HARNESSING THE POTENTIAL OF BACTERIA ISOLATED FROM CONSTRUCTION BY-PRODUCTS AS A SUSTAINABLE APPROACH TOWARDS ENVIRONMENTAL PROTECTION

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With the rise of industrial progress, pollution has been and remains a major concern for the world. Scientific advances have contributed to the solutions of the given issue by suggesting various ways of encountering and reprocessing; the relatively operative methods include the employment of microorganisms. Bacteria exhibit great diversity in their forms, properties, and activities. For this reason, the current study encompasses the isolation of microorganisms from hostile environments with a greater adaptability, along with their application in solving major ecological issues. To this end, LB agar medium was used effectively in the isolation and purification of strains until pure colonies were obtained, the latter being subsequently molecularly identified.

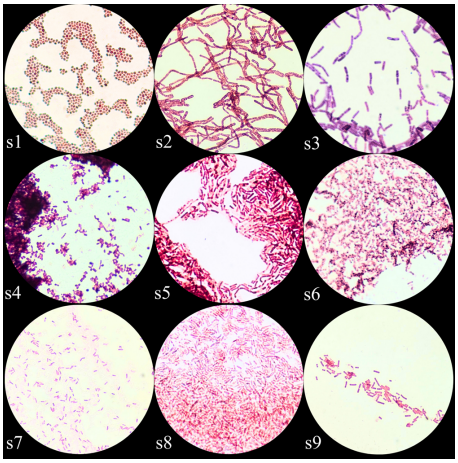

Fig. 1. Gram staining of isolated bacteria

In order to evaluate enzymatic activity, strains were screened and subsequently monitored for the predominant decomposition of substrates used. A total of 9 species were distinguished – 7 corresponding to lipase, 3 to gelatinase, 4 to pectinase, and 5 to cellulase activities – to represent the acquired bacteria. The promising outcomes were shown by strains “s3”, “s7”, and “s8”, sharing the results in almost every assessment, indicating their capability to metabolise a wide range of organic matter, speeding its degradation. Ultimately, given the nature of microorganisms, forward-looking considerations on the applications of bacteria active in the decomposition of oils, plastics, and industrial by-products have been specifically structured to address the problem of organic pollutants widespread.

Keywords: Construction by-product; Bacteria; Circular economy; Enzymatic activity.