

CYAMOPSIS BIOTECH



ABOUT US

INTRODUCTION

We, Cyamopsis Biotech (India) Pvt. Ltd., (Formerly known as Dada Ganpati Guar Products Pvt. Ltd.) offer a wide selection of Guar products for your specific requirements. Established in the year 2008, we are one of the leading Manufacturer, Exporter and Supplier of Guar products. We possess a perfect blend of latest technologies and highly qualified technicians to produce a range of quality Guar Protein products.

We are devoted to developing innovative solutions for a sustainable and efficient future for the agriculture industry. In order to fulfil this goal, Cyamopsis Biotech has a truly global approach with highly skilled professionals and experts in their field. We make our contribution by utilising cutting edge technology at state- of- the- art production facilities in India and efficient supply chain around the world. We have our presence in USA, Canada, Europe which makes us truly global.

STRUCTURE



Guar gum is obtained from the seed of the legume Cyamopsis tetragonolobus. The germ portion of its seed is predominantly protein and the endosperm predominantly guaran. Guaran, the functional polysaccharide in guar gum, is composed of a linear chain of D-mannose residues bonded together by ($1 \rightarrow 4$)-glycosidic linkages. Pendant from the mannose backbone are Dgalactosyl units attached via (1 \rightarrow - Glycosidic linkages. It was 6)first believed that the side groups were substituted at regular along the intervals mannan backbone (1). However, recent using experiments enzyme degradation of guar (2), spectroscopic methods (3),

and computer simulation (4), indicate a more random distribution of galactose side groups.

One such model proposes a guar galactomannan in which the galactosyl units are randomly arranged mainly in pairs and triplets (5) (Figure 4.1 b). The of anhydromannose ratio to anhydrogalactose units has historically been reported at 2:1. Recent studies support ratios in the range of 1.6:1 to 1.8:1 (3-9). Current data also suggest that galactomannans from different guar varieties have the same galactose/ mannose arrangement.

PROPERTIES

RHEOLOGY

Rheology is the study of flow and deformation of material when external force is applied. Guar gum in aqueous solutions shows pseudoplastic or shear- thinning behavior which means reduction in viscosity with increasing shear rate as shown by many high molecular weight polymers.

This shear thinning behavior of guar gum aqueous solution increases with polymer concentration and molecular weight. Guar gum aqueous solutions also do not show yield stress properties. Aqueous solutions of guar gum at 1 % concentration show a typical behavior of macromolecular biopolymer with dominating loss modulus (G") over storage modulus (G') in lower frequency range.

However, in high frequency range storage modulus dominates the loss modulus (Shobha and Tharanathan 2009). With time guar gum aqueous solutions showed a decreaseing storage modulus (G') and loss modulus (G").



- Waxy starch +1% guar gum without enzyme
- Waxy starch +1% guar gum with enzyme
- 1% guar gum without enzyme

VISCOSITY

Eighty to eighty- five percent of the guar bean endosperm is galactomannan polysaccharide (See Chapter 3 . 1 . 3). This is the Viscosifying component of guar. The remaining portion is composed of guar. of water, protein, enzyme, and several other non- polymeric carbohydrates. The major non-viscosifying sugar, arabinose, is present at about 5 % by weight of the endosperm







A fluid is called Pseudoplastic or shear thinning when its viscosity decreases with increasing shear rate. Shear thinning fluids are also called non- Newtonian since Newtonian fluids have constant viscosity with increasing shear rate. In Figure Newtonian and non-Newtonian behavior is illustrated by a plot of viscosity vs. shear rate for a silicone oil and an 0. 48% guar solution.



EFFECT OF PH

The pH of the polymersolution is important for very the crosslinking characteristics of metal ion. Some metals anv form effective crosslinks over a wide pH range. Titanium, for crosslink example will guar, HPG and CMHPG from pH 3 to pH 9. Other complexors are very pH specific, e.g., borate ion which will only form a gel Zirconium above pH 8. will crosslink at low pH or high pH, attached the depending on ligands. Aluminum has high affinity for the carboxymethyl substituent on CMHPG at low pH.

