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Role of Microbiology in Pharmaceutical Industries: Short Communication

Bhrigu Nadda

Department of Microbiology, Punjab University, Chandigarh-160014, India

Abstract

Microbiology is an important area of research for the pharmaceutical industry. Vast involvement of microbes in various diseases makes microbiology vital. Developments from vaccines to medical devices are directly or indirectly dependent on microbiological studies. In this review recent updates of microbiology applications in pharmaceutical industries are explored.

Keywords*: *Medical, Microbiology, Pharmaceutical Industries, Vaccines

INTRODUCTION

The study of microorganisms such as bacteria, fungi, protozoa and similar organisms that cannot be seen with the naked eye is known as microbiology. When association of microbes with diseases was discovered, the microbiology became extremely important subject for pharmaceutical industry [1]. Various significant discoveries have been made with the field of microbiology especially in the area of pharmaceutical and medical industries.

Understanding the basic theories and principles of human cell mechanisms and microbiology is important [2]. It enables pharmaceutical researchers to discover antimicrobial drugs. This minimizes an increasing number of communicable diseases.

The applied branch of microbiology in the field of drugs is known as pharmaceutical microbiology. It includes the study of microorganisms related with the pharmaceutical manufacturing e.g. reducing the number of microorganisms in a process environment, excluding microorganisms and microbial by-products like endotoxin and exotoxin from water and other materials, and confirming the finished pharmaceutical product is sterile [3].

Other key focus of pharmaceutical microbiology is to decide how a product interacts in contamination cases e.g. you have syrup for cough medicine, if the cap of bottle is taken off and forget to replace the cap [4]. There is a possibility that the syrup is contaminated with microorganisms such as *Candida albicans and Escherichia coli.*

The most important involvement of microbiology to the pharmaceutical sciences is the advancement in the field of antibiotics. Most of the antibiotics were originally product of microbial metabolism. But the fresh genetic calculations have enabled the manufacturing of more enhanced medicines. Vaccines are also vital contribution of microbiology in the direction of development of drugs. The production of vaccines against diseases usually involves the growth of large amounts of bacteria. Microorganisms can also generate steroids. In addition microbiology also contributes towards quality control of a pharmaceutical laboratory. Prevention of microbial contamination of drugs, parenteral, ophthalmic preparations, nasal dosage forms and inhalation products using pharmacopoeia standards such as, Microbiological Test Methods, Growth Promotion test, Sterility Testing, Microbial Limits Test, Bioburden Testing, Water Testing, Bacterial Endotoxin (LAL Testing) etc.

APPLICATIONS

Objectionable microbial contaminations to pharmaceutical products are a potential risk which may influence the integrity and patient safety [5]. Robust quality control and strict regulations are required to be followed to overcome such issues [6]. Quality measures under United States Pharmacopeia, Indian Pharmacopeia, British Pharmacopeia and, Japanese Pharmacopeia etc seem to be very much adequate to address such issues. As the microbial quality is vital part of pharmaceutical manufacturing process, pharmaceutical companies must safeguard their products by continuous and through testing of equipment, raw materials, environment surfaces, packaging etc [7-8].

Growth promotion testing is a common quality control assay which is used to establish the nutritional

contents of culture media to assure the microbial growth can be supported [9]. This kind of testing is significant because media of culture is frequently used in different pharmacopeia quality control assays.

CONFLICT OF INTEREST: None

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