



herbal and ayurvedic products. The demand in past is found to have increased with increase in number of middle class population. People are now a days very much aware of the ingredients in cosmetic products, the benefits of plant products and the harmful effects of chemical ingredients. The presence of artificial and chemical ingredients in cosmetic products has made people to rethink about suitable alternatives to suit their personal care regime. The herbal products have finally made their appearance in packaged form in the domestic markets, as cosmetics and personal care preparation such as soaps, shampoos, detergent bars, liquid soaps, liquid detergents, etc. These products play a vital role in our sense of well being and quality of life. The herbal soaps and detergents directly influence our emotions and can trigger moods. These creations not only protect the skin from harmful sun radiations but also leave behind a pleasant fragrance. Due to the increasing awareness and importance of cleanliness and healthiness, the use of herbal products is also increasing. Future demand for herbal products depends upon the per capita rate of consumption and segment of population using these products.

This handbook provides detailed information on the manufacturing process of herbal soaps and detergents. This book contains numerous formulae, manufacturing process of different type of soaps and detergents which are used in day to day life. The book is an unique compilation and will be very helpful to all its readers, new entrepreneurs, professionals, beauty care product manufacturers, existing units, technical institutions, etc.

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## Synthetic Odourous Chemicals Fixatives

### Raw Materials : Herbal Products

Acacia arabica

A. indica Benth

Parts Used : Bark, gum, leaves, seeds, pods.

Acalypha Indica

(N.O. - Euphorbiaceae)

ANDROPOGON MURICATUS. Retz. or A. Squarrosus

Angelica (Angelica archangelica)

Anise (Pimpinella anisum)

Associated Oil

AZADIRACHTA INDICA

Basil (Ocimum basilicum)

BALSAMODENDRON MUKUL, HOOK. or B. agollocha

Parts Used - Gum

BALSAMODENDRON MYRRHA

(N.O. Burseraceae)

Parts Used : Gum from the bark of the tree

Bay (Laurus nobilis)

Associated Oils

Benzoin (Styrax benzoin)

Associated Oils

Bergamot (Citrus bergamia)

Birch (Betula lenta)

Associated Oils

Calendula (Calendula Officinalis)

Associated Oil

Caraway (Carum carvi)

Cardamom (Elettaria cardamomum)

CITRUS MEDICA, Linm

(N.O.—Rutaceae)

Carrot Seed (Daucus carota)

Caulophyllum Inophyllum

Cedarwood (Cedrus species)

Cinnamon (Cinnamomum zeylanicum)

Associated Oils

Clary Sage (Salvia sclarea)

Associated Oils

Celery (Apium graveolens)

Chamomile, German  
(*Matricaria recutita*, formerly *M. chamomilla*)  
Associated Oils  
Coriander (*Coriandrum sativum*)  
Curculigo orchioides Gaertn  
(N.O.—Amaryllidaceae)  
Ayurvedic Properties  
CURCUMA LONGA, Linn  
(N.O.—Scitaminaceae)  
Associated Oil  
Cypress (*Cupressus sempervirens*)  
Eucalyptus (*Eucalyptus globulus*)  
Associated Oils  
Fennel (*Foeniculum vulgare*)  
Associated Oil  
Fir (*Abies alba* and other species)  
Associated Oils  
Associated Oils  
FICUS RELIGIOSA LINN  
(N.O. Moraceae)  
Parts Used : Bark, Fruit, Root  
Ayurvedic Properties  
Galbanum (*Ferula galbaniflua*)  
Associated Oils  
Geranium (*Pelargonium graveolens*)  
Associated Oil  
Ginger (*Zingiber officinale*)  
Associated Oil  
Helichrysum (*Helichrysum angustifolium*)  
Hyssop (*Hyssopus officinalis*)  
Associated Oil  
Inula, Sweet (*Inula graveolens*, or *I. odorata*)  
Associated Oil  
HEMIDESMUS INDICUS, R. BR.,  
*Asclepias pseudosarsa*, var. *latifolia*  
(N.O. Asclepiadaceae)  
Jasmine  
(*Jasminum officinale* and *J. grandiflorum*)  
Associated Oil  
Juniper (*Juniperus communis*)  
Associated Oils

