Gum Arabic / Gum Acacia

The dried exudate (gum) from Acacia Senegal and related species (Acacia Seyal)
Gum Arabic

- Origin
- Collection (origin) and Processing (Europe)
- Structure
  - chemical composition
- Properties
  - functional characteristics and influences
- Applications
- Important Quality Parameters
- Comparison of the different grades
- Our qualities
Gum Arabic - Origin

South of Sahel zone, mainly Sudan, Chad and Nigeria
Gum Arabic - Collection

Tapping
Gum Arabic - Collection

Cleaning
Gum Arabic - Collection

Sieving
Gum Arabic - Processing

- **Dry**
  - powder
  - granular

- **Wet**
  - spraydrying
  - rollerdrying
Gum Arabic - Structure

- Complex polysaccharide
  - neutral or weakly acid
  - containing nitrogenous material (amino acids)
  - chemical composition vary slightly
  - contained sugar monomers in a ratio of 3:3:1:1 are
    - galactose, arabinose, rhamnose and glucoronic acid
  - highly branched molecule with great variation in molecular mass
Gum Arabic - Structure
Gum Arabic - Properties

- readily dissolves in cold water
- odourless
- tasteless
- viscosity is a function of concentration
Gum Arabic - Properties

- Solutions of Gum Arabic below 40 %
  - react like Newtonian liquid
    - viscosity is shear rate independent

- Solutions of Gum Arabic at higher concentrations
  - show pseudoplastic characteristics
    - shear thinning

⇒ reversible decrease of viscosity with increasing shear forces
Gum Arabic - Properties

- weakly acid character in water (pH ≈ 4.5)
- pH of the solution affects the viscosity
Gum Arabic - Properties

- viscosity decreases in the presence of electrolytes (salts)
Gum Arabic - Properties

- comparison with other thickening agents shows lower viscosity of Gum Arabic solutions even at higher concentrations
Gum Arabic - Properties

- emulsifier for essential oils and flavours
  - proteins adsorb on the surface of the oil droplets
  - formed emulsions remain stable for a long period of time

**Disadvantage:**
prolonged heating ( > 70 °C) of Gum Arabic solutions causes precipitation of the proteinous components !!!
Gum Arabic - Applications

Food industry

- Confectionery
  - gums, especially wine gums (thickener)
  - pastilles (thickener)
  - marshmallows (foam stabiliser)
  - toffees (emulsifier)
  - glaze on coated nuts or similar products
Gum Arabic - Applications

➢ Food industry
   – Beverages
     • emulsifier in production of citrus and cola flavour oils for soft drinks
   – Diary Products
     • stabiliser in frozen products like ice and ice cream
       – water absorbing, producing a finer texture
Gum Arabic - Applications

➢ Food industry
  – Bakery products
    • glazes and toppings
  – Diabetic and dietetic products
    • low level of metabolism
  – Flavour fixative
    • spray dried encapsulation
Gum Arabic - Applications

 Pharmaeutical industry
  • stabiliser in emulsions
  • binder in tablets
  • mucilage for tablet coatings

 Cosmetic industry
  • smooth feel in lotions and protective creams
  • adhesive in facial masks or face powders
Gum Arabic - Applications

➤ Other industries

- mucilage
- simple adhesive and glue
- protective colloid and suspending agent in Inks
Gum Arabic - Important Quality Parameters

- Purity
- Colour
- Optical rotation
- Emulsifying properties
- Microbiological values
Gum Arabic -
Comparison of the different grades

- **Powder / granular form**
  - price
  - solubility (compared to crude gum)

- **Spraydried / rollerdried form**
  - purity
  - homogenous
  - microbiology
  - solubility
Gum Arabic - Our Qualities

LUMPS

- CEROGA 821 Kordofan cleaned
- CEROGA 812 cleaned ex Acacia Senegal
- CEROGA 803 small lumps ex Acacia Seyal
- CEROGA 800 technical
Gum Arabic - Our Qualities

POWDER

- CEROGA 836 very fine white
- CEROGA 834 light white
- CEROGA 831 off-white
- CEROGA 830 technical dark
Gum Arabic - Our Qualities

SPRAYDRIED

- CEROSPRAY K / Gum Arabic spraydried white
- CEROSPRAY N / Gum Arabic spraydried light
- CEROSPRAY B / Gum Arabic spraydried yellowish
- CEROSPRAY F / Gum Arabic spraydried off-white
- CEROSPRAY D / Gum Arabic spraydried dark
Gum Arabic spraydried

Dissolution of the gum in water, extraction of impurities
Gum Arabic spraydried

Elimination of impurities through centrifugation
Gum Arabic spraydried

Concentration and Pasteurisation
Gum Arabic spraydried

Spray Tower