

# Food Colours, Flavours and Additives Technology Handbook (2nd Edition)

**Author:** Dr. Himadri Panda

**Format:** Paperback

**ISBN:** 9788195830411

**Code:** NI348

**Pages:** 536

**Price:** Rs. 1,895.00 US\$ 48.00

**Publisher:** NIIR PROJECT CONSULTANCY SERVICES

Usually ships within 5 days

## Food Colours, Flavours and Additives Technology Handbook

### About the book

Food colours are additives that can be natural or artificial. Natural food colours are obtained from fruits, vegetables, plants and minerals. Artificial food colours are made from coal tar dyes or petroleum byproducts. Food flavours are another type of additive that can be natural or artificial. Natural flavours come from herbs, spices and fruits while artificial flavours come from chemicals which have been artificially created to replicate natural flavours. Finally, additives are substances used in food processing as well as any substance added to foods either directly or indirectly for preservation, processing or improving their flavour. These substances may include nutrients like vitamins and mineral salts; biological controls such as yeasts; preservatives such as sulfur dioxide; antioxidants; emulsifiers; acidulants; anticaking agents and thickeners like guar gum; carrier solvents such as propylene glycol alginate, a thickener derived from seaweed. Carriers also function as stabilizers, preventing oils from separating out and appearing on top of a product. - substances that help other substances mix together smoothly -include carrier solvents such as propylene glycol alginate, a thickener derived from seaweed. Carriers also function as stabilizers, preventing oils from separating out and appearing on top of a product.

The beverage segment is anticipated to be the largest in the food flavors market. Due to rising discretionary budgets among consumers, various synthetic flavors, including chocolate fruit and floral flavors, are growing in popularity in developing economies in Asia Pacific and the Middle East. The dairy, confectionery, and bread sectors are anticipated to increase significantly. The global market for food colours, flavours, and additives has been growing steadily over recent years. The food colors market is expected to reach a market valuation of US\$ 2.6 Bn, accelerating with a CAGR of 7.3%. Bakery, Cereal, and Snacks accounted for 18% of sales by volume in the food colors market. The global food colors market is driven by the highly growing demand for innovative, unique-looking food dishes, and altering taste and food appeal preferences due to the rise of social media among the populations worldwide. An increase in consumer awareness for clean-label food products and the additional health benefits that certain natural food colors possess is estimated to drive the market for food colors. The use of food additives has increased in recent years. This is because consumers are increasingly looking for foods that are healthier and more convenient. Food additives can help to improve the nutritional value of food and make it more appetizing. High demand for new flavors from the food & beverages industry and continuous innovation drive the growth of the market. In addition, increase in requirement from the fast food industry is expected to provide growth opportunities in the food flavors market.

The food color industry has been booming for a while now as people are more conscious about what they put into their bodies. With so many flavors to choose from for different dishes, it's just not enough anymore to make food taste good - it also has to look good. That's where food color comes in. Not only does it make your

food look more appetizing, but it also makes your cooking more fun!

The book covers a wide range of topics connected to Food Colours, Flavours and Additives, as well as their manufacturing processes. It also includes contact information for machinery suppliers, as well as images of equipment and plant layout.

A comprehensive reference to manufacturing and entrepreneurship in the Food Colours, Flavours and Additives products business. This book is a one-stop shop for everything you need to know about the Food Colours, Flavours and Additives products manufacturing industry, which is ripe with potential for manufacturers, merchants, and entrepreneurs. This is the only comprehensive guide to commercial Food Colours, Flavours and Additives products manufacture. It provides a feast of how-to knowledge, from concept through equipment purchase.

## Contents

### Contents

#### 1. FOOD COLORIMETRY

- 1.1 The Determination of Strength
- 1.2 Colorant Identification
- 1.3 The CIE Method of Colour Measurement
- 1.4 Additive Colour Mixing
- 1.5 The CIE 1964 Supplementary Standard Colorimetric Observer
- 1.6 Illuminant D65
- 1.7 The Calculation of Tristimulus Values
- 1.8 Metamerism
- 1.9 The Nature of Perceived Colour
- 1.10 The Quantification of Colour Appearance
  - 1.10.1 The X, Y, Z Method
  - 1.10.2 The CIELAB Method
- 1.11 The Quantification of Colour Differences
- 1.12 The Quantification of Metamerism
- 1.13 Colour Measuring Instruments
  - 1.13.1 Spectrophotometers
  - 1.13.2 Optics
  - 1.13.3 Plotting Facilities
  - 1.13.4 Effective Band-Width
  - 1.13.5 Speed of Operation
  - 1.13.6 Tristimulus Colorimeters
  - 1.13.7 Visual Colorimeters

