PROTOCOLS IN LIVESTOCK GENOME ANALYSIS

The book **Protocols in Livestock Genome Analysis Presents the Fundamental** principle and detailed protocols of laboratory techniques with an adequate amount of thought been applied towards making it simplistic and effective. The book has been structured into seventeen chapters. It begins with Chapter 1, giving readers some basic safety and precautions while working in molecular genetics laboratory that is exposed to hazardous agents. Chapter 2, 3 and 4 explains the most basic and fundamental procedures in molecular genetics laboratory i.e. isolation of genomic DNA, plasmid DNA, total RNA which are prerequisite for researchers conducting downstream genetics research like gene amplification or expression. Chapter 5 deals with quantification of DNA and RNA with specific examples. Chapter 6 deals with technique of polymerase chain reaction for amplification of a specific DNA sequences while Chapter 7 focuses on various variants of polymerase chain reaction that have been developed over the years for specific applications. Chapter 8 discusses the reverse transcription-polymerase chain reaction which is important prerequisite for gene expression studies and genetic characterization. Chapter 9 describes at length, agarose gel electrophoresis for the separation of nucleic acids and their analysis. Chapter 10 describes single strand conformation polymorphism, a technique that is capable of identifying most sequence variations in a single strand of DNA. Chapter 11 details the restriction digestion of DNA molecules by restriction endonucleases. Chapter 12 describes real-time PCR that can detect their accumulation and quantify the number of substrate DNA molecules present in starting sample. Chapter 13 discusses the method of chromatin immunoprecipitation, a very important technique for elucidating the transcriptional regulation of gene expression. Chapter 14 deals with detailed analysis of microsatellite repeat sequences along with statistical tools for data analysis. Chapter 15 explains the very important procedures of DNA ligation, competent cells preparation and transformation involved in cloning of any desired DNA sequence. Chapter 16 describes the set of steps for retrieving QTL & SNP information from online Animal QTL databases. Chapter 17 provides a simple understanding of DNA microarrays. Chapter 18 details the in situ hybridization method for localization of genetic material. Chapter 19 provides the recipe for preparation of buffers and solutions required for conducting various procedures outlined in previous chapters.

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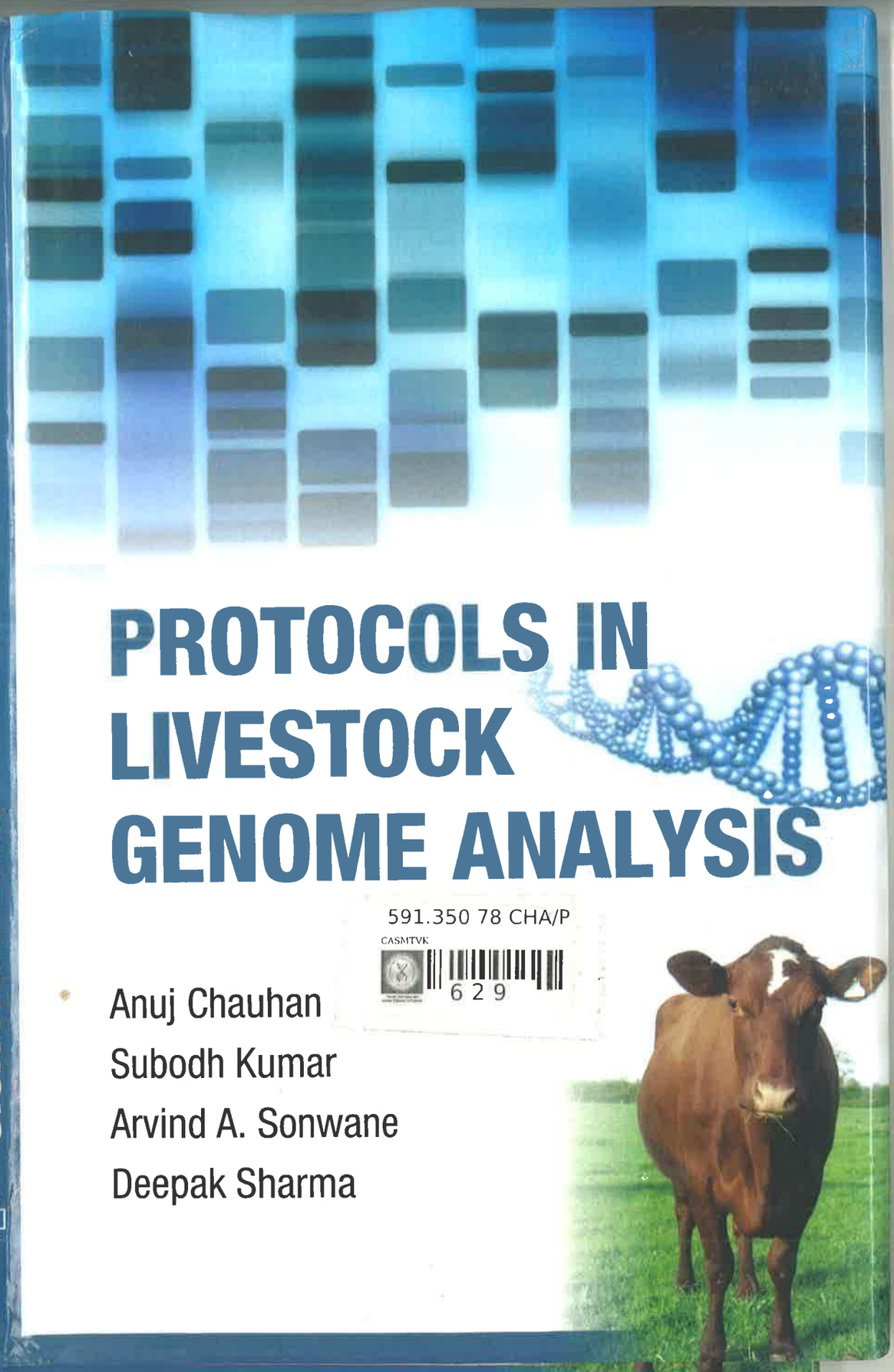

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Contents

CHAPTER-1

Laboratory Safety and Precautions

In a molecular biology laboratory, there is a certain hazard associated with the use of a variety of chemicals and materials. One should learn and adhere to the general safety guidelines to ensure a safe laboratory environment. The risk involved in handling potentially hazardous laboratory reagents required for performing various molecular biology protocols and ways to counter them are outlined in this chapter along with the importance of wearing personal protective equipments.

Handling Laboratory reagents

Acrylamide (unpolymerised)

Is a potent neurotoxin and is absorbed through skin (effects are cumulative). Use gloves and a face mask when weighing.

Ammonium persulfate

Ammonium persulfate is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes and skin. Inhalation may be fatal. Wear appropriate gloves, safety glasses, and protective clothing. Always use in a chemical fume hood. Wash hands thoroughly after handling.

Chloroform

Chloroform is irritating to the skin, eyes, mucous membranes, and respiratory tract. It is a carcinogen and may damage the liver and