A Study of bacterial flora of a transit landfill

S KARTHIK NARAYAN, DR. V. JANAHIRAMAN

Research Scholar, SSSUTMS, SEHORE, MP

Research Guide, SSSUTMS, SEHORE, MP

Abstract

Soil is a living biological system in which millions of microorganisms play a silent but dynamic role that leads to agricultural productivity. Prior to the 1940s, research into these soil microbes was limited to specific groups and genera, and was considered important from the agricultural point of view because it directly contributed to soil fertility. The most important members of the soil bacteria were Azotobacter. Thiaoblum and autotrophic nitrifiers, while phytopathogens such as Agrobacterium. In India, soil microbiology is a neglected science. Our knowledge of these microorganisms is based primarily on working in other countries, because we view our country as very large and the climatic and agronomic conditions are in contrast to other countries. There is still much work to be done to understand the microbiology of soil types from India.

Keyword: Bacteria, Sustainable biosphere, nutrients

Introduction

Soil microorganisms are increasingly becoming an important source in the search for molecules of industrial importance. The extent of microbial diversity in nature is still largely unknown, so there may be much more useful products for identifying soil microorganisms. In soil, 80 to 99% of microorganisms remain unknown, while it is known that these biological communities play a dominant role in maintaining a sustainable biosphere. Today, the academic and industrial interest in soil bacteria (due to its multiple advantages over other microorganisms) is increasing and trying to derive these unique biologically active metabolites and their new commercially important products. Bacteria occur in different ecological habitats. They are considered valuable because they are used in fermentation processes, both in the production of butter and cheese, and in the manufacture of chemicals such as ethanol, acetone, organic acids and enzymes, perfumes, etc., various antibiotics, vaccines. , Steroids and other therapeutically useful compounds with a variety of biological activities. Therefore, there is an immense potential for detecting efficient bacterial strains in landfills with valuable applications. In order to meet the demand for new organisms with unique enzyme / molecular production properties for industrial applications and waste removal, constant attempts have been made to isolate new bacteria from different environments. As a result, the present study aimed to study

bacterial strains in landfills with the ultimate goal of degrading waste and discovering new bioactive compounds for industrial applications.

Material and Methods

The means of cultivating and isolating soil-filled bacteria from waste and wastewater were of various types (due to specific nutrients and other needs), ie DNA, Blood Agar, Jensenagar, Agar Kings B, Tetrazolium Medium, Mac ConkeyAgar. Agar 88, TDA, SL rhodium, CRYEMA, KF agar, thioglycolate broth, deoxy-chocolate citrate agarate and other selective and enrichment media. The incubation was generally carried out in SyC. In some cases, anaerobic cultures were produced. The standard methods used were those of Holt and Sharma. Morphology, flogging, sporulation, colony characteristics, staining, O2 requirements and biochemical assays, particularly IMViC assays and fermentation assays, were used to identify the bacteria according to the methods described by Cowan and Steel, Ainsworth and Cappucino and Sherman (2004). If required, Stoke cultures, broth cultures and gelatin peaks were also used.

RESULTS AND DISCUSSION

It was observed that the total number of bacteria was 5.9 x 1 G CFU / GM. Twenty-three bacterial genera from 29 identified species were isolated from soils, which were covered with waste, manure, debris, contaminated biomedical wastes, faeces, and sludge deposited in the Abu drainage (Table 1). Bajpayee (2004) estimated the amount of Meerut's solid waste to be 650 tonnes / day, of which 20 out of a total of 20 tonnes / day were at the transit unloading point. This frustrated the cleanliness of the environment and the health of the people who lived nearby. The bacterial flora inventory at this site was created due to the lack of such information at the local level and the impact of the study on health. Table 1 clearly shows that the bacterial flora can be divided into (1) agricultural importance and (2) medically significant.

Xanthomonas sp. From agricultural waste, X. citri, X. oryzae, known incentives for citrus fruits and mildew of bacteria were isolated on the paddy field. Erwinia ceratowora and E. amylovora cause soft rot in vegetable and fruit burns (Sharma, 2005). Rhizobium meliloti forms root tubers with peas and increases soil fertility, while Azorhizibium forms nitrogen-fixing tubers on the Sesbania strain. Strains of Bacillus firmus and Brevibacillus isolated in the present study have already been used in the biological treatment of potato fungal pathogens such as Fusarium, Altemaria, Rhizoctonia and Pythium sp. (Panwar et al., 2006). Enterobacter strain KH-7 has been shown to control dry rot in potatoes (Panwar et al., 2004). Clostridia are equally important in agriculture. Vemna and. al. (1999) reported that Clostridia was a trigger of root rot in potatoes. Rastonia had no value as a biological control agent (Panwar et al., 2006). The isolated Thiobacillus f / 7 / opart / s in this study is a sulfur-oxidizing bacterium. It is known for the formation of deposits that can

corrode the water pipes of the cooling towers of thermal power plants (Little et al., 1991). Flavobacterium is also important in agriculture. Most of the bacteria reported in this survey are gram-negative and of medical importance. Alkalis, Clostridium !, Escherichia, Helicobacter, Klebsiella, Proteus and Pseudomonas (both important medical and agricultural) are some of these cases.