Labdanum (*Cistus labdaniferus*)  
Associated Oils  
Lavender (*Lavandula angustifolia*, previously *L. vera* and *L. Officinale*)  
Associated Oils  
Lemon (*Citrus limon*)  
Associated Oil  
Associated Oils  
Lemongrass Cochin (*C. flexuosus*)  
Grown in India primarily for isolation of citral  
Lovage (*Levisticum officinale*)  
Marjoram  
(*Origanum marjorana* or *Marjorana hortensis*)  
Associated Oils  
Melissa (*Melissa Officinalis*)  
Associated Oil  
Mimosa (*Acacia decurrens* var. *dealbata*)  
Associated Oil  
Myrrh (*Commiphora myrrha*)  
Associated Oils  
Myrtle (*Myrtus communis*)  
Oakmoss (*Evernia prunastri*)  
Associated Oil  
Orange (*Citrus sinensis*)  
Associated Oils  
Orange Blossom (Neroli)  
(*Citrus aurantium* var. *amara*)  
Associated Oils  
Patchouli (*Pogostemon cablin*)  
Pepper, Black (*Piper nigrum*)  
Associated Oils  
Cubeb (*Piper cubeba*)—A litsea substitute  
Peppermint (*Mentha piperita*)  
Associated Oils  
PSORALEA CORYLIFOLIA LINN.  
(N.O. Papilionaceae, Fabaceae)  
Parts Used : Roots, leaves, fruits, seeds  
Ayurvedic Properties  
Ravensare (*Ravensara aromatica*)  
Rose (*Rosa damascena*, *R. gallica*, and others)  
Associated Oils

Rosemary (*Rosmarinus officinalis*)

Associated Oils

Rosewood (*Aniba rosaeodora*)

Sage (*Salvia officinalis*)

Sandalwood (*Santalum album*)

Associated Oil

Spikenard (*Nardostachys jatamansi*)

Associated Oils

SMILAX CHINA

(N.O. - Liliaceae)

TERMINALIA CHEBULA RETZ.

(N.O. Combretaceae)

Parts Used : Fruit

Ayurvedic Properties

TERMINALIA BELERICA ROXB

(N.O. Combretaceae)

Parts Used : Fruit (unripe and ripe)

Ayurvedic Properties

Healing Power and Curative Properties

Cough

Stomach Disorders

Sore Throat

Chronic Constipation

Intestinal Worms

Eye Disorders

Other Diseases

Tea Tree (*Melaleuca alternifolia*)

Associated Oils

Thyme (*Thymus vulgaris*)

Associated Oils

*Thymus vulgaris* has many chemotypes

Tuberose (*Polianthes tuberosa*)

Vanilla (*Vanilla planifolia*)

Vetiver (*Vetiveria zizanoides*)

Violet (*Viola odorata*)

Associated Oil

Yarrow (*Achillea millefolium*)

Ylang-Ylang (*Canaga odorata*)

Associated Oils

Preparation and Properties of Surface Active Agents from Castor Oil

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Hard Fats are  
Soft Fats are  
Some Suggested Formulations for Washing Soaps

Good Quality  
Cheaper Quality  
A Typical Batch for Herbal Based Toilet Soap  
Oriental type  
Perfume mixture as formulated below  
Perfumes as formulated below  
Perfume Mixtur  
Formulation of fancy Soap Type  
Perfume Mixture  
Himalayan Boquet Type  
Perfume Mixture  
Rose Soap Type  
Perfume Mixture  
Transparent Soap - No. 1.  
(glycerine soap of market)  
A suggested formulation  
Transparent Soap-No.2  
(by special milling method)  
Mottled Soap  
Carboli Acid Soap  
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Liquid Antiseptic Soap  
Deodorant Soaps  
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Combination in Soap No. 2  
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Textile Soaps  
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Laundry Soap Formulations  
More Formulations  
Laundry Washing Aids  
More Laundry Wash Mixtures

