Abstract

Natural rubber is a polymer of isoprene units and is obtained from the tree *Hevea brasiliensis*. It is a compound having a wide range of applications of which the use in automobile industry is having prior importance. The disposal of waste rubber is becoming a major problem as the consumption of rubber products is high. So the development of a potent strain capable of degrading of natural rubber is appreciable. *Bacillus pantothenticus*, a gram positive bacteria isolated from soil was found to be effective in the biodegradation of natural rubber latex. The products of latex biodegradation were separated from the ether extract by TLC. GC/MS showed the biodegradation of the major compound into three simpler fractions with low molecular weights. FTIR analysis also supported the bioconversion of the polymeric compound. The band representing the polymeric association was found to be decreased considerably after the treatment with the bacteria. The determination of CO$_2$ liberated gave evidence for the complete mineralisation of the polymeric compound. Decrease in the total organic carbon of the medium, accumulation of lipids in the bacterial cell and formation of acids in the extract further confirmed the degradation of the hydrocarbon chain. An oxygenase enzyme responsible for the rubber degradation was isolated from the organism and the factors affecting the enzyme reaction were optimized. The same strain was found to be effective in the treatment of latex centrifugation effluent. The treatment of effluent was found to be effective with the activated sludge reactor which was designed as a part of this work.

Key words
Natural rubber latex, Microbial degradation, *Bacillus pantothenticus*, cis 1, 4-polyisoprene, cellular lipids, oxygenase enzyme, latex centrifugation effluent, activated sludge reactor.