.
Inlet	Trichostrongylus sp.	Ova	4 E.P.G.
Outlet	" "	Ova	1 E.P.G.
Inlet	Eimeria spp.	Oocyst	12 O.P.G.
Outlet	" "	Oocyst	8 O.P.G.

E.P.G. = egg per gramme

O.P.G. = cocyst per gramme

B. NRC Extension site Digester (Month : Feb.)

Table II : Parasites of Veterinary Importance detected through the sludge

Source	Parasite	Stage	Number/gm
Inlet	Trichostrongylus sp.	Larvae	4 L.P.G.
Outlet	" "	-----	-----
Inlet	Eimeria sp.	Oocyst	20 O.P.G.
Outlet	" "	oocyst	8 O.P.G.

L.P.G. = Larvae per gramme
O.P.G. = oocyste per gramme

Proposed future plan of work

- 1- Study the effect of some physical factors and chemical agents on the viability and infectivity of ova of worms and protozoa cysts.
- 2- Study the effect of these inactivation methods on the bacterial flora of the sludge.