Production of industrially important enzymes and microbial lipids from biomass of Municipal Solid Wastes (MSW) in Bangladesh

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Introduction: Municipal Solid Wastes (MSW) in developing countries is usually dumped in open field resulting environmental pollution and public health hazards. Methane, the second prevalent greenhouse gas having impact on climate change over 20 times greater than carbon dioxide is emitted from the rotten MSW. Organic part which is almost 70-80% of MSW can be converted to bioresources to mitigate the climate change and environmental pollution.

Objective: To produce industrially important enzymes and microbial lipids from biomass of MSW.

Methodology: We have isolated and identified proteolytic and cellulolytic bateria and fungi from MSW, cowdung and sea sands. We have successfully used MSW as raw materials in the bioreactor for production of industrially important protease and cellulase enzymes from bacterial and fungal isolates and microbial lipids from oliagenous yeast *Lipomyces starkeyi*. The enzymes were purified and characterized.

Results: Amount of accumulated lipids of *L. starkeyi* grown in MSW hydrolysate media under optimal conditions was ~45% (v/w) of dry biomass of the yeast cells. Gas chromatographic analysis revealed that this lipid was composed of saturated and unsaturated fatty acids. The fatty acid composition of this microbial lipid is similar to that of vegetable oils.

Discussion: Our study indicates that organic MSW might be a valuable alternative feedstock for production of microbial lipids and industrially important enzymes.