

# Jungbunzlauer

*From nature to ingredients®*



## TayaGel® HA

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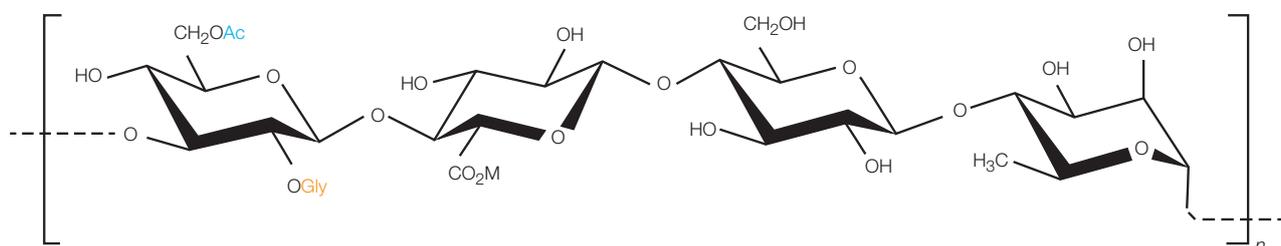
## High Acyl Gellan Gum

With TayaGel<sup>®</sup> HA, our high acyl gellan gum, Jungbunzlauer offers a bio-based, non-GMO certified, ingredient for clean label products. Its excellent texturising properties makes it an ideal stabiliser in a range of applications including plant-based milk alternatives, conventional dairy products and a variety of other beverages.

## Structure

The molecular structure of gellan gum is a linear anionic chain composed of a tetrasaccharide repeating sequence of two residues of  $\beta$ -D-glucose, one of  $\beta$ -D-glucuronate and one of  $\alpha$ -L-rhamnose. In its native or high acyl (HA) form the same glucose unit carries two

acyl substituents, acetyl and glyceryl. The degree of acyl substituents is essential for the functional properties of gellan gum and differentiates the high acyl (HA) form, from low acyl (LA) gellan gum.



**Figure 1: Tetrasaccharide repeating unit of gellan gum with indicated acetyl and glyceryl side groups (modified from E.R. Morris et al. Food Hydrocolloids 28 (2012))**

## Preparation of solutions

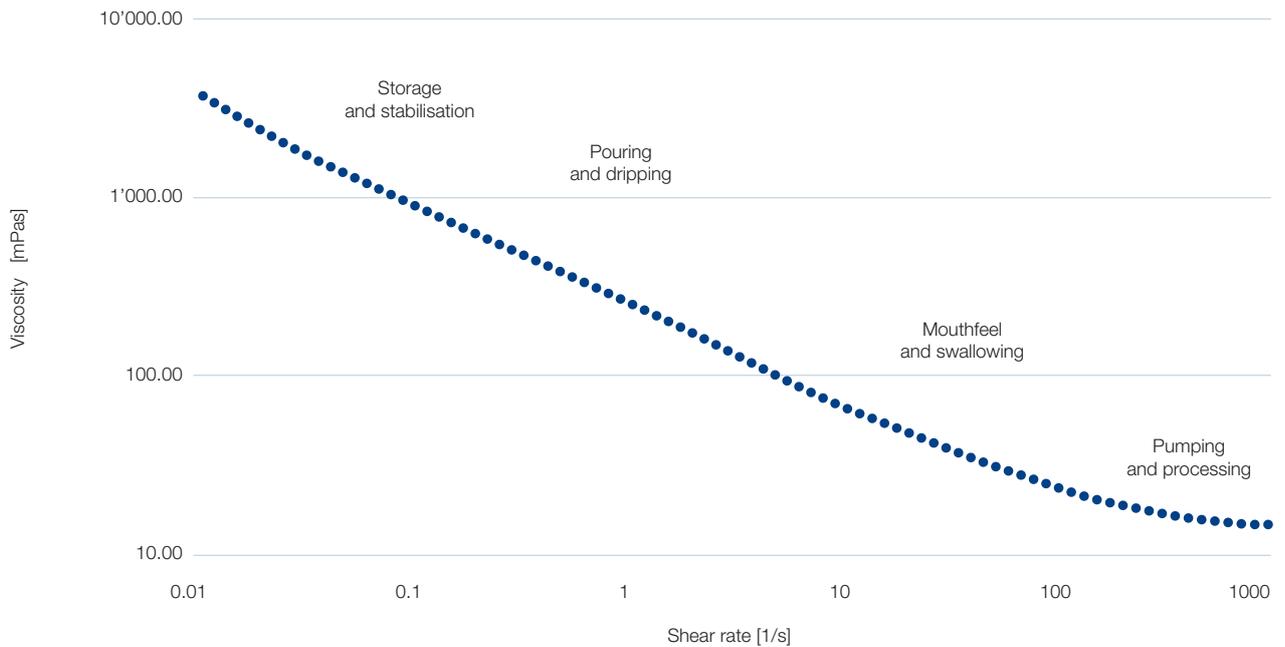
TayaGel<sup>®</sup> is insoluble in cold water and requires the application of heat for full hydration. In cold water, TayaGel<sup>®</sup> can be readily dispersed by applying high speed stirring and slowly adding the product to the vortex. At room temperature and in deionised water, TayaGel<sup>®</sup> tends to swell and creates a paste-like consistency. This swelling behaviour is inhibited in the presence of low levels of sodium ions, which improves gum dispersion and decreases

