

exploite the microorganisms responsible for suppression in biotechnological venture as soil-borne diseases are only partially controlled by the pesticides available. Some forms of disease-suppressiveness may be due to non pathogenic fungi (*Phialophora*, *Fusarium*, *Trichoderma*) or to root colonizing fluorescent pseudomonads. The latter are an important factor of the suppressive capacity of soils against black root rot caused by *Thielaviopsis basicola*. These soils extend over a distinct geological area of 22 km² near Payerne, Switzerland. The actual knowledge will be discussed.

Microbiological processes in urban wastes management

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Among the multiple processes which can take part in a waste management system, several are controlled by microorganisms; these include landfill disposal, which will undergo a slow biological oxidation, either aerobic or anaerobic; composting, i.e. optimized, aerobic and mainly thermophilic decomposition of solids; biological depuration (activated sludge or microbial beds), allowing the aerobic decomposition of dissolved organic pollutants; methanogenic digestion, i.e. anaerobic decomposition of suspended and dissolved organic matter allowing recuperation of biogas. Further processes could be involved, including the microbial oxidation of gases and volatile compounds occurring in the soil layers covering a landfill or in soil filters. The choice of a biological process in waste management should take into account the importance of recycling organic matter for humus regeneration in soils, the possible material and energy recuperation, as well as the negative effects of conventional systems on the environment. Two strategies including biological steps are discussed: one is centered on an optimized landfill disposal, with possible recuperation of gas and later of stabilized humus; the other implies intensive digestion of the organic fraction of waste combined with sewage sludge.

Modified 'Chalmer', a new medium for the enumeration (of the total) lactic acid bacteria among competitive flora

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The commercialized media used at present for the enumeration of the lactic acid bacteria have two defects:

- a) They are inhibitory for some species due to the presence of substrates like acetic acid, sodium acetate, etc.
- b) They permit growth at certain nonlactic acid bacteria like *Bacillus* or *Micrococcus*, not differentiated by characteristic colony types.

The modified Chalmer medium contains no inhibitors for the gram +ve flora and allows distinction of lactic from nonlactic flora, by characteristic colony types which do not need additional confirmatory tests as the confirmation rate is 100%. Its repeatability is very satisfactory.

It can be used for the detection and enumeration of the total lactic acid bacteria in acidified dairy products and fermented meat products.

Measurement of virus inactivation in the environment

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Survival of viruses in the environment is an important factor for human and animal health. We were specially interested in the question whether sludge fertilizer still contains infectious virus, and to what extent sludge treatment may reduce this risk. We measured inactivation of the model virus bacteriophage f2,

which in many respects resembles enterovirus and shows extraordinary heat stability. The virions were adsorbed to electro-positive filters, sandwiched between two inert filter membranes with pores smaller than the virus diameter, and exposed within filter holders with openings instead of inlet and outlet connections. After exposition, the surviving fraction was eluted and determined by plaque counting.

Aerobic thermophilic predigestion of sludge at 60°C led to a virus titer reduction of $5.9 \pm 1.15 \log 10$ units per h, thermophilic anaerobic digestion at 52–55°C reduced 0.54–3.28 log 10 units per h, whereas mesophilic anaerobic digestion at 35°C inactivated only between 0.53 and 2.33 log 10 units per day.

Similar inactivation studies with human and animal viruses, i.e. rota- and parvoviruses are in progress.

Rapid enumeration of *Escherichia coli* type 1 in water and foods by a membrane filter method

Arbeitsgruppe Mikrobiologie der Lebensmittelkontrolle Nordwestschweiz (corresponding author: T. Burki, Labor für Lebensmittelhygiene, Aarau)

A membrane filter method for the enumerating of *Escherichia coli* type 1 in water and foods is described. After a preincubation period of 2–4 h at 37°C or over night at 20°C on trypticase soy agar the membrane is transferred to ECD agar for an additional 12–24 h incubation at 44°C. *Escherichia coli* colonies are identified by a positive indole test performed directly on the membrane.

Rapid enumeration of microorganisms in foods by the direct epifluorescent filter technique (DEFT)

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Membrane filtration and epifluorescence microscopy were used for the direct enumeration of bacteria in meat- and dairy products, vegetables, pastries and drinking water. The different homogenized food samples could be filtered after employing varying surfactants and enzyme mixtures.

Fresh and pasteurized products showed good correlation between the direct and the colony counts.

Limulus-amebocytes-lysate (LAL) tests with foods

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Three different micromethods of the LAL-test, i.e. the capillar, microplate and chromogene test for the rapid determination of the amount of gram-negative bacteria in perishable foodstuffs were compared with respect to their practical applicability.

All three micromethods showed comparable and reproducible results when applied to pure cultures or to various fresh foods such as lettuce, minced meat, poultry carcasses, etc., and also to natural, carbon-free mineral water. A relatively good correlation existed between the endotoxin contents and the number of colonies of gram-negative bacteria down to the amounts of 10^3 – 10^4 g⁻¹. At low colony counts, unknown interference factors which may originate from the products, have to be taken into account.

Microbial desulfonation of multisubstituted naphthalene sulfonic acids

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Sulfonated aromatics, e.g. dyestuffs and their metabolites, are observed to be about 10% of the organic pollutants of the river