



SOIL DERIVED ANTIBIOTICS: SOIL AS A POTENTIAL SOURCE OF NEWLY EFFECTIVE ANTIBIOTICS

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ABSTRACT:

Since its introduction, antibiotic use has been considered as a revolution in treating infections and promoting health. Antibiotics are also used in treating animals and offering health for animals and more food for humans. The real problem relating to antibiotic resistance as a response of bacteria to survive against antibiotic effects has been reported and confirmed by many studies across the literature. This phenomenon has been associated with increasing trends of evolving new resistant species that developed wide spectrum resistance. The solution is to search for new antibodies. The aim of this review study is to search the literature for the possibility to find new antibiotics in the soil. Searching literature has identified several studies that showed soil is a very good source for new antibiotics. Taken together, antibiotic use should be more rational to minimize antibiotic resistance. Furthermore, soil is a good source for new antibiotics.

KEYWORDS: antibiotics, antibiotic resistance, soil, infection.

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INTRODUCTION

Antibiotics are very interesting for studying and conducting research for several reasons such as the complexity of their structure, and mode of action (1). Antibiotics are classified according to mechanisms of action such as inhibition the synthesis of cell wall, structural alteration of cell membrane, suppression of protein synthesis, prevention of nucleic acid synthesis (2).

The uses of antibiotics are varied that include treating infectious diseases of both humans and animals. Furthermore, Antibiotics are used in animal production to raise the production level of meat through reduction of infections and by thus global growth is increased (3). From a pharmaceutical industry point of view, there is an increasing trend of antibiotic production that reached more than one hundred thousand tons at global level (4).

Antimicrobial resistance

Antimicrobial resistance, the capacity of germs to rout the medications intended to slaughter them, is one of the largest worldwide general wellbeing challenges (5). Anti-infection agents are one of our most useful assets for battling perilous diseases. Their disclosure has changed human and creature wellbeing (6). Tragically, we currently live in a period when individuals around the world, including Americans, are passing on from untreatable contaminations in light of the development and spread of anti-microbial resistance (7).

It has been reported that at any rate 2 million individuals were contaminated with antibiotic resistant germs every year in the United States. Furthermore, at any rate 23,000 individuals passed on accordingly (8).

Although the use of antibiotics was considered as the most important invention in the history of treating infectious diseases, pathogens exhibited antibiotic resistance (9). One of the strategies to solve this problem includes search and development of the new compounds to overcome drug resistance of pathogenic microorganisms, and

significantly increase the variety of effective antibiotic drugs (10).

According to World Health Organization, during 2000 to 2015, 22 new antibiotics were developed to undergo clinical trials in the world (11).

The study of Alsohaili et al. (12) showed that pathogens isolated from urine samples of patients with urinary tract infection were resisting to one antibiotic at least. Of isolated pathogens, *E. coli* and *Klebsiella* spp exhibited high resistance to ampicillin.

In another study, Al-Saraireh et al (13) conducted a study to identify a Gram positive Bacillus in soil samples. The bacterial extract had antibacterial activity against Bacillus subtilis, Micrococcus luteus and Staphylococcus aureus.

Another study pointed to the possibility of isolated soil *Streptomyces* to inhibit the growth of multi-drug resistant Pseudomonas aeruginosa (14). In another study, Falkinham et al (15) were able to isolate both actinomycin C2 and actinomycin C3 from the red soil. The isolated species were able to prevent the growth of Micrococcus luteus and Staphylococcus aureus. ElBanna et al (16) found that the bioactive materials resulting from various Bacillus species that were isolated from various sources showed antibacterial activity against methicillin-resistant S. aureus.

The study of Lewis (17) put emphasis on the importance of increasing resistant bacteria that causes a global health problem. According to the author, the majority of antibiotics were isolated from soil -derived actinomycetes.

CONCLUSION:

Antibiotics are considered as a revolution since its introduction in treating infection agents. The development of antibiotic resistance by microbes is a very serious problem with global impacts. Searching for new antibiotics that had no resistance is the existing concern for scientists and researchers. Environment is sometimes called our mother and has the solutions for human being. Searching for antibiotics in soil is the most updated trend with promising results.

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