EFFECT OF CONCENTRATION

Guar molecules hydrate to form a random coil configuration in aqueous solutions . In dilute solutions, these coils are well separated from each other. As polymer concentration the increases, the polymer chains begin to contact each other or entangle. The concentration at entanglement which occurs c*) (denoted as is also dependent on molecular weight. molecular As the weight increases, the chair occupies more space in the solution. (greater hydrodynamic volume) and entanglement will occur at a lower polymer concentration.

EFFECT OF TEMPERATURE

Derivatized guar, crosslinked with transition metal ions, has been shown to maintain higher viscosity at elevated temperatures (8). This improved temperature stability is also illustrated by comparing plots of G' and G" vs. time and frequency for guar/ borate gels with HPG/ titanate gels. At 65 °C, borate systemloses the guar/ viscosity as the crosslinked density decreases (Figure 4.6.3.5 a). The HPG/ titanate gel maintains network with its structure increasing temperature.





The frequency dependence of G' and G" illustrates the differences between the two crosslinked systems. The HPG/ titanatesystem is a three dimensional network because G' is independent of frequency.

The guar/ borate gel is a less ordered structure, with G' and G" behavior similar to a polymer melt structure. However, the guar/ borate gel reforms a network structure when the temperature is decreased. These data suggest that the complexation constant of a particular polymer.

COMPATIBILITY

SALTS

The viscosity of non- ionic polymers such as guar and HPG is marginally affected by the presence of high concentrations of monovalent salts. Tolerance decreases for solutions of multivalent cations where guar will be insoluble or may even precipitate if the salt concentration is sufficiently high. Figure 4.5.4 a illustrates the viscosifying ability of guar in various salt solutions.



For anionic derivations, such as CMPHG, even monovalent cations affect the viscosity development. After hydrating one hour, the viscosity of CMHPG in deionized water is significantly higher than in a salt solution (Figure). This is due to the contraction of the polymer chains through electrostatic repulsion of anionic groups which reduced polymer chain entanglements.

ACIDS AND BASES

The stability of guar galactomannan in acidic conditions is observed using polymer dilute solutions at temperatures of 25,37 and 50°C. depolymerisation The of guar galactomannan was monitored by determining changes in solution viscosity, from which the viscosityaverage molecular weight was estimated. The lowest p H values at which guar galactomannan remained stable were found to be 2 .0, 3.0 and 3.5, respectively, at these temperatures. The acid degradation appears to be a random scission process obeying first order

kinetics. The activation energy at pH 1.5, 2.0 and 3.0 were estimated to be 117.4, 118.6 and 120.5 k mol-1, respectively. This indicates that guar gum is reasonably stable under an acidic environment. The viscosity of fully hydrated guar gum solutions at acidic p H was found to be slightly lower than it was at neutral p H even when no degradation occurred. Current results suggest that guar gum may be used in mild acidic processing conditions, particularly when excessive heat treatment is not used.

SUGAR

In guar- sugar solution, sugar competes with guar gum molecule for the water available in the solution, hence presence of sugar in guar gum solution causes delay in hydration of guar gum molecules. The viscosity of guar- sugar solution decreases gradually and is inversely proportional to the sugar concentration. Sweeteners like aspartame, acesulfame- k, cyclamate and neotame do not affect intrinsic viscosity of guar gum solutions significantly.