Gram-negative enterobacteria, Escherichia coli and Klebsiella, Salmonella and Pseudomonas species are of already known medical importance (Turk et al., 1983). Similarly, staphylococci, streptococci, clostridia and salmonellosis are important foodborne intoxications and well described in the literature. Staphylococcus is usually associated with burns and causes folliculitis, anthrocytes and impetigo in the skin. S. aureus is also responsible for bacterial endocarditis and osteomyelitis. Acne, fibrosis, septic arthritis and sepsis are other notable diseases. Streptococcus pyrogens causes an infection in the pharynx while Clostridium perfringens is the cause of gaseous gangrene. Helicobacter pylori is a clear cause of stomach problems and causes gastric and duodenal ulcers. Pseudomonas aeruginosa can cause burns and cystic fibrosis in addition to increasing yields. Fecal coliforms and fecal streptococci are equally important. Commensal Escherichia coli can also become pathogenic (Harsh Mohan, 2005). Therefore, it is clear that current research is important for the current knowledge in Meerut, for the agricultural and biomedical consequences and for the public awareness of the dangers of solid waste. Therefore, measures to improve the cleanliness of the environment are important.

References

Ainsworth, G.C. 1974. *PlantJ^athologists Pocket Books.* CM!, England, pp. 26-28.

Cowan, S.T. and K.J. Steel 1965. *Manual for the identification of Medical Bacteria.* University Press, Cambridge. Bajpayee, Laxmiiont 2004. 77mes *of India.* IS'" June, 2004.

Cappucino, J.G. and N. Sherman 2004. *Microbiology: A Laboratory Handbooks'^* edition. Pearson Education Pvt. Ltd. Singapore.

Chaudiiary, Reeta 2005. Ecological and Management studies of microflora associated with garbage in Meerut. Ph.D Thesis, CCS. University, Meerut. Chaudhary, R., Gola, A. and Singh, L. 2002. Microbial evaluation managreement and handling of biomedical weste at Meerut. *Acta Botnical Indica* 30; 77-82.

Dube, Swastika, Singh, Lokendra and Rajendra Singh 2003. A survey of root-knot nematodes associated with certain weeds an dintercrops of sugarcane in Meerut.

Holt, J.G., ed. 1994. Bergey's Manual of Determinative Bacteriology. 9* edition, Williams and Wilkins Co., Baltimore. Joshi, Esha Basanti 1965. Commissioner cum State Editor, Utlar Pradesh Gazattiers, Meenjt.

Mohan, Harsh 2005. *Textbook of Pattiology* 5* edition, Jaypee Brothers Medical Publishers (P) Ltd. *Nevj* Delhi

Panwar, S, Sunaina, V., Tomar, D.K. and Lokendra Singh 2004. Evaluation of Enterobacter sp. KH-7 for biocontrol of Fusarium Dry Rot of Potato. *Plant Archives,* 4(1): 49-51.

Panwar, S., Singh, Lol^endra and Preeti Vats 2006. Evaluation of *Brevibaccilus brebis* and Bacci/us *firwis* strain in mangement of fungal pathogen. *Pesticide Res. Jour.* 18 (2):159-121

Singh, R.P., Singh, Lokendra and V.S. Verma 1984. Effect of/Azotobacter exudates on certain microbes associated with the phylloplane of Soyabean. *Pttytopath* J., 109: 97-103.

Singh, Rajendra 2001. Studies on Abu drain in relation to species composition of microbes and pollution. Ph.D. Thesis, CCS. University, i\/leerut. Singh, Lokendra, Josht, Nidhi and Rajendra Singh 2002.

Association of mycorrhizal fungi with wild and cultivated plants in Meerut College Campus and Abudrain. *Ad. Plant Sci.,* 15 : 316-317.

Singh, Rajendra, Dube, Swastika and Lokendra Singh 2003. Population of Nematodes associated with root zones of egg-plant and onion crops in Meerut. *Ad. Plant. Sci.,* 16(2): 443-446.

Sharma, Kanika 2005. Manual of Microbiology: *Tools and Techniques.* Ann Books, New Delhi.

Turk, D. C, Porter, L.A., Duerden, B.I. and TM.S. Reid 1983. *Medical Microbiology.* 6"' edition, Hodder English Language Book Society. Tiwari, V.N. 2005. Biofertilizers: Facts, Prospectives and Future strategy with reference to organic farming. *Vegetos,* 18 (1&2): 151-159