

# The Complete Book on Gums and Stabilizers for Food Industry

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Gums are plant flours (like starch or arrowroot) that make foods & other products thick. Gums are used in foods for many reasons besides being used as a thickener. Gums are important ingredient in producing food emulsifier, food additive, food thickener & other gum products. The main reason for adding a gum or hydrocolloid to a food product is to improve its overall quality. India is the largest producer of gums specially guar gum products. Similarly stabilizers are an indispensable substance in food items when added to the food items, they smoothen uniform nature and hold the flavouring compounds in dispersion. Gum technology stabilizers are carefully controlled blends of various food ingredients. Most processed foods need some sort of stabilization at some point during production, transportation, storage and serving. The science and technology of hydrocolloids used in food and related systems has seen many new developments and advances over recent years. The breadth and depth of knowledge of gums and stabilizers has increased tremendously over the last two decades, with researchers in industry and academia collaborating to accelerate the growth. Gums as food constituents or as food additives can influence processing conditions in the following ways; retention of water, reduction of evaporation rates, alteration of freezing rates, modification of ice crystal formation and participation in chemical reactions.

Some of the fundamentals of the book are functions of gum, typical food applications, gums in food suspensions, rheology and characters of gums, natural product exudates, flavor fixation, ice cream, ices and sherbets, gelation of low methoxyl pectin, seaweed extracts, microbial gums, transformation of collagen to gelatin, cellulose gums, dairy food applications, bakery product applications, analysis of hydrocolloids, gums in food products, general isolation of gums from foods, identification of gums in specific foods, group analysis and identification schemes, group identification methods, qualitative group analysis etc.

This book contains rheology of gums, plant sheet gums, microbial gums, cellulose gums and synthetic hydrocolloids different stabilizers used in food industry. The book will be very resourceful to all its readers, new entrepreneurs, scientist, food technologist, food industries etc.

## 1. FUNCTIONS OF GUM

Convenience Foods

Instant Coffee

Frozen Foods

Freeze-Dried Foods

Gum Constituents

Effect on Processing

Pertinent Processing Parameters  
Function in Food Applications  
Viscosity  
Definition and Meaning  
Factors Effecting Hydrophilic Viscosities  
Typical Food Applications  
Gelation  
Mechanism of Gel Formation  
Types of Gel Linkage  
Gel Textures  
Effect of Sugar on Gels  
Rheological Behavior  
Gel-Enhancing Effect of Other Gums  
Emulsification and Stabilization  
Types of Emulsions  
Preparation of Emulsions  
Applications of Hydrocolloids  
Breaking of Emulsions  
Suspensions and Dispersions  
Description  
Yield Value  
Gums in Food Suspensions  
Foams  
Description  
Requirements for Stability  
Food Applications  
Measurement of Foam Stability  
Crystallization Control  
Description  
Types of Crystal Bonding  
Effect of Hydrocolloids  
Flavor Fixation  
Description  
Historical Background  
Basic Principles  
Function of Gums  
Important Parameters  
Advantages of Gum Arabic  
Limitations of Spray-Dried Flavors  
Slab Fixation  
Microencapsulation (Coacervation)  
Alginate Film Encapsulation  
Protective Films  
Description  
Applications  
Synergistic Effect  
Syneresis Inhibition  
Selection and Application of Hydrocolloids  
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Newtonian Flow

Non-Newtonian Systems  
Bingham Plastic  
Pseudoplastic (Shear-Thinning)  
Dilatancy (Shear-Thickening)  
Thixotropic Flow  
Rheopexy  
Rheology in Foods  
Flow Curve Data  
Rheological Measurement of Liquids  
Capillary Viscometers  
Rotational Viscometers  
Brookfield Synchro-Lectric Viscometer  
Corn Industries Viscometer  
Brabender Visco-Amylograph  
Validity of Measurements  
Rheological Measurements of Solids  
Parameters of Solids  
Food Gel Systems  
Types of Gel Measurements  
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Exchange Ridgelimeter  
Gel Characterization Apparatus (GCA)  
Description  
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Interpretation of Measurements  
Typical Gel Measurements  
Texturometer  
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Standards  
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Bakery Products  
Dairy Products  
Beverages  
Flavor Fixation  
Miscellaneous  
Gum Ghatti  
Structure and Properties  
Applications  
Gum Karaya  
Structure  
Properties  
Ice Cream, Ices and Sherbets  
Meat Products  
Baked Goods  
Dairy Products  
Miscellaneous  
Gum Tragacanth  
Structure