viscosity during processing. Full hydration will be obtained by heating to 80-90°C resulting in a turbid solution. The hydration of high acyl gellan gum is affected by high levels of sugar and low pH values. It is therefore recommended that TayaGel<sup>®</sup> is added to solutions with moderate pH (> 3.5) and dissolved sugar levels of less than 25%. Once hydrated, acid and additional sugars can be added to form the final product.

## Properties

TayaGel<sup>®</sup> is a bio-based gelling, suspending and stabilising agent with extraordinary and very useful properties. After hydration by heating to 80-90°C, TayaGel<sup>®</sup> solutions will form soft, elastic and flexible gels with a remarkably low tendency to syneresis upon cooling. At very low concentrations, TayaGel<sup>®</sup> exhibits very good stabilising and suspending properties while providing highly pseudoplastic solutions. This unique ability results from its fluid gel structure, which suspends while still maintaining a homogenous and

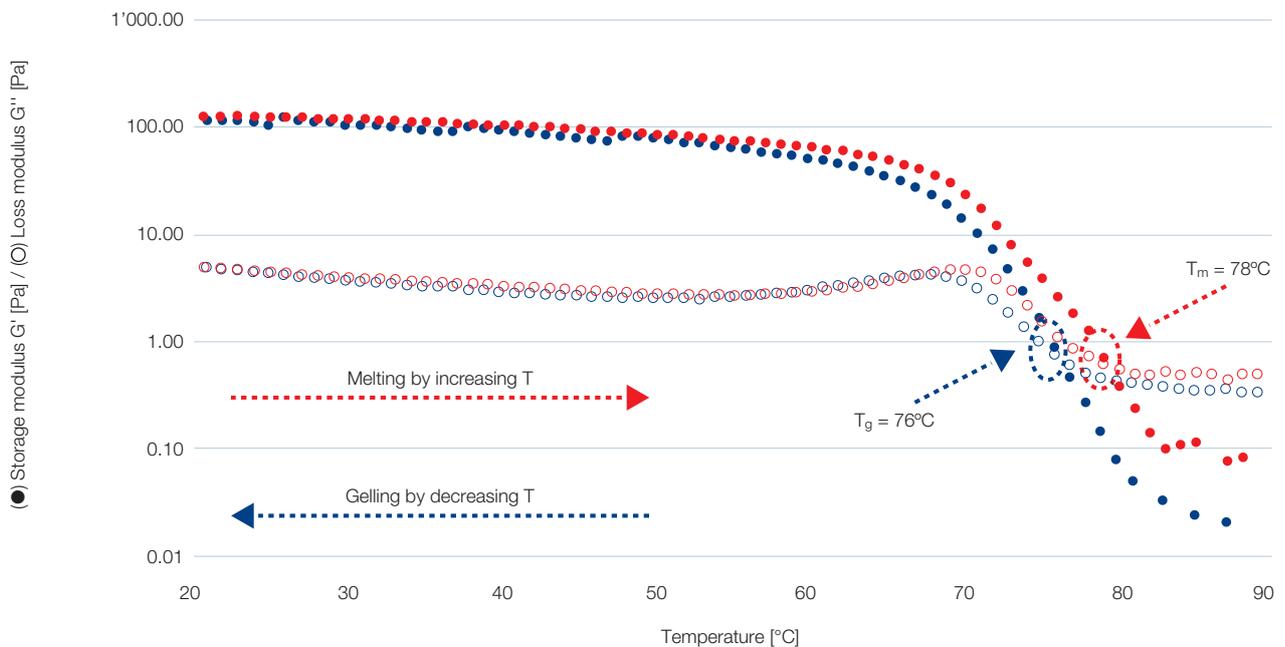
pourable fluid character. Owing to their fluid gel structure, TayaGel<sup>®</sup> solutions exhibit an apparent yield stress which provides strong stabilising properties during storage. At the same time its shear-thinning behaviour guarantees a hardly perceivable mouthfeel and excellent processability. Since the formation of this fluid gel structure is initiated upon cooling, hot filling packaging or HTST/UHT processes are easily feasible.