OUR PRODUCTS

- Fast Hydrating Guar Gum (CB-OG-FH)
- Hydroxypropyl Guar (CB-DR-HPG)
- Hydroxyethyl Guar Gum (CB-DR-HEG)
- Carboxymethyl Guar Gum Anionic (CB-DR-CMG)
- Carboxymethyl Hydroxypropyl Guar Gum (CB-DR-CMHPG)
- Guar Hydroxypropyl Trimonium Chloride (CB-DR-HPC)
- Sodium Thiosulfate Stabilized Guar (CB-DR-STG)
- Friction Reducer- Hydrophobic Guar (CB-DR-FR)
- Paam Grafted Friction Reducer (CB-DR-PAAM)
- Dietary Food Fiber (CB-FG-PHGG)
- Free Flow Guar (CB-OG-FF)
- Food Grade Guar Gum
- Industrial Grade Guar Gum
- Textile Grade Guar Gum
- Paper Grade Guar Gum

INDUSTRIES SERVED



OIL AND GAS INDUSTRY

- Industrial grade Guar gum powder are use in oil well fracturing, oil well stimulation, mud drilling and industrial applications and preparations as a stabilizer, thickener and suspending agent.
- It is a natural, fast hydrating dispersible guar gum and is diesel slurriable.
- In the oil field industry, guar gum is used as a surfactant, synthetic
- polymer and deformer ideally suited for all rheological requirements of water- based and brine- based drilling fluids.

- High viscosity Guar Gum products are used as drilling aids in oil well drilling, geological drilling and water drilling.
- These products are used as viscosifiers to maintain drilling mud viscosities that enable drilling fluids to remove drill waste from deep holes.
- Guar gum products also reduce friction in the holes, and so minimising.
- power requirements. Some Guar Gum products act to minimise water loss should occur in broken geological formations.

Application	Effect	Grades
Drilling Fluids	Flocculation of clay, gelling	 Fast Hydration Straight Guar HPG CMHPG Guar Borax Treated Guar Xanthon Gum Blend Guar Hydroxyalkyl Guar Hydroxyethyl Guar Gum Free Flow Guar Hydrophobic Guar PAAM Grafted Guar Anionic Guar
Deep and Hot Formations	Stabilizer, greater flexibility with chemical activators	HPGPAAM Grafted Guar
Non-Clay Well Bore	Viscosifiers to maintain drilling mud viscosities that enable drilling fluids to remove drill waste from deep holes	Hydroxyphobic GuarAnionic Guar
Friction Reducer	Moisture preservation of dough	Hydroxyalkyl GuarHydroxyethyl Guar GumCMHPG Guar
Oil Well Fracturing	Surfactant, synthetic polymer and deformer	 Free Flow Guar Hydrophobic Guar Fast Hydration Straight Guar
Bore Hole Plugs	Minimize water loss, minimizing power requirements	Fast Hydration Straight GuarFree Flow Guar
Ultra-Thick Fracturing Fluid	Stabilizer, thickener and suspending agent	Xanthon Gum Blend GuarHydroxyalkyl Guar



PAPER INDUSTRY

- Guar Gum provides better properties compared to substitutes.
- Due to improved adhesion, it gives better breaking, mullen and folding strengths.
- Guar Gum imparts improvederasive and writing properties, better bonding strength and increased hardness.
- It gives denser surface to the paper used for printing.

Application	Effect	Grades
Surface Sizing Agent	Reduce the fiber consumption, simplify the glue preparation technology, minimize labour intensity, raise printing performance and strength	• Guar Gum Formate
Retention Aid	Improve retention of the fiber, fine, filler in wise pH range, enhance drainage in forming section	• Peracetic Treated Guar
Wet Strength Additive	Increases wet web strength, enhances drainage, improves machine speed and runnability	 Paraformaldehyde Treated Guar
Dry Strength Additive	Enhances paper strength in wide pH range, improve retention and drainage	Oxidized GuarCationic Guar
Strength Aid	Enhances surface strength, inhibits fuzzy printing, enhances internal bond strength of coated paper	 Oxidized Guar Paraformaldehyde Treated Guar Peracetic Trated Guar Aminoethyl Guar Cationic Guar Guar Gum Formate
Pitch/Stickies Control Agent	Improves the fixation of sizing agents, promotes sizing effect, improves paper strength	Peracetic Trated Guar



PHARMACEUTICAL & COSMETICS INDUSTRY

Guar gum powder is used in pharmaceutical industries as Gelling/ Viscosifying / Thickening, Suspension, Stabilization, Emulsification, Preservation, Water Retention/ Water Phase control, Binding, Clouding/ Bodying, Process aid, Pour control for following applications. In tablet manufacturing it is used as a binder and disintegrating agent and in micro- encapsulation of drugs.

