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Nota di contenuto	Industrial Scale Suspension Culture of Living Cells; Foreword; Contents; Preface; List of Contributors; The History and Economic Relevance of Industrial Scale Suspension Culture of Living Cells; 1 Introduction; 2 A Short History of Suspension Culture (Fermentation); 2.1 Ethanol, Organic Acids, and Solvents, the Beginning; 2.2 Vitamins Fermentation Takes a Long Time to Develop; 2.3 Steroids, the First Large-Scale Biocatalysis Processes; 2.4 Antibiotics, a US-Lead Turning Point in Fermentation Technology; 2.5 Amino Acids, a Japanese Fermentation Success Story 2.6 Enzymes, a European Fermentation Success Story2.7 Single Cell Proteins, an Economic Flop; 2.8 Biofuels are Controversial Story; 2.9 Recombinant DNA Technology Based Products (Monoclonal Antibodies and Other Recombinant Proteins), Setting off an Avalanche of New Products; 3 The Contemporary Situation; 3.1 How Long Can the USA Keep its Leading Role?; 3.2 China and India Become Global Forces in Fermentation; 4 The Future of Suspension Culture; 4.1 New Frontiers;

4.2 Yet "Uncultured" Cells and Organisms?; 5 Economic and Market Considerations; 5.1 The Pharmaceutical Market
 5.2 Personal Care Products 5.3 Chemicals, Industrial and Technical Enzymes; 5.4 Food, Dietary Supplements (Functional Food, Nutraceuticals), and Feed Products; 6 Conclusions; References; Part I: Suspension Culture of Bacteria, Yeasts, and Filamentous Fungi; 1 Bacterial Suspension Cultures; 1.1 Introduction; 1.2 Organisms, Cells, and their Products; 1.2.1 Bacteria as Production Platform for Various Products; 1.2.2 Historical Outline for Escherichia coli; 1.2.3 Industrial Aspects of Bacterial Expression Systems; 1.3 Bioprocess Design Aspects for Recombinant Products
 1.3.1 Bacterial Cultivation Processes 1.3.2 Gram Negative Cell Factory: Cellular Compartments and Transport across Membranes; 1.3.3 Industrial Strategies: Quality, Folding State, and Location of Recombinant Protein Products; 1.3.4 Approaches towards Bioprocess Design, Optimization, and Manufacturing; 1.3.5 Bacterial Bioprocess Design; 1.3.5.1 Technical and Physiological Constraints for Bacterial Bioprocess Design; 1.3.5.2 Media Design; 1.3.5.3 Product Titer is Determined by the Biomass Concentration and the Specific Productivity q_p ; 1.3.6 Industrial Production Strategy by Two-Step Cultivation
 1.3.6.1 Batch Phase for the Accumulation of Biomass 1.3.6.2 Structured Approach Towards Batch Design; 1.3.6.3 Fed-Batch Phase Process Design from Scratch; 1.3.6.4 Induction Phase: Product Formation Characteristics; 1.3.6.5 Process Parameters Impacting Recombinant Product Formation; 1.3.6.6 Concept of Time-Space Yield; 1.4 Basic Bioreactor Design Aspects; 1.4.1 Introduction; 1.4.2 Vessel Design and Construction; 1.4.3 Dimensioning; 1.4.3.1 Materials of Construction; 1.4.3.2 Surface Quality and Welding; 1.4.3.3 Nozzles and Ports; 1.4.4 Mass Transfer; 1.4.5 Cleaning in Place
 1.4.6 Steaming in Place

Sommario/riassunto

The submersed cultivation of organisms in sterile containments or fermenters has become the standard manufacturing procedure, and will remain the gold standard for some time to come. This book thus addresses submersed cell culture and fermentation and its importance for the manufacturing industry. It goes beyond expression systems and integrally investigates all those factors relevant for manufacturing using suspension cultures. In so doing, the contributions cover all industrial cultivation methods in a comprehensive and comparative manner, with most of the authors coming from the industry i