#### 2. SYNTHETIC ORGANIC COLOURS FOR FOOD

- 2.1 Synthetic Colours Used Food
  - 2.1.1 Class of Synthetic Colours for Food
  - 2.1.2 Description of Synthetic Colours for Food
  - 2.1.3 Azo Food Colours
  - 2.1.4 Triarylmethane Food Colours
  - 2.1.5 Xanthene Food Colours
  - 2.1.6 Quinoline Food Colours
  - 2.1.7 Indigoid Food Colours
- 2.2 Manufacture of Synthetic Organic Colours for Food
  - 2.2.1 Manufacture of Azo Food Colours
  - 2.2.2 Manufacture of Triarylmethane Food Colours
  - 2.2.3 Manufacture of Xanthene Food Colours
  - 2.2.4 Manufacture of Quinoline Food Colours

- 2.2.5 Manufacture of Indigoid Food Colours
- 2.2.6 Manufacturing Plant Used for Food Colours
- 2.3 Quality Assurance of Food Colours
- 2.4 Blended Food Colours
- 2.5 Physical Form of Food Colours
- 2.6 Lake Colours
  - 2.6.1 Legislation on Lake Colours
  - 2.6.2 Manufacture of Lake Colours
  - 2.6.3 Specifications for Lake Colours
  - 2.6.4 Lake Colour Usage
- 2.7 Stability Properties of Food Colours
  - 2.7.1 Action of Light
  - 2.7.2 Affect of Food Processing Temperatures
  - 2.7.3 Action of Alkalis and Acids
  - 2.7.4 Action of Food Preservatives
  - 2.7.5 Action of Ascorbic Acid
  - 2.7.6 Action of Reducing and Oxidising Agents
  - 2.7.7 Action of Proteins
- 2.8 Storage of Food Colours
- 2.9 Solubility of Food Colours
- 2.10 Applications of Food Colours
  - 2.10.1 Soft Drinks and Non-Alcoholic Beverages
  - 2.10.2 Sugar Confectionery
  - 2.10.3 Desserts, Icings and Frozen Confectionery
  - 2.10.4 Preserves and Table Jellies
  - 2.10.5 Baked Goods
  - 2.10.6 Canned Fruit, Vegetables and Soups
  - 2.10.7 Meat and Fish Products and Analogues
  - 2.10.8 Dry-Premix Convenience Foods
  - 2.10.9 Milk Products
  - 2.10.10 Snack Foods
  - 2.10.11 Pickles, Sauces and Ketchups
  - 2.10.12 Pet Foods
  - 2.10.13 Pharmaceutical and Cosmetic Products
- 2.11 Polymeric Dyes
- 3. NOVEL SYNTHETIC COLOURS FOR FOOD
  - 3.1 Polydye Concept (Dynapol)
  - 3.2 Solubilising Groups
  - 3.3 Use of Polymeric Colours in Food
  - 3.4 Selection of Polymeric Dyes for Food Coloration
- 4. ANTHOCYANINS
  - 4.1 Types of Anthocyanins
  - 4.2 Occurrence and Distribution
  - 4.3 Structural Transformations
  - 4.4 Stabilisation and Augmentation by Physico-Chemical Effects
    - 4.4.1 Effect of Acylation
  - 4.5 Reactions of Anthocyanins in Model and Food Systems
  - 4.6 Anthocyanins as Food Colours
    - 4.6.1 Extraction and Purification
    - 4.6.2 Further Processing of Extracts
    - 4.6.3 Stability of Anthocyanin Additives
  - 4.7 Analysis