- Suspensions
- Anti- acid formulations
- Tablet binding and disintegration agent Controlled drug delivery systems
- Slimming aids
- Nutritional foods
- Used as a thickener, protective colloid in Skin care products, creams and lotions.

 Also used in toothpaste, and shaving cream for easy extruding from the container tube.

Guar Gum is an important noncaloric source of soluble dietary fiber. Guar gum powder is widely used in capsules as dietary fiber. Fiber is a very important element of any healthy diet. It is useful in clear and cleanses the intestinal system since fiber can not be digested. This keeps the intestines functioning properly and also improves certain disorders and ailments. All natural fiber diet works with body to achieve a feeling of fullness and to reduce hunger. Its synergistic mix of guar gum and fiber mixture when taken with water expands in stomach to produce a feeling of fullness.

Application	Effect
Hand Sanitizer	Optimum thickening; Compatible with alcohol solution up to 30% ethanol; Stable over a wide pH range. Film former in Hand sanitizers for soft skin feel. Strong synergy with Xanthan gum.
Shower Products	Guar derivative providing high conditioning and significant deposition of water-insoluble actives onto hair. Suitable for everyday use shampoo.
Facial Cleansers	Purified Guar derivative providing soft skin feel.
Feminine Hygiene	Purified Guar derivative providing superior benefits in low surfactant/low sulfate, silicone-free formulations; suitable for everyday use formations.
Face and Neck Care	Allows formulating transparent, pumpable/sprayable hydroalcoholic gets
Body Care	Reduce skin irritation and rednedd by 30% more than other cationic polymers. It is also suitable for clear, silicone-free solutions
Eye Care	Self-hydrating version of Guar. Purified Guar derivative providing high conditioning benefits.
Sun Care	Purified Guar derivative as a thickener and moisturizer providing superior benefits.
Hand, Nail and Foot	Guar gum acts as a stabilizer and helps keep the oil/wax/dye mixture from separating.
Colour Cosmetics	Guar derivative providing high deposition efficiency of activities (silicone, natural oil, UV filters, anti-dandruff) on severely damaged hair with no build-up side effect. Also suitable for silicone-free formulations.
Shaving	Unique "fluid" smooth feel in wet applications, i.e, body washes, styling gels; strong synergy with Xanthan gum.
Deodorants / Air Freshner	Good compatibility with electrolytes and stability over a wide range of pH. Strong synergy with Xanthan gum.
Oral Care and Toothpaste	Thickener with optimum/full compatibility with polar solvents and ethanol.



FOOD INDUSTRY

Guar gum is one of the best thickening additives, emulsifying additives and stabilizing additives. In Food Industry Guar gum is used as gelling, viscosifying, thickening, clouding, and binding agent as well as used for stabilization, emulsification, preservation, water retention, enhancement of water soluble fiber content etc.

Water binding properties and ability

To inhibit ice crystals make guar gum best used gum in ice cream industry. The CB-FG Guar Gum is designed specifically for water binding and inhibiting ice crystals. Guar gum finds first place in list gum polysaccharides for the ice cream industry.

CB-FG guar gum is designed for better emulsification. It increases shelf life, smoothens the texture and enhances the mouth feel.

