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CHAPTER-9

PRINCIPLES AND APPLICATIONS OF BIOTECHNOLOGY IN FISHERIES AND AQUACULTURE

Gulshan Kumar¹, Sarvendra Kumar² and Devanand T N¹

¹School of Fisheries, Centurion University of Technology and Management, Odisha

²College of Fisheries, Kishanganj, Bihar

1. Introduction

Biotechnology is a broad term and most often defined as use of living organism, its components or processes for benefit of mankind. Fisheries and aquaculture is dedicated towards the production of aquatic organisms or products obtained from them for human use. In current time biotechnological tools and processes are useful for every discipline of biological science and have tremendous applications in chemical, pharmaceutical and food industries. In fisheries and aquaculture biotechnology has contributed for increasing the performance of cultivated species as well as making valuable products and services. Biotechnological tools are being used very commonly in this area for identification of new species, developing high

performing animals, disease diagnosis, making pharmaceuticals and for generating valuable information through research. After the approval of transgenic salmon for human consumption by FDA, a new era of transgenic animal food has begun. Biotechnology is a multidisciplinary science involving concepts from biology and engineering. If we try to concise the subject, the techniques involving manipulation of nucleic acids will be central to the content. The technique most often used to manipulated nucleic acids is recombinant DNA (rDNA) technology and can be considered as heart of modern biotechnology. This technique is used for making valuable products and manipulating genetics of farmed species for performance improvement. Before the discovery of rDNA technology biotechnology was solely dependent on searching of organism having desired features. Recombinant DNA technology has given us capability to modify the existing organism so that it can furnish desired products and services. Recombinant DNA and associated techniques are also very popular in research in different areas of science including molecular biology, pathology, developmental biology and evolution. Due to its diverse nature covering all aspects of biotechnology in one chapter is difficult. The content of this type of chapters varies from author to author and generally cover a broad range of topics from molecular biology, microbiology and engineering. The content of this chapter is dedicated towards describing concepts and methodology of recombinant DNA technology and supportive molecular techniques. The content will also summarise some recent advances in biotechnology involving genomics, transcriptomics, proteomics and genome editing

2. Recombinant DNA technology