

ISOLATION AND IDENTIFICATION OF ACTINOMYCETES DEGRADING THE FUNGICIDE ALLIAL FROM THE ACTIVE SLUDGE OF THE WASTEWATER TREATMENT PLANT IBN ZIAD (CONSTANTINE CITY)

BOUFERCHA OUMEIMA ^(1,2), **IRINA SOUSA MOREIRA** ⁽³⁾, **PAULA MARIA LIMA CASTRO** ⁽³⁾, **BOUDEMAGH ALLAOUEDDINE** ⁽²⁾

- ⁽¹⁾ Laboratory of Microbiological Engineering and Application, Department of Microbiology. Faculty of Natural and Life Sciences. University Mentouri Brothers, Constantine- Algeria. boufercha.oumeima@yahoo.com
- ⁽²⁾ Department of Microbiology. Faculty of Natural and Life Sciences. University Mentouri Brothers, Constantine- Algeria. boudemgh.allaoueddine@yahoo.fr
- ⁽³⁾ Universidade Católica Portuguesa, CBQF - Centro de Biotecnologia e Química Fina – Laboratório Associado, Escola Superior de Biotecnologia, Rua Diogo Botelho 1327, 4169-005 Porto, Portugal. ismoreira@porto.ucp.pt (I.Moreira)/ plcastro@porto.ucp.pt (P.Castro)

Abstract

The old methods of agriculture were based on the use of intensive manual labor. The twentieth century saw the birth of a revolution in agricultural practices, which relied mainly on plant protection techniques. These new perspectives have paved the way for an agriculture dominated by pesticides. The use of these molecules has improved yields and crop diversity to meet the nutritional needs of the growing world population. However, in recent years, other health and environmental problems have arisen due to uncontrolled overuse. Allial (fosetyl aluminum) is a systemic fungicide of the phosphonate class. It is not very persistent in soils and water and is recalcitrant to hydrolysis at environmental pH. This fungicide is also very soluble in water and can therefore reach surface waters by leaching from agricultural soils. Photolysis of this xenobiotic is not possible. In order to remove this fungicide from wastewater, biological treatment methods are necessary. Activated sludge microorganisms can play an important role in its biodegradation. In this study, were isolated actinomycetes from activated sludge of the wastewater treatment plant of Ibn Ziad. These bacteria, known by their extraordinary metabolic diversities, were tested for their aptitudes to degrade this toxic pesticide. Minimum salt medium supplemented with different concentrations up to 200 mg/L of fosetyl aluminum as the only carbon source. The cultures were incubated during 5 days at a temperature of 30° C. According to the results obtained, five isolates of actinobacteria showed a significant potential for the biodegradation of this fungicide. The identification of these isolates by analysis of the 16S rDNA gene allowed to assign them to the *Streptomyces* genus.

Keywords: Actinomycetes, biodegradation, activated sludge, fosetyl aluminum.

Acknowledgements: This work was supported by National Funds from FCT – Fundação para a Ciência e a Tecnologia through the project UIDB/50016/2020.