Properties  
Salad Dressings and Sauces  
Ice Cream, Ices and Sherbets  
Bakery Products  
Confectionery  
Miscellaneous

#### 4. PLANT SEED GUMS

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Botany  
Source  
Structure  
Properties  
Applications  
Guar Gum  
Historical Background  
Source  
Structure  
Properties  
Applications

Psyllium Seed Gum  
Source  
Structure  
Properties  
Applications  
Quince Seed Gum  
Source

Structure  
Properties  
Applications

#### 5. PECTINS

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Function in Plants  
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Low Methoxyl Pectins  
Gel Formation  
Theoretical Discussion  
Sugar  
Setting Time  
Gel Strength  
Gelation of Low Methoxyl Pectin  
Manufacture of Pectin  
Process  
Standardization  
Manufacture of Low Methoxyl Pectins  
Uses of Pectin  
Jams, Jellies and Preserves  
Critical Parameters  
Canned Fruits and Fruit Juices  
Confectionery Products  
Dairy Products

Miscellaneous  
Uses of Low Methoxyl Pectins  
Dessert and Pudding Mixes  
Canned Fruit Sauce Gels  
Canned Tomato Aspic  
Frozen Foods  
Soda Fountain Fruit Toppings  
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Fruit Pie Fillings  
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Production  
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Background  
Structure  
Properties  
Applications  
Alginates  
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Toxicity  
Food Applications  
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Deacetylated Polymer  
Phosphomannan Y-2448  
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Structure  
Properties  
Rheological Behavior  
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Rheological Behavior  
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Ash  
Metal Content  
Sulfur Dioxide Content  
Organic Additives  
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Viscosity  
Color  
Turbidity  
Gel Strength (Bloom)  
Protective Colloid Action  
Emulsion Stabilizer  
Preservation  
Gelling Properties and Mechanism  
Gel Structure Hypotheses  
Gelation of Gelatin

Phenomena Related to Gelling Mechanism

Applications

Gelatin Desserts

Confections

Ice Cream Stabilizers

Dairy Products

Meat Products

Bakery Goods

Food Coatings

Flavor Fixation

Miscellaneous

## 10. CELLULOSE GUMS

Cellulose Derivatives

Microcrystalline Cellulose

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Food Applications

Pharmaceutical and Cosmetic Applications

Food and Drug Administration Status

Sodium Carboxymethylcellulose (CMC)

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Properties

Dairy Food Applications

Bakery Applications

Salad Dressings, Sauces, and Gravies

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Packaged Dry Mixes

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Legal Status

Methylcellulose and Hydroxypropylmethyl-cellulose

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Bakery Product Applications

Dietetic Foods

Dehydrated Foods

Frozen Foods

Salad Dressings

Breading Batters

Edible Film Applications

Legal Status

Hydroxypropylcellulose (Klucel)

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Food Applications

Food and Drug Administration Status

Methylethylcellulose

Properties

Applications

Food and Drug Administration Status

Other Cellulose Derivatives

Hydroxyethylcellulose (HEC)

Ethylcellulose (EC)

Ethylhydroxyethylcellulose (EHEC)  
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11. SYNTHETIC HYDROCOLLOIDS  
Polyvinylpyrrolidone (PVP)  
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Carboxyvinyl Polymers (Carbopol)  
Background  
Properties  
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12. ANALYSIS OF HYDROCOLLOIDS  
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Identification of Gums in Specific Foods  
Group Analysis and Identification Schemes  
Group Identification Methods  
Qualitative Group Analysis  
Analysis by Quaternary Ammonium Salt Reactions  
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Additional Analytical Methods  
Infrared Spectroscopy  
Paper Chromatography  
Electrophoresis  
X-Ray Diffraction  
Differential Thermal Analysis (DTA)  
Reagents for Gum Identification

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