

Preface

Protein hydrolysates, otherwise commonly known as peptones or peptides, are used in a wide variety of products in fermentation and biotechnology industries. The term “peptone” was first introduced in 1880 by Nagelli for growing bacterial cultures. However, later it was discovered that peptones derived from the partial digestion of proteins would furnish organic nitrogen in readily available form. Ever since, peptones, which are commonly known as protein hydrolysates, have been used not only for growth of microbial cultures, but also as nitrogen source in commercial fermentations using animal cells and recombinant microorganisms for the production of value added products such as therapeutic proteins, hormones, vaccines, etc.

Today, the characterization, screening and manufacturing of protein hydrolysates has become more sophisticated, with the introduction of reliable analytical instrumentation, high throughput screening techniques coupled with statistical design approaches, novel enzymes and efficient downstream processing equipment. This has enabled the introduction of custom-built products for specialized applications in diverse fields of fermentation and biotechnology, such as the following.

1. Protein hydrolysates are used as much more than a simple nitrogen source. For example, the productivities of several therapeutic drugs made by animal cells and recombinant microorganisms have been markedly increased by use of protein hydrolysates. This is extremely important when capacities are limited.
2. Protein hydrolysates are employed in the manufacturing of vaccines by fermentation processes and also used as vaccine stabilizers.
3. Protein hydrolysates are being used in large-scale industrial fermentations as sources of nitrogen and unknown growth factors, such as certain peptides, etc. They are also useful in diagnostic media to grow microorganisms in Petri plates and to detect pathogens and perform antibiotic sensitivity tests.
4. Protein hydrolysates are used in regular diets as well as prescription diets for companion animals.
5. Protein hydrolysates play an important role in animal nutrition, especially for raising healthy animals with increased immune resistance.
6. Protein hydrolysates are used as plant growth regulators to increase commercial crop yields as well as to control weeds in plants.

Thus protein hydrolysates industry is growing rapidly with wide applications in biotechnology, yet there has been no single book that describes (i) the challenges and opportunities for manufacturers and end users, (ii) the techniques used in manufacturing, characterization and screening of protein hydrolysates, and (iii) the applications of protein hydrolysates in a wide variety of industries, e.g., that of fermentation for production of many primary and secondary metabolites of microorganisms, and in the rapidly growing area of industrial biotechnology for production of biopharmaceuticals. One of the misconceptions involving the use of protein hydrolysates in fermentations is that they are being used merely as a nitrogen source. However, the functionality of the product obtained is not necessarily due solely to protein hydrolysates in general, i.e., it may be due to specific peptides, or the combination of peptides, or to non-protein components in the product. This is due to the fact that the preparations may contain carbohydrates, lipids, micronutrients, etc. Indeed, some manufacturers deliberately add such factors into the process to bring about unique functionality. Since only a handful of manufacturers dominate the market, this tends to keep the manufacturing process proprietary, making it harder to understand and appreciate its fine points. This book will close the gap by revealing valuable information on the latest developments in this vital and tremendously important field.

Vijai K. Pasupuelti
SAI International, 1436 Fargo Blvd.,
Geneva, IL 60134,
USA

Arnold L. Demain
Research Institute for Scientists Emeriti (R.I.S.E),
Drew University, NJ 07940,
USA

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Pasupuleti, V.K.; Demain, A.L. (Eds.)

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