(Soap and Sodium Metasilicate Solution)  
A Fabric Cleaning Compound  
Cotton Scouring Soap  
Dry Cleaner's Soap  
A suggested Formulation of Dry Cleaner's Soap  
WATER SOFTNER  
(Chemicals which may be used for prevention of soap curds)  
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AUTOMOBILE SOAP  
WIRE DRAWING SOAP  
SCOURING SOAP  
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A Typical Charge  
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Aerosol Package  
Liquid Soaps/Shampoos  
Process of Manufacture  
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Germicidal Agents  
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A General Formulation  
Foamless oil Shampoos  
A Formulation  
Baby Shampoos  
Medicated Dandruff Shampoos  
Other miscellaneous shampoos  
Aerosol Shampoos (Pressure Dispersed)  
HERBAL TOILET SOAPS  
To Prevent Pimples  
To Fight Dandruff  
To Kill Germs  
To Prevent Prickly Heat  
HERBAL SHAMPOOS  
Lime Shampoo  
Lavender Shampoo  
Methi-Shikakai Shampoo  
Sandalwood Shampoo  
Neem Shampoo  
Hair Rinses  
Apple Hair Rinse  
Barley Hair Rinse  
Chamomile Hair Rinse  
Rosemary-Chamomile Hair Rinse  
Rosemary Hair Rinse  
Hair Setting Preparations for all Hair Types  
Bay-Rum Hair Setting Preparation  
Clove Hair Setting Preparation  
Gum Tragacanth Hair Setting Preparation  
Lime Hair Setting Preparation

## HAIR CONDITIONERS FOR ALL HAIR TYPES

Avocado Hair Conditioner

Sunflower Hair Conditioner

Wheat Hair Conditioner

Shampooing

## ANTI-DANDRUFF PREPARATIONS FOR ALL HAIR TYPES

Anti Dandruff Lemon Preparation

Anti-Dandruff Egg Preparation

Anti-Dandruff Vinegar Preparation

Anti-Dandruff Sesame Preparation

Anti-Dandruff Sesame Preparation

Anti-Dandruff Rosemary Preparation

## Technology of Manufacturing Herbal Synthetic Detergents

Performance Criteria

Washing habits

Quality of water

Soiling

White vs. coloured clothes

Manufacturing facilities

Safety and pleasant 'in-use' qualities

Colour, odour and flow characteristics

Shelf life

Pricing

Formulation Requirements

Alkalinity

Good building and active matter

Approach to Product Formulation

Non Soapy Detergent Powder Formulations

Production Procedure

## FORMULATIONS OF SYNTHETIC DETERGENT POWDERS

### A TYPICAL BATCH OF FINISHED PRODUCT

(A good quality household detergent granules)

For 1000 kg. yield

Surfactants

Builders

Additives

### A TYPICAL BATCH USING ACID SLURRY OF

### UNSEPARATED SPENT ACID

For 1000 kg. of finished detergent

Surfactant

Builders

Additives

Detergent Powder Prepared Without  
Using Spray Dryer (High Bulk Density)

A TYPICAL FORMULATION OF HOUSEHOLD  
DETERGENT POWDER

For 1000 kg. finished product

Procedure

Foam Regulation

Typical Suds Regulated Surfactant Compounds

General Formulations for Industrial Detergent Powder

Woollen Piece Goods Scouring Preparation

Formulation with anionic and soap as active surfactants

Light Duty

Machine Dish Washing Powder

Scouring Powders Including Kitchen Cleaners

Abrasives

Surfactants

Other Chemicals

Soap Powder

Manufacturing Process

Floor Washing Compound

Heavy-duty Household Washing Powder

White Household Heavy-duty washing Powder

Spray-dried Heavy-duty Household Hand-washing Powder

Household Spray-dried Powder

General-purpose Spray-dried Powder

General Purpose Powder

High-foam Food/Dairy Detergent Cleaner

Heavy-duty Detergent Powder

Light-duty Detergent Powder

General Formula for Detergent Powders

Spray-dried Enzyme Detergent

Medium-foam Detergent Powder

Glass Rinsing Sanitizer

Industrial Sanitary Cleaner

General Cleaning Compound

Dishwashing Compound

Heavy-duty Detergent

Household Laundry Bleach

Low Sudsing Detergent Powder

Hand Laundering Powder  
Plastic-ware Destaining Compounds  
Magic Dip Bleach  
Purex Bleach  
All-purpose Metal Cleaning Compound  
Standards  
Scheme for the Manufacture of Detergent  
powder on small scale  
Land and Building  
Projecting Cost  
Plant and Machinery  
Labour & Staff  
Monthly Requirements of Raw Materials,  
Utilities and Factory Overheads  
Working Capital (3 months basis)  
Total Capital Investment  
Own Capital Requirements  
Factory cost of Production (Monthly Basis)  
Profitability

