



Biodegradation of Plastics using *Bacillus subtilis*

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Abstract : *Plastics are among the most engineered materials and have encountered huge growth in both usage and adaptation. Though plastics can be degraded by various processes their degradation by physical and chemical means leads to innumerable environmental hazards and various kinds of pollution. Degradation of plastics using microorganisms appears to be more effective, considering the fact that microbes are abundant in the environment and their specificity in attacking plastics is relatively high. This study introspected the degrading ability of *Bacillus subtilis* isolated from the dumped soil of Patna, Bihar. Various microbial species produce surface active compounds called as Bio surfactants which has capacity*

*to increase the degradation process. Pre-treatment of plastic films with Ultraviolet light aids its accessibility for the microorganisms as their sole carbon source, thus enabling a much faster rate of biodegradation. Inoculation of pre-treated polyethylene films of thickness 18 micron and 41 microns with *Bacillus subtilis* in addition to its bio surfactant proved to be most efficient with a weight loss percentage of 41.6% and 27.14% respectively in 40 days.*

Keywords: *Plastic, Biodegradability, Bio surfactant, Microorganisms.*

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Introduction:

The word 'plastic' is derived from the Greek word "plastikos", that means able to be moulded into various shapes and sizes. Polyethylene (PE) trash found in the environment is one of the most common problem observed in both urban and rural areas. This is because majority of the PE wastes cannot be recycled even with the help of modern technology. In the last few decades there has been an increasing rise in plastic wastes entering into the municipal solid waste streams. The worldwide utility of polyethylene is expanding at a rate of 12% annum and approximately 140 million tons of synthetic polymers are produced worldwide each year (Shimao M., 2001). These plastic wastes are responsible for causing serious health problems to