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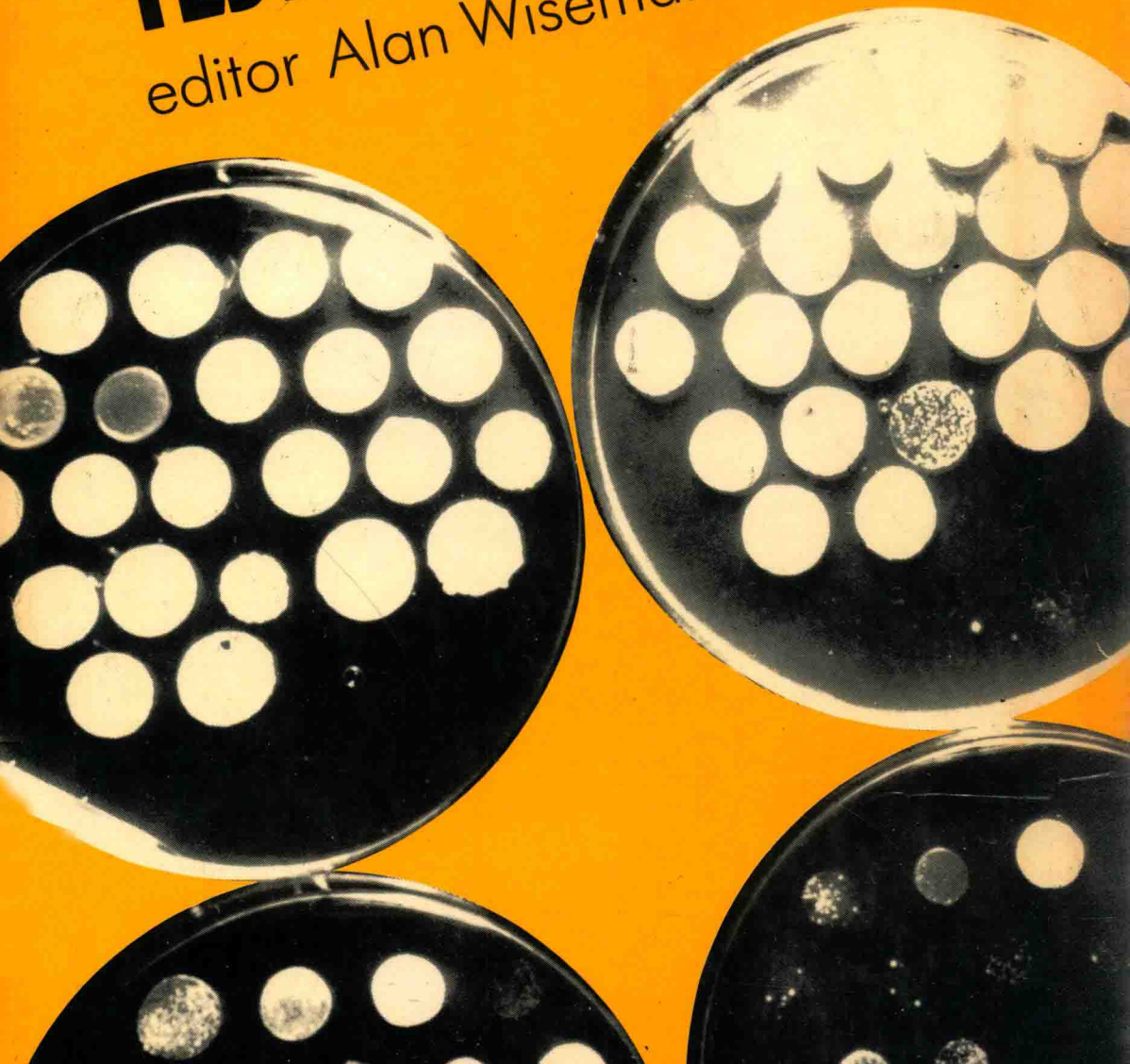
ENZYME INDUCTION, MUTAGEN ACTIVATION AND CARCINOGEN TESTING IN YEAST

editor Alan Wiseman



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Editor:

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Editor's introduction

Dr. Alan Wiseman
Biochemistry Division, Department of Biochemistry, University of Surrey, Guildford

1.1 GENERAL INTRODUCTION: TESTING FOR MUTAGENICITY AND CARCINOGENICITY IN YEAST

Although yeast has been used in the traditional biotechnology industries of brewing and baking for many centuries (Wiseman, 1985, 1977–1985), it has been the advent of recombinant DNA technology during recent years that has stimulated the remarkable present interest in its genetics and synthetic capabilities. Important medical products are being made by 'brewing techniques' following the incorporation and expression in the yeast of foreign genes, some of human DNA sequence, by the techniques of genetic engineering (see review by Kingsman *et al.* 1985, 1987).

In parallel with these very important developments in the manufacture of particular proteins, there is another field of growing interest in yeast where the application of genetics is important. This field is in the study of genotoxicity by a variety of techniques. Most carcinogens are clearly genotoxic chemicals and can cause a variety of gene damage related responses that may be readily detected in the yeast. This book therefore is concerned with the use of yeasts to detect carcinogens by observing the mutagenic effects caused by these carcinogenic chemicals. Along with similar approaches using bacteria, yeast is proving to be useful also in the detection of mutagenic agents, and likely carcinogens therefore, in the environment, in foodstuffs, and in pharmaceutical preparations. Yeast cells are eukaryotic, like mammalian cells, and there may be advantages in their use, relative to the use of the bacterial (prokaryotic) cell. In addition, the *in situ* (closer to the DNA) activation of these mutagens (and carcinogens) that require to be chemically activated (modified) before they can damage DNA in the 'appropriate manner' has been demonstrated inside yeast cells that contain cytochrome P-448 enzymes. It may be important not to have to activate the carcinogens outside the cell by using the usual rat liver cytochrome P-448/P-450 additive, with a preincubation period for activation.