Detergent Bars  
Introduction  
Requirements of a Detergent Bar  
NSD Bar Vs. Soap  
Components of Detergent Bars  
Active detergent  
Sodium tripolyphosphate  
Talc  
Starch  
China clay  
Calcite  
Soda ash  
Sodium sulphate  
Sodium silicate  
Coconut mono ethanolamide  
Soapstock  
Dicalcium phosphate  
Rosin  
Titanium dioxide  
Colour  
Fluorescer

Perfume  
Water  
Processing of NSD Bars  
Handling of Raw Materials  
Processing  
Process Control  
Some Typical Formulations of Detergent Bar  
Formulations for detergent bar manufacture  
Plant & Machinery for Small Scale Detergent  
Cake Manufacture  
Kneader  
Milling Machine  
Plodder  
Bar Cutter or Billet Cutter  
Embossing or Stamping Machine  
Pulverizer  
Formulations of Detergent Cakes  
Soap-Surfactant Combination  
Detergent Bar  
Low-soap Syndet Bar  
Soap-Synthetic All-purpose Bar  
All Syndet Bar  
Alkyl-Sulfate Syndet Bar  
Proctor & Gamble's Soap Syndet Formulation  
Proctor and Gabmle's Syndet Laundry Bar  
SCHEME FOR THE MANUFACTURE OF  
DETERGENT CAKES ON SMALL SCALE  
Capacity : 1 tonne per day per shift basis  
Land and Building  
Projecting Cost  
Plant and Machinery  
Monthly requirements of Raw Materials, Utilities and Factory  
Overheads  
Labour and Staff  
Working Capital requirements (3 months basis)  
Total Capital Investment  
Own Capital Requirements  
Cost of Production (Monthly Basis)  
Profitability

Herbal Liquid and Paste Detergents

Requisites of surfactants for formulating liquid detergents

Surfactants most commonly used

Consumption of Surfactants in Detergents (in kilotons)\*

Builders

Viscosity Controlers

Other Ingredients

HOUSEHOLD LIQUID DETERGENTS FOR LAUNDERING

Heavy Duty

Manufacture of Paste Detergents

FORMULATIONS OF LIQUID AND PASTE DETERGENTS

Heavy Duty liquid Detergents

A few formulations are listed in Table 2

Light Duty Detergents

Liquid Shampoo

Liquid Shampoo Formulation

TYPICAL FORMULATIONS

Opaque viscous solution

Procedure

Light Duty : (for silk, wool etc.)

TYPICAL FORMULATIONS

Procedure

Shampoos

Rug Cleaning Liquid Detergent Formulations

A Recommended Formulation

Heavy-duty Liquid Detergents

Heavy-duty Liquid Detergent with 'Controlled

Opaque Lotion-type Light-duty Liquid Detergent

Light-duty Household Liquid Detergent

40% Detergent Paste

20 % Detergent Paste

Metal Degreasing Liquid Detergent

General-purpose Solvent-based Detergent

Textile Scouring Paste

Textile Degumming Detergent Paste

Low Foaming Liquid Detergents

Other Formulations of Synthetic Liquid Detergents

Light-duty Liquid Detergent

Light-duty Liquid Detergent for Dishwashing

Household Liquid Detergent Cleaner

Light-duty Clear Detergent Liquids

Light-duty Liquid Detergent Lotion

Heavy-duty Liquid Detergent  
Scheme for the Manufacture of Liquid  
Detergents on Small Scale  
Land and Building  
Projecting Cost  
Plant and Machinery  
Labour and Staff  
Monthly Requirements of Raw Materials,  
Utilities & Factory Overheads  
Working Capital Requirements (3 months basis)  
Total Capital Investment  
Own Capital Requirements  
Cost of Production (Monthly basis)  
Profitability

Determination of Physical, Surface Active and Performance Characteristics of  
Surfactants

Physical Characteristics  
Density of Powdered Detergents  
Apparent Bulk Density  
Apparent density,  $g/ml = 40/V$   
Cup Density  
Particle Size of Powdered Detergents  
Hand Sieving  
Machine Sieving  
pH and Alkalinity  
Free Alkalinity  
Cloud Point of Non-ionic Detergents  
Viscosity  
Surface-Active Properties  
Ring Method  
Experimental Procedure  
Determination of Surface Tension  
Determination of Interfacial Tension  
Calculation of Surface Tension  
Calculation of Interfacial Tension  
Correction Factor 'F' for the Ring Method Factor 'F' for  
PERFORMANCE CHARACTERISTICS  
Dishwashing Tests  
Laundry Evaluation  
Split Item Tests