## 5. SOME SYNTHETIC CAROTENOIDS AS FOOD COLOURS

### 5.1 Synthesis

### 5.2 Properties

### 5.3 Carotenoids in Fat-Based Foods

#### 5.3.1 Margarine and Butter

#### 5.3.2 Other Shortenings, Fats and Oils

#### 5.3.3 Processed Cheese

#### 5.3.4 Other Fat-Based Products

### 5.4 Carotenoids in Water-Based Foods

#### 5.4.1 Confectionery—Hard Candy

#### 5.4.2 Confectionery—Fruit Jellies

#### 5.4.3 Confectionery—Marzipan

#### 5.4.4 Sugar-Coated Tablets

#### 5.4.5 Confectionery—Fondant

#### 5.4.6 Confectionery—Chocolate

#### 5.4.7 Ice-Cream

#### 5.4.8 Yogurt

#### 5.4.9 Cheese

#### 5.4.10 Bakery Products

#### 5.4.11 Baked Goods-Icings and Fillings

#### 5.4.12 Fruit Juices

#### 5.4.13 Soft-Drink Powders

#### 5.4.14 Soft Drinks

#### 5.4.15 Tomato Products

#### 5.4.16 Soups and other Canned Products

#### 5.4.17 Dessert Products

### 5.5 International Legal Status

### 5.6 Vitamin a Activity

## 6. MISCELLANEOUS NATURALLY OCCURRING COLOURING MATERIAL FOR FOODSTUFFS

### 6.1 Carotenoid Pigments

### 6.2 Annatto, 1971 CI No 75120, E160(b)

### 6.3 Paprika

### 6.4 Saffron

### 6.5 Miscellaneous Carotenoid Colours

### 6.6 Melanoidin Pigments

#### 6.6.1 Caramel, E150

#### 6.6.2 Manufacture of Caramel

#### 6.6.3 Processing Conditions for the Manufacture of the Major Caramels

#### 6.6.4 Properties of Caramel

#### 6.6.5 Composition of Caramel

#### 6.6.6 Uses of Caramel

#### 6.6.7 Other Melanoidin Pigments

### 6.7 Porphyrin Pigments

#### 6.7.1 Extraction of Chlorophyll and Manufacture of Derivatives

#### 6.7.2 Uses of Chlorophyll and Its Derivatives

#### 6.7.3 Haem Pigments

### 6.8 Betalaine Pigments

#### 6.8.1 Beetroot Red, E162

#### 6.8.2 Extraction of Beetroot Red

#### 6.8.3 Uses of Beetroot Red

- 6.8.4 Pokeberry
- 6.9 Quininoid Pigments
  - 6.9.1 Cochineal and Cochineal Carmine, 1971 CI No 75470, E120
  - 6.9.2 Extraction of Cochineal
  - 6.9.3 Properties of Cochineal
  - 6.9.4 Preparation of Cochineal Carmine
  - 6.9.5 Properties of Cochineal Carmine
  - 6.9.6 Kermes and Lac Pigments
  - 6.9.7 Alkannet, 1971 CI No 75530
- 6.10 Miscellaneous Organic Pigments
  - 6.10.1 Riboflavin and Riboflavin-5'-Phosphate, E 101
  - 6.10.2 Turmeric (Curcumin, 1971 CI No 75300, E100)
  - 6.10.3 Orchil, E 121
  - 6.10.4 Indigotin, 1971 CI No 75781, Formerly E132
  - 6.10.5 Vegetable Carbon, E153
  - 6.10.6 Other Miscellaneous Organic Colouring Materials
- 6.11 Inorganic Pigments of Natural Origin for Food
  - 6.11.1 Titanium Dioxide, 1971 CI No 77891, E171
  - 6.11.2 Iron Oxides and Hydroxides, 1971 CI Nos 77489, 77491, 77492, 77499; E172
  - 6.11.3 Other Inorganic Pigments for Food
- 7. ANALYSIS OF SYNTHETIC FOOD COLOURS
  - 7.1 Synthetic Dyes
    - 7.1.1 Qualitative Identification
    - 7.1.2 Quantitative Analysis of Major Components
    - 7.1.3 Dye Content
    - 7.1.4 Inorganic Salts
    - 7.1.5 Moisture
    - 7.1.6 Quantitative Analysis of Minor Components
    - 7.1.7 Subsidiary Dyes
    - 7.1.8 Synthetic Intermediates
    - 7.1.9 Primary Aromatic Amines
    - 7.1.10 Leuco-Base
    - 7.1.11 Water-Insoluble Matter
    - 7.1.12 Ether Extractable Matter
    - 7.1.13 Trace Heavy Metals
  - 7.2 Aluminium Lakes
    - 7.2.1 Qualitative Identification
    - 7.2.2 Quantitative Analysis of Major Components
    - 7.2.3 Quantitative Analysis of Minor Components
  - 7.3 Inorganic Pigments
    - 7.3.1 Titanium Dioxide
    - 7.3.2 Iron Oxides
    - 7.3.3 Vegetable Carbon
- 8. THE INFLUENCE OF COLOUR ON SENSORY PERCEPTION AND FOOD CHOICES
  - 8.1 Visual Appearance and Colour in Food Choices
  - 8.2 Qualitative Indications of the Importance of Colour
  - 8.3 Quantitative Indications of the Importance of Colour
  - 8.4 Effect of Colour on Taste Thresholds
  - 8.5 Colour-Flavour Investigations Utilising Quantitative Colour Measurement Techniques