**Figure 2: Model viscosity curve of TayaGel HA-D in chocolate milk drink (0.035%) demonstrated as apparent viscosity dependent on shear rate. Typical application-related shear rates are denoted**

At higher usage levels, TayaGel® can act as soft gelling agent with a three-dimensional network structure. Depending on the concentration used, TayaGel® gels will set at between 70 and 80°C, but do not show thermal hysteresis, meaning they set and melt at

the same temperature. These thermo-reversible gels will soften while heating and even melt with prolonged heating time, but regain their gel properties upon cooling.



**Figure 3: Model gelation curve of TayaGel® HA in distilled water (0.5%) demonstrated as storage modulus G' and loss modulus G'' dependent on temperature. The cross-over of storage G' and loss G'' modulus defines the setting point of the blue curve at 76°C during cooling and the melting point of the red curve at 78°C during re-heating**

In acidic environments, TayaGel® is susceptible to hydrolytic degradation. Therefore pH levels below 3 and prolonged heating in acidic conditions should be avoided, as this will lead to a loss of functionality, resulting in poorer stabilising properties and/or softer gels. The presence of salt can have various impacts on the properties of TayaGel® solutions as well as on the gel strength. For example, the swelling behaviour of TayaGel® can be influenced by monovalent cations, whereas any cation (calcium, magnesium, sodium or potassium) can have some minor impact on the setting temperature and final gel strength.

## Grades

### Jungbunzlauer offers two types of TayaGel® HA:

- TayaGel® HA: high acyl, food grade gellan gum developed for all non-dairy applications.
- TayaGel® HA-D: high acyl, food grade gellan gum developed specifically for use in dairy products.

## Application areas

TayaGel® is an extremely efficient stabilising and suspending agent, providing a smooth fluid gel structure, even at very low concentrations between 0.02% and 0.05%. It is used mainly as a stabiliser in dairy and dairy alternative beverages, but also for pulp stabilisation in fruit drinks. Additionally, at concentrations above 0.1% its special soft gelling properties make it suitable for applications in confectionary products, jams and fruit preparations, puddings, pie fillings, icings and frostings, as well as dairy products such as milk drinks, ice cream and yoghurt. For dairy applications TayaGel® HA-D offers the best option to create excellent stabilised products.

