DENTAL PRODUCTS

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ORAL CARE PRODUCTS

1. Toothbrush
2. Dentifrice
3. Oral Rinses
ORAL ENVIRONMENT

Teeth
Gingiva / Mucosa
Saliva
Plaque
Tartar
Caries
Periodontal Disease
COMPOSITION & CHEMISTRY OF DENTIFRICES
COMPOSITION & CHEMISTRY OF DENTIFRICES

DENTIFRICE:
A dentifrice is a substance used with a toothbrush for the purpose of cleaning the accessible surfaces of the teeth (American Dental Association)

TOOTHPASTE:
Toothpaste is a colloidal suspension of a mixture of ingredients that must be carefully balanced in order to provide an efficacious, safe, and consumer friendly product
TOOTHPASTE INGREDIENTS

• Abrasive
• Binder
• Humectant
• Sweetener
• Flavor
• Surfactant

• Active Ingredients
ABRASIVE

• Function:
  – Cleaning and polishing

• Characteristics:
  – Solid, insoluble particles
  – Abrasive
  – Potential for fluoride interaction
ABRASIVE

• Types:
  – Silica
  – Phosphate Salts – ie “Dical”
  – Carbonates – ie Calcium Carbonate or Chalk
  – Others
BINDER

• **Function:**
  Used to stabilize toothpaste formulations to prevent separation of the liquid and solid phases

• **Characteristics:**
  Can be natural or synthetic
BINDER

• Types:
  – Natural Polymers
    • Carboxymethyl Cellulose (CMC)
    • Carrageenans
    • Xanthan Gum
  – Synthetic Polymers
  – Others
HUMECTANT

• Function:
  Used in toothpaste to prevent loss of water and subsequent hardening of the product upon exposure to air

• Characteristics:
  Affect taste perception
  Proper usage level produce a clear translucent toothpaste
HUMECTANT

• Types:
  – Glycerine
  – Sorbitol
  – Polyethylene Glycol
  – Xylitol
  – Propylene Glycol
SWEETENER

- Types:
  - Sodium Saccharin
  - Sodium Cyclamate
  - Acesulfame K
SWEETENER

• Function:
  An important part of toothpaste flavoring system

• Characteristics:
  Government regulations
  Non-cariogenic
FLAVOR

• Function:
  Improve taste of toothpaste

• Characteristics:
  One of the most important factors for consumer
  A mixture of flavoring agents
FLAVOR

• Types:
  – Minty
  – Fruity
  – Medicinal
  – Cinnamon
Oral products have a unique and specialized flavor requirements. To be successful in oral products, a flavor must:

- Have a pleasant taste while brushing
- Leave a pleasant taste in your mouth after brushing
- Be compatible with the base
SURFACTANT

- **Function:**
  Produce foam and aid in the removal of debris
  Emulsifies flavoring agents

- **Characteristics:**
  May react with other toothpaste components
  High level may cause mucosal irritation
SURFACTANT

• Types:
  – Sodium Lauryl Sulfate
  – Sodium N-Lauroyl Sarcosinate
  – Sodium Dodecyl Benzene Sulfonate
  – PEG Oil
FLUORIDE ACTIVES

• **Function:**
  Increase resistance to enamel solubility

• **Characteristics:**
  Regulated by Government
  Restricted usage level
  Soluble fluoride ion is essential for activity
FLUORIDE ACTIVES

• Types:
  – Sodium Fluoride \( \text{NaF} \)
  – Sodium Monofluorophosphate \( \text{MFP} \)
  – Stannous Fluoride \( \text{SnF}_2 \)
OTHER ACTIVES

- Tartar Polyphosphates
  Zinc Citrate

- Plaque / Gingivitis Triclosan
  SnF2
  Chlorhexidine
  Zinc Citrate

- Desensitizer Potassium Nitrate

- Whitening Calcium Peroxide
  Hydrogen Peroxide
# TYPICAL COMPOSITION

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Humectants</td>
<td>60 – 20</td>
</tr>
<tr>
<td>Water</td>
<td>0 – 50</td>
</tr>
<tr>
<td>Binders</td>
<td>0 – 12</td>
</tr>
<tr>
<td>Abrasive</td>
<td>18 – 50</td>
</tr>
<tr>
<td>Flavor</td>
<td>0.5 – 2.0</td>
</tr>
<tr>
<td>Sweetener</td>
<td>0.2 – 1.0</td>
</tr>
<tr>
<td>Surfactant</td>
<td>0.5 – 2.0</td>
</tr>
<tr>
<td>Fluoride</td>
<td>0.2 – 1.2</td>
</tr>
</tbody>
</table>
TOOTHPASTE CONSIDERATIONS

• Safety
• Efficacy
• Consumer Friendly
  – Pleasing taste
  – Ease of use
  – Pleasing appearance
PRODUCT CRITERIA

• Minimum one year shelf life
• Easily dispensable
• Compatible with the package
• Efficacious
• Safe
MOUTHWASHES or ORAL RINSES
## Ingredients of Dentifrices and Oral Rinses

<table>
<thead>
<tr>
<th>Dentifrice</th>
<th>Oral Rinse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Therapeutic agent(s)</td>
<td>Therapeutic agent(s)</td>
</tr>
<tr>
<td>Abrasive</td>
<td>-</td>
</tr>
<tr>
<td>Surfactant(s)</td>
<td>Surfactant(s)</td>
</tr>
<tr>
<td>Humectant(s)</td>
<td>Humectant(s)</td>
</tr>
<tr>
<td>Flavor</td>
<td>Flavor</td>
</tr>
<tr>
<td>Thickener(s)</td>
<td>Ethanol</td>
</tr>
<tr>
<td>Coloring</td>
<td>-</td>
</tr>
<tr>
<td>Water</td>
<td>Coloring</td>
</tr>
<tr>
<td></td>
<td>Water</td>
</tr>
</tbody>
</table>
# Mouthwash Components

<table>
<thead>
<tr>
<th><strong>Ingredient</strong></th>
<th><strong>Function</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Flavor</td>
<td>Makes mouthwash pleasant to use. Adds a refreshing, cool quality to oral cavity immediately and for some time after use. Makes breath temporarily pleasant by imposing a pleasant note over breath aroma. Some flavors exert significant antibacterial effect.</td>
</tr>
<tr>
<td>Humectant</td>
<td>Adds &quot;body&quot; to product, inhibits crystallization around closure.</td>
</tr>
<tr>
<td>Surfactant</td>
<td>Used for solubilization of flavor. Provides foaming action. Assists removal of oral debris by lowering surface tension. Can be antibacterial. (Selection is critical in antibacterial mouthwashes; must be compatible with antibacterial active.)</td>
</tr>
<tr>
<td>Water</td>
<td>Major vehicle to carry other ingredients.</td>
</tr>
<tr>
<td>Special ingredients:</td>
<td><strong>Antibacterial agent</strong> To enhance antibacterial efficacy.</td>
</tr>
<tr>
<td></td>
<td><strong>Astringent salts</strong> Can interact with proteins of saliva and oral mucosa.</td>
</tr>
<tr>
<td></td>
<td><strong>Chlorophyllins</strong> For topical deodorization.</td>
</tr>
<tr>
<td></td>
<td><strong>Fluoride</strong> Anticaries agent.</td>
</tr>
</tbody>
</table>
THANK YOU