- 8.6 Effect of Colour on Odour
- 8.7 Effect of Colour on 'Pleasantness' of Food
- 9. NATURAL COLOURS IN FOOD
- 9.1 Aim of Chapter
- 9.2 Natural Colourants
- 9.3 Natural Colours Presently Used in Food
- 9.4 Methods of Improving Natural Colourants
- 9.5 Novel Sources of Natural Colourants
  - 9.5.1 Microbial Sources
- 9.6 Animal Sources
- 9.7 Plant Sources
  - 9.7.1 General Reviews
  - 9.7.2 Colourants from By-Products
  - 9.7.3 Gardenia Extracts
  - 9.7.4 Other Sources
- 9.8 Stability of Natural Colourants in Foods
  - 9.8.1 Feasibility of Novel Sources
  - 9.8.2 Effect of Additives
- 9.9 Stable Forms of Natural Colourants Found in Vivo
- 9.10 Stabilised Forms of Natural Colourants
  - 9.10.1 Flavonoids
  - 9.10.2 Porphyrins
  - 9.10.3 Others
- 10. FOOD FLAVOURS
- 10.1 Food Acceptance
- 10.2 Taste
- 10.3 Odor
- 10.4 Flavor Chemistry
- 10.5 Flavor Materials
  - 10.5.1 Natural Flavorings
  - 10.5.2 Artificial Flavorings
  - 10.5.3 Progressive Use of Synthetics
  - 10.5.4 Typical Synthetics
- 10.6 Compounding
- 10.7 Economic Aspects
- 10.8 Flavor Precursors
- 10.9 Sensory Evaluation
- 11. THE CHARACTER OF ADDITIVES
- 11.1 Antioxidants
- 11.2 Preservatives
- 11.3 Emulsifiers and Stabilizers
- 11.4 Emulsifiers
- 11.5 Food Colours
- 11.6 Some Dyestuff Food Colours in Current Use
- 11.7 Natural or Nature-Identical Food Colours
- 11.8 Flavours
- 11.9 Toxicant Substances in Herbs/Spices
- 11.10 Flavour Components of Herbs and Spices
- 11.11 Sequestrants
- 11.12 Anticaking Agents
- 11.13 Acids, Buffers, and Bases
- 11.14 Humectants
- 11.15 Firming and Crisping Agents

- 11.16 Sweeteners
- 11.17 Enzymes
- 11.18 Nutritive Additives
  - 11.18.1 Vitamins
  - 11.18.2 Trace Elements
  - 11.18.3 Minerals
  - 11.18.4 Essential Amino Acids
- 11.19 Essential Amino Acids
- 11.20 Flour and Bread Additives
- 12. SAFETY TESTING
  - 12.1 Acute Toxicity
  - 12.2 Genetic Toxicology
  - 12.3 Subchronic Toxicity Tests
  - 12.4 Chronic Toxicity Tests
- 13. BIS SPECIFICATIONS
- 14. HOW TO START THE BUSINESS OF FOOD ADDITIVES MANUFACTURING?
  - 14.1 Introduction
    - 14.1.1 What Is a Food Additive?
    - 14.1.2 Types of Food Additives
  - 14.2 Start A Flavor Business by Following These Steps
    - 14.2.1 Decide the Business Structure
    - 14.2.2 Research the Market
    - 14.2.3 Arrange for Funds
    - 14.2.4 Decide on the Location
    - 14.2.5 Get FSSAI Registration/License
    - 14.2.6 Get Other Mandatory Licenses
    - 14.2.7 Equipment and Staff
- 15. HOW TO START THE BUSINESS OF FOOD COLOUR MANUFACTURING?
  - 15.1 Introduction
    - 15.1.1 Types of Natural Colours
    - 15.1.2 How are Natural Colors Made?
    - 15.1.3 Raw Material Requirements
    - 15.1.4 Manufacturing Process
  - 15.2 Decide the Business Structure
  - 15.3 Research the Market Well
  - 15.4 Take Water Testing & an Organic Testing Certificate
  - 15.5 Location of the Organisation
  - 15.6 Get the Required Machinery
    - 15.6.1 Main Machinery
  - 15.7 Obtain Necessary Permits and License
  - 15.8 Get Business Insurance
  - 15.9 Create Your Business Website
- 16. HOW TO START THE BUSINESS OF FOOD FLAVOR MANUFACTURING?
  - 16.1 Introduction
    - 16.1.1 The Business Purpose of Flavor
  - 16.2 Start A Flavor Business by Following These Steps
    - 16.2.1 STEP 1: Plan Your Business
    - 16.2.2 STEP 2: Form a Legal Entity
    - 16.2.3 STEP 3: Register for Taxes
    - 16.2.4 STEP 4: Open a Business Bank Account & Credit Card