### TayaGel® in beverages:

- Plant-based and vegan beverages
- Dairy beverages
- Soft and juice drinks
- RTD tea and coffee
- Sports and energy drinks

### TayaGel® in food (often in combination with low acyl gellan gum):

- Baked goods
- Confectionery
- Dairy
- Dairy alternatives
- Desserts, ice cream
- Fruit preparations, sweet spreads
- Sauces, dressings
- Soy products
- Food for the elderly

### TayaGel® in personal care:

- Natural alternative to synthetic thickeners
- Typically used in combination with other thickeners, e.g. xanthan gum



Application	Usage in %	Function
Chocolate milk drink	0.030-0.050%	Stabilisation of cocoa particles
Plant-based drinks	0.030-0.050%	Stabilisation of cocoa particles or mineral salts
Fruit juice drinks	0.030-0.050%	Stabilisation of pulp
Coffee creamer	0.025-0.035%	Stabilisation of mineral salts
Jam	Up to 0.250%	Gelling agent in fruit preparation
Fruit juice jelly	Up to 0.300% (combination with low acyl gellan gum)	Gelling agent
Yoghurt fruit preparation	Up to 0.100%	Suspending agent
Sour cream	Up to 0.100%	Thixotropic spreading behaviour
Water-dessert jellies	0.100-0.350% (combination with low acyl gellan gum)	Gelling agent

## Regulatory status

All Jungbunzlauer food grade gellan gum types fulfil the purity requirements of all relevant food regulations. In the European Union, gellan gum is listed as a generally permitted food additive (E 418) and may be added to all foodstuffs, following the quantum satis principle, with only few limitations as found in regulation (EC) 1333/2008. In the USA the Food and Drug Administration (FDA) has affirmed gellan gum as a food additive permitted for direct addition to food for human consumption (21 CFR Sec. 172.665).



## Quality

All Jungbunzlauer gellan gum grades are entirely manufactured without the use of GMO and only traceable non-GMO raw materials are used. There are therefore no GMO labelling requirements for Jungbunzlauer gellan gum according to regulations (EC) No 1829/2003 and 1830/2003.

Jungbunzlauer's TayaGel® HA grades are Kosher and Halal certified. TayaGel® HA is also suitable for vegetarian and vegan diets.

To demonstrate our strict quality and food safety policy, the production facility Pernhofen is certified according to ISO 9001, FSSC 22000, GMP+ (Feed) and Responsible Care schemes.



## Storage and stability

Jungbunzlauer's TayaGel® HA grades should be stored in a cool (max. 30°C) and dry (max. 70% rel. humidity) place in closed containers. Jungbunzlauer guarantees a shelf life of two years from the date of manufacture for these products when stored under the specified conditions.

In its powder form, TayaGel® HA grades are resistant to microbial degradation. The use of a preservative is recommended when solutions of gellan gum are to be stored for more than 24 hours.

# Jungbunzlauer Group

Jungbunzlauer is represented in all major markets. Our global network of sales companies and distributors covers more than 130 countries.

## North America

## Europe (incl. Russia, Africa and Middle East)



- SALES OFFICE
- PRODUCTION SITE

- PRODUCTION SITE / SALES OFFICE
- APPLICATION TECHNOLOGY CENTER

Jungbunzlauer is one of the world's leading producers of biodegradable ingredients of natural origin. The Swiss-based, international company's roots date back to 1867. Today, Jungbunzlauer specialises in citric acid, xanthan gum, gluconates, lactics, specialties, special salts and sweeteners for the food, beverage, pharmaceutical and cosmetic industry as well as for various other industrial applications.

Jungbunzlauer's products are manufactured utilising natural fermentation processes based on renewable raw materials.

All its products can be used, transported and disposed of in a secure and ecologically safe way. The Group operates manufacturing plants in Austria, Canada, France and Germany.

A worldwide network of sales companies and distributors with a thorough understanding of target markets and client requirements underlies Jungbunzlauer's strong market and customer focus. Committed to its rigorous quality standards, Jungbunzlauer guarantees for the excellence and sustainability of its products and services.

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