Practical Fermentation Technology
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For David & Louise
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Preface

Fermentation is a very ancient practice indeed, dating back several millennia. More recently, fermentation processes have been developed for the manufacture of a vast range of materials from chemically simple feedstocks, such as ethanol, right up to highly complex protein structures. The advent of this latter range of products and processes has revolutionised the practice of clinical medicine and many areas of fundamental research, and has also significantly increased the need for skilled individuals in the fermentation area.

The key question is ‘How can we deliver these skills to those who need them?’ In essence, this question hints at the potential difficulties: fermentation itself is an applied science, an underpinning technology. Many of the new entrants have no track record in the area, and being an applied science, in this context at least, publicly supported training in this area has been subject to the usual neglect in funding terms in many countries.

Typically, the acquisition of a set of practical skills might involve the skills being passed on or down from an experienced practitioner to a relative newcomer via demonstration, explanation and repetition. However, given the expansion in the use of fermentation techniques, this bespoke one to one approach is not always possible, especially for the many new scientists, engineers and technicians entering the fermentation area, in labs which have no previous experience of this area to draw upon.

This book is aimed at helping these relative newcomers to fermentation. It is not intended as a substitute for the type of training described above, but it may help the newcomer avoid some of the more obvious mistakes and pitfalls we have all made, and especially, to prevent them from ‘re-inventing the wheel’.

The contributors to this book are academic and industrial scientists and engineers with many years practical experience of actually carrying out fermentation processes of different types, at a range of scales from bench-top, right up to the largest industrial production scales. This book is intended to help the beginner or less experienced fermentation scientist, by bringing together and setting down our practical experiences in fermentation technology. It is not intended to cover fundamental or theoretical aspects underpinning fermentation, which are, in any respect, already well covered by a range of accessible books and reviews. Instead, we have focused on the practical skills and associated problems, cross referencing to appropriate reading material dealing with the underpinning science or engineering where relevant.

This book proceeds from a brief background on the development of fermentation, through the criteria for selection of lab based fermenters, with a chapter on the more specialised needs and challenges of equipping a lab for membrane protein expression (a very common raison d’ être for the setting up of small fermentation labs or suites