- 16.2.5 STEP 5: Set up Business Accounting
- 16.2.6 STEP 6: Obtain Necessary Permits and License
- 16.2.7 STEP 7: Get Business Insurance
- 16.2.8 STEP 8: Define Your Brand
- 16.2.9 STEP 9: Create Your Business Website
- 16.2.10 STEP 10: Set up Your Business Phone System
- 17. THE TOXICANT RISKS OF NATURAL FOOD
- 17.1 Constituents of Natural Food Products
- 17.2 Microbiological Contaminants of natural Food Products
- 17.3 Non-Microbiological Contaminants of Natural Food Products
- 18. FLOW CHART
- 19. PLANT LAYOUT
- 20. PHOTOGRAPHS OF PLANT AND MACHINERY WITH SUPPLIER'S CONTACT DETAILS
- Powder Blender Mixer Machine
- Food Additives Making Equipment Homogenizer High Shear Emulsifying Mixer
- Powder Mixing Machine with Screw Conveyor
- Grinding Machine
- Mixing Vessel / Mixing Tank
- Mixing Tank
- Thin-Film Evaporator
- Agitated Thin Film Evaporator
- Stainless Steel Storage Tank
- Liquid Filling Machines
- Commercial Food Dryer
- Food Dehydrator

## About NIIR

**NIIR PROJECT CONSULTANCY SERVICES (NPCS)** is a reliable name in the industrial world for offering integrated technical consultancy services. NPCS is manned by engineers, planners, specialists, financial experts, economic analysts and design specialists with extensive experience in the related industries.

Our various services are: Detailed Project Report, Business Plan for Manufacturing Plant, Start-up Ideas, Business Ideas for Entrepreneurs, Start up Business Opportunities, entrepreneurship projects, Successful Business Plan, Industry Trends, Market Research, Manufacturing Process, Machinery, Raw Materials, project report, Cost and Revenue, Pre-feasibility study for Profitable Manufacturing Business, Project Identification, Project Feasibility and Market Study, Identification of Profitable Industrial Project Opportunities, Business Opportunities, Investment Opportunities for Most Profitable Business in India, Manufacturing Business Ideas, Preparation of Project Profile, Pre-Investment and Pre-Feasibility Study, Market Research Study, Preparation of Techno-Economic Feasibility Report, Identification and Section of Plant, Process, Equipment, General Guidance, Startup Help, Technical and Commercial Counseling for setting up new industrial project and Most Profitable Small Scale Business.

NPCS also publishes various process technology, technical, reference, self employment and startup books, directory, business and industry database, bankable detailed project report, market research report on various industries, small scale industry and profit making business. Besides being used by manufacturers, industrialists and entrepreneurs, our publications are also used by professionals including project engineers, information services bureau, consultants and project consultancy firms as one of the input in their research.

Our Detailed Project report aims at providing all the critical data required by any entrepreneur vying to



venture into Project. While expanding a current business or while venturing into new business, entrepreneurs are often faced with the dilemma of zeroing in on a suitable product/line.

---

**NIIR PROJECT CONSULTANCY SERVICES** , 106-E, Kamla Nagar, New Delhi-110007, India. **Email:** [npcs.india@gmail.com](mailto:npcs.india@gmail.com) **Website:** [NIIR.org](http://NIIR.org)

Sun, 28 Apr 2024 09:23:11 +0530