



Actinobacter biosurfactants producer isolated from marsh sediments in Iraq

Sukaina Abdullah Habib¹; Ahmed Abd Burghal^{2*}

¹University of Basrah, Department of Biology, College of Science, 61004, Iraq.
(saca1265@gmail.com).

²University of Basrah, Department of Biology, College of Science, 61004, Iraq.
(ahmed.burghal@uobasrah.edu.iq) *corresponding author

Abstract

Bio-surfactants (BSs) are biologically operative compounds produced from numerous micro-organisms such as Bacteria, Yeast, Fungi and Actinobacteria. Actinobacteria are microorganisms that have an important role in many fields, such as the pharmaceutical, food and industrial industries and the environment through the production of antibiotics, enzymes, surfactants and other metabolites. These compounds have several functions as bio-product in different fields of biotechnology. The present study aimed to identify and screen BS-producing actinobacteria species isolated from marsh sediment in the south of Iraq. The activity of Bio-surfactants was detected by emulsification index (E24%), oil spreading test, and drop collapse. In our current study, Fifty sediment samples were collected from marsh in the south of Iraq during October 2021. Twenty-seven isolates of filamentous bacteria were isolated on Actinomycete Isolation Agar. Each Isolate were purified by the stripping technique on an International Streptomyces Project-5. Kim's liquid media were used to carry out biosurfactants production after two weeks of incubation. The isolated bacterial strains that have high activity were identified by 16S rRNA gene sequencing. The results showed that the biosurfactants producing actinobacteria belonged to the *Streptomyces griseorubens*, *S. rochei*, *S. smyrnaeus*, *S. cacaoi*, *Saccharomonospora xinjiangensis* according to molecular identification. All strains have the ability for biosurfactant production, isolate SK61 and SK68 gave the greatest efficiency in Emulsification index 58% and 56, Oil spreading 65mm and 40mm, Drop collapse (+++ and ++) respectively. Thus this study detects diversity of actinobacteria strains capable of biosurfactants production.

Keywords: Biosurfactants, Actinobacteria, 16S rDNA, *Streptomyces*, Sediments

interacting with the interface between them (Mani *et al.*, 2016). Bacteria have the capacity to produce biosurfactants due to their ability to produce glycolipid molecules (Sari *et al.*, 2015). Chemical structures of biosurfactants are wide range, including phospholipids, glycolipids, lipoproteins, fatty acids, and polymeric biosurfactants, (Aparna *et al.*, 2012). The ability of biosurfactants to emulsify is a highly appealing property. Both "biosurfactants" and "bioemulsifiers" are frequently used in

Introduction

Biosurfactants are surface-active compounds generally produced by oil-utilizing micro-organisms such as and fungi, yeast and actinobacteria that were released into the environment or remain to the producer cells. The features of biosurfactants make them promising substances for use in different application. BSs are amphiphilic compounds that include both hydrophobic and hydrophilic parties that solubilize two various phases in a heterogeneous solution by