



## Viscosity, Flow behaviour and Gelling strength

### Raw Material

**VIDOGUM SP-SYN** (viscosity-reduced tara gum E 417) is extracted from the endosperm of the seeds of the wild shrub “Caesalpinia spinosa L.” The active chain-like hydrocolloid molecules belong to the Galactomannan group.

Tara gum has been approved for use in the EU since 1995.

Origin: Peru.

### Production

Separation of the endosperm, milling, sifting, thermal viscosity reduction, standardisation.

### Characteristics

**VIDOGUM SP-SYN** is suitable for cold processes. The hot viscosity is significantly reduced compared to native tara gum. With double dosage the same viscosity values as for **VIDOGUM SP** can be achieved – at the same time, also a doubling of water-binding in the system is achieved, with the following benefits:

- Reduction of syneresis
- Full mouth-feel (important for fat-reduced products)

**VIDOGUM SP-SYN** appears to be less pseudo-plastic than **VIDOGUM SP**. With increasing shear forces, shorter molecular chains align themselves parallel to the shear direction in the same way as longer molecular chains. The system thereby attempts to avoid the external constraint in order to achieve the lowest possible energy condition. This can be observed through a reversible viscosity reduction. The viscosity of shorter molecular chains does not, however, reduce as strongly as that of longer chains. Regarded geometrically, the shorter the chains become, the more these will take on the form of a globe. Globular molecules (such as for example, starch) accordingly demonstrate no pseudo-plastic flow behaviour. As shearing also takes place in the mouth during consumption, **VIDOGUM SP-SYN** provides a more pleasant and creamier mouth-feel than **VIDOGUM SP**. An excessive viscosity reduction will be experienced as slimy, while a weak viscosity reduction corresponds to the mouth-feel of starch. This is particularly suitable for fat-reduced dairy products and mayonnaise.

Comparison of the mouth-feel:

**VIDOGUM SP**: full-bodied ↔ **VIDOGUM SP-SYN**: creamy, full-bodied ↔ **VIDOCREM** (viscosity reduced guar gum): creamy, full-bodied.

**VIDOGUM SP** synergistically strengthens the gelling network of agar-agar and k-Carrageenan – this synergy is less strongly marked in comparison with **VIDOGUM L** (locust bean gum). Through the addition of **VIDOGUM SP-SYN**, the gelling structure will become considerably more elastic. The gelling optimum in aqueous solutions is:

k-Carrageenan: **VIDOGUM SP-SYN** = 70 : 30.

Together with xanthan gum, **VIDOGUM SP-SYN** forms smooth gels that are particularly suitable for culinary products.

The gelling optimum in aqueous solutions is:

Xanthan gum: **VIDOGUM SP-SYN** = 50 : 50.

With **VIDOGUM SP-SYN**, this gel already forms at room temperature – a relevant gelling delay does not have to be taken into account.

## Benefits

**VIDOGUM SP-SYN** synergetically combines the benefits of VIDOCREM (viscosity reduced guar gum) and VIDOGUM SP (native tara gum).

**Characteristics of VIDOGUM SP-SYN similar to VIDOCREM** (viscosity reduced guar gum):

- Higher dosages are possible without thereby achieving viscosities that are too high (due to reduced chain lengths):
  - Considerably improved syneresis reduction.
  - Improved mouth-feel → ideally suited for fat-reduced products.
  - Better stabilisation of essential oils (e.g., in lemonades).
  - Gels (→ synergy) with xanthan gum (useful in mayonnaise, dressings).
- Lower pseudo-plastic behaviour due to the reduced chain lengths:
  - Creamier mouth-feel.
  - Flow behaviour similar to VIDOGUM L (locust bean gum).
- Further differences in comparison with VIDOGUM SP (native tara gum):
  - Outstanding suitability for cold applications, no subsequent swelling.
  - Can be used in saccharose solutions up to 70% (VIDOGUM SP only up to 60%).

**Characteristics similar to VIDOGUM SP** (native tara gum):

- Synergy with k-Carrageenan and agar-agar → Strengthening of the gel network → cost reduction.
- Increase of the elasticity of k-Carrageenan gel networks.
- Already form gels at room temperature (→ synergy) with Xanthan (beneficial for e.g. mayonnaise, dressings).
- Synergistic viscosity increase together with native and modified starch.
- Freeze-thaw stable → suitable for deep-freeze products.

## Areas of use

**VIDOGUM SP-SYN** is used in many applications. The characteristics, benefits and application possibilities listed here can thereby only represent a selection.

Product Group	Dosage [%]	Benefits in application and finished product using a selected example
Dairy and dessert products	0.3 – 0.6	Fat-reduced, thermally treated cream cheese and quark desserts – with k-Carrageenan: <ul style="list-style-type: none"> <li>• Creamy and at the same time full-bodied mouth-feel in comparison to native tara gum (→ fat replacer).</li> <li>• Gelling network is smoother and more elastic.</li> <li>• Outstanding syneresis prevention due to the possibility of using higher dosages.</li> <li>• As a rule, an addition before the fermentation requires the following pre-conditions: Fat content: &gt; 14%; Use of additional hydrocolloid as a stabiliser (e.g. pectin, agar-agar).</li> <li>• Good aroma release.</li> </ul>
Fruit products and soft drinks	0.2 – 0.6	Fruit desserts, soft jellies - with pectin, agar-agar, modified starch or xanthan: <ul style="list-style-type: none"> <li>• Specially suited for fruit desserts (weak gelling with xanthan gum).</li> <li>• Increase of elasticity and shine of fruit gums with agar-agar in comparison to pure agar-agar.</li> <li>• Outstanding aroma and acid release (→ fresher taste).</li> <li>• Solubility in sucrose solution up to 70 %.</li> <li>• Good aroma release.</li> </ul>
Culinary products	0.2 – 0.6	Mayonnaise, salad dressings - with xanthan gum and modified starches, produced cold and hot: <ul style="list-style-type: none"> <li>• Forms a weak gel with xanthan gum (→ very pleasant mouth-feel).</li> <li>• Gelling with xanthan gum even in cold processes, no relevant gelling delay.</li> <li>• Syneresis reduction.</li> <li>• Due to the full bodied and creamy mouth-feel, particularly suited for fat-reduced mayonnaise.</li> <li>• Freeze-thaw stable and therefore outstandingly suitable for deep-freeze products.</li> <li>• Good aroma release.</li> </ul>