Application	Effect	Grades
Frozen Food	Reduces ice crystal formation, binder, stabilizer, odour free guar gum	High viscosity guar 5000 cps -9000 cps
Sauces & Salads	Water binder, stabilizer, Co- emulsifier	Ultralow viscosity 50 cps – 2000 cps
Dairy Products	Texturizer, uniform viscosity, colour retention	Ultralow viscosity 50 cps – 2000 cps
Baked	Moisture preservation of dough	Medium Viscosity 3000 – 5000 tons
Confectionery	Gelling, glazing and moisture retention	Medium Viscosity 3000 – 5000 tons
Beverages	Bulking agent, viscosifier, low calorie claims	Medium Viscosity 3000 – 5000 tons
Pet Food	Moisture retention, thicken, stabilizer, binder	Medium Viscosity 3000 – 5000 tons
Dietary fiber	Partially hydrolysed guar, fullness feels, reduced calorie intake, aids in weight loss	Depolymerised Guar



Technical Specification

Chemical Analysis

MOISTURE	12% Maximum
PROTEIN	5% Maximum
ASH	1% Maximum
AIR	5% Maximum
FAT	1% Maximum
GUM CONTENT	78% Minimum
рН	5.5-6.5

Microbiologica

TPC/GM	2000 Maximum
YEAST AND MOULDS/GM	200 Maximum
COLIFORM/GM	NIL/ABSENT
E.COLI/10 GM	NEGATIVE
SALMONELLA/20 GM	NEGATIVE

Granulation

ON 40 MESH	Nil
THROUGH 100 MESH	99% Minimum
THROUGH 200 MESH	90% Minimum



TEXTILE INDUSTRY



- Guar Gum gives excellent film forming and thickening properties when used for textile sizing, finishing and printing.
- It reduces warp breakage, reduces dusting while sizing and gives better efficiency in production.

Application	Effect
Hot Water Applications	PAAM Grafted Guar Gum
Reactive Dyes	Carboxymethyl Guar
Basic Dyes	Cationic Guar
Disperse Dyes	Natural Guar
Silk Printing	Depolymerised Guar
High Viscosity Polyester Printing	Borax Cross-linked Hydroxyalkyl Guar
Carpet Printing	Low Viscosity Guar
Acid Dyes	Anionic Guar
Fabric Softening Composition	Cationic Guar

0

C

0

0

0

C

OTHER INDUSTRIES SERVED



Construction Industry

- For friction reduction and moisture retention in the pumping of cement slurry
- For wall putty
- Moisture retention
- Strengthening agent

Explosives Industry

- Gelling agents for gel sausage type explosives and pumpable slurry explosives
- Cross- l inking agents for gel and slurry explosives systems Hydroalkyl guar gum in nonaqueous composition
- Hydroxypropyl guar gym in nitroglycerin free and to aerate NH4 NO 3 explosives
- Carboxyethyl guar gum for thickening of ammonium nitrate solution.





Metallurgy and Mining Industry

- FGuar gum is also used in flotation.
- Acts as a depressant for talc or insoluble gangue mined along with the valuable minerals
- Filtration aid Derivative for uranium ores Paam Grafted guar for flocculants
- Paraformaldehyde treated guar gum for flocculation of slimes Aminoethyl Guar for settling of f ine particles
- Sodium sulfate treated guar gum for the sedimenting agent.

PACKAGING

Type of Bags	Quantity
HDPE Bags	50.00 Kgs
Jumbo Bags	1 MT
Container Liner Bag	22 MT

We can customize packaging as per your requirement. Shelf Life : Our products have extended shelf life of 24 Months.

CONTACT US

Cyamopsis Biotech (India) Pvt Ltd

C511, M3M Urbana, sector 67, Gurgaon, Haryana, 122011 +91 9896511101 +91 8587064707 +91 9996290669 info@cyamopsisbiotech.com

Other addresses

Plant Location Cyamopsis Biotech, NH 10, Moriwala, Sirsa, Haryana, India 125055

Cyamopsis Biotech USA LLC

AIG, 2929, Allen Parkway, Suite 200, Houston, Tx-77019 | USA +1 607 232 9281 info@cyamopsisbiotech.com

Warehouse Location 359, PIKE CT. SUITE 500, LAPORTE, TEXAS 77571 | USA

For more information, visit Cyamopsisbiotech.com