
Preface

Discovered by Kary Mullis in 1983, the polymerase chain reaction (PCR) is a breakthrough technology that has allowed the advancement of different scientific fields, being a fundamental tool in current scientific research. As such, significant literature exists on the basics of the PCR technique, but the specificities of its application to different areas of the biotechnology and bioengineering field is mostly dispersed. Despite being a well-established technique, novel applications are constantly emerging given the power and flexibility of PCR, with continuous updates being published in this very exciting and moving field. Thus, along with cutting-edge methodologies, this volume focuses on many core PCR applications in the biotechnology and bioengineering field.

In the initial chapters, software for *in silico* PCR and primer design as well as some particular PCR protocols, such as long fragment or degenerate PCR, are given. Subsequently, particular focus is given to PCR applied to molecular and synthetic biotechnology, including the presentation of a novel platform for high-throughput gene synthesis by PCR. Also, a protocol is presented for nucleic acid extraction and molecular enrichment by whole genome amplification (CRENAME) before PCR, which enables the multiparametric assessment of potable/drinking water, but that can be easily applied to other type of samples. In the following chapters, several examples of PCR applications in food science and technology, environmental microbiology and molecular ecology, and healthcare are presented. Within these, novel applications in currently hot research topics, such as synthetic biology, food authentication and metagenomics are addressed. The book is not intended to cover all existing PCR protocols, but rather to give an overview of the power and flexibility of this technique with concrete examples in the biotechnology and bioengineering field. While initially aimed to cover only end-point PCR, two chapters dealing with the detection of allergens and soy in food matrices include real-time PCR protocols, as in these cases quantification is mandatory.

In the fast-changing world of today, it's hard to imagine how a simple technique not only managed to stay popular for over 30 years, as its use is still expanding. One of the ways PCR has managed to maintain ubiquitous has been through diverse technological advances. This book aims to contribute to a current update of PCR-dependent methods and thus, to be a valuable and useful resource for wet lab researchers, particularly within the biotechnology and bioengineering field.

Braga, Portugal

Lucilia Domingues

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