Bundle Test  
Foam Tests  
Dynamic Foam Test  
Pour Foam Test  
Wetting Test  
Canvas Disc Test  
Skein Test

Analysis of Surfactants

Separation of Surfactants

IDENTIFICATION OF COMPONENTS

Anionics

Cationics

Non-ionics

DETERMINATION OF SURFACTANTS

Total Organic Active Ingredient

Procedure

Correction for Sodium Chloride Content

ANIONIC SURFACTANTS

Preliminary Estimate of Mol. Wt.

Titration with Cationic Surfactants

Preparation and Standardization of Titrant

Titration of Sample

Amine Complexation Method

Determination of Alkylaryl Sulfonates

Determination of Alkylaryl Sulfonates in the  
Presence of Short Alkyl Chain Sulfonates

Determination of Fatty Alcohol Sulfates

CATIONIC SURFACTANTS

Determination of Amine Oxides

Non-Ionic Surfactants

Column Techniques

Batch Technique

Analysis of Fats and Fatty Oils

Methods of Analysis

DETERMINATION OF PROPERTIES

Physical Characteristics

Procedure

Procedure

Chemical Characteristics

Procedures

## COMPOSITION ANALYSIS

Gas Chromatography

Procedures

Spectroscopic Methods

Procedure

## OTHER TESTS

Procedure

Analysis of Detergents

Methods of Analysis

Sampling

Separation

Procedure

## IDENTIFICATION OF COMPONENTS

Procedures

Infrared Absorption Bands of Typical Commercial Detergents

Typical Analysis of a Linear Alkylate Sample

Procedure

## DETERMINATION OF SURFACTANTS

Total Organic Active Ingredients

Procedure

Anionic Detergents

Procedure

Procedure

Cationic Detergents

Procedure

Nonionic Detergents

Procedure

## DETERMINATION OF COMPONENTS

### OTHER THAN SURFACTANTS

Abrasives

Procedure

Ammonia

Procedure

Carbonates

Procedure

Carboxymethylcellulose

Chlorides and Available Chlorine

Procedures

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Procedure  
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Specific Gravity of Ethanol-Water Solutions at  
Varying Concentrations  
Specific Gravity of Isopropyl Alcohol-Water  
Solutions at Varying Concentrations  
Procedure  
Fatty Acids  
Procedure  
Glycerine  
Hydrotropes  
Procedure  
Metallic Impurities  
Procedure  
Neutral Oil (Free Oil) and Free Fatty Alcohol  
Procedure  
Perborates  
Procedure  
Phosphates  
Procedure  
Silicates  
Procedure  
Solids  
Procedure  
Steam-Distillable Matter  
Procedure  
Sulfates  
Procedure  
Water  
Procedure  
Performance Tests  
Procedure  
Analysis of Soaps  
Methods of Analysis  
SAMPLING  
Procedures  
SEPARATION  
Procedures  
IDENTIFICATION  
Procedures  
DETERMINATION OF SOAP COMPOSITION

Procedures

DETERMINATION OF INORGANIC FILLERS AND  
SOAP BUILDERS

Procedures

DETERMINATION OF OTHER ADDITIVES

Procedure

Munson and Walker Sugar Equivalents

Procedure

DETERMINATION OF IMPURITIES

Procedure

OTHER QUALITY CONTROL TESTS

ANALYSIS OF SOAPS CONTAINING SYNTHETIC DETERGENTS

ANALYSIS OF METALLIC SOAPS

Procedure

Beauty with Fruits and Vegetables

Apple

Apricot (Khubani)

Banana

Barley

Carrot

Castor Oil

Clove

Cucumber

Dhania

Egg

Honey

Lavender

Lemon

Orange

Palak

Peach

Potato

Pudina

Rose

Sage

Salt

Saunf

Tea

Thyme

Tomato

Yoghurt

Sulfonated Oils

Historical Background

Chemistry of Sulfation and Sulfonation

Applications of Sulfonated Oils

MANUFACTURE OF SULFONATED OILS

Sulfation

Sulfonation

SULFATION OF INDIVIDUAL OILS

Characteristics and Analysis of Sulfonated/Sulfated Oils

## About Niir

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