



Tara spinosa is native to South America.

# *An Alternative to Xanthan Gum For Personal Care Applications*

BASF CARE CREATIONS RESEARCHERS DETAIL THE BENEFITS OF CAESALPINIA SPINOSA (TARA) GUM, THE COMPANY'S NEW, SUSTAINABLE BIOPOLYMER.

By Rosa Nicolini, Juan Brito and Hannah Cwienkala, BASF North America

**T**oday's consumers want a new type of personal care regimen. Not only does it need to be effective and make them feel confident, but it must be sustainable, too. Sustainability must apply not just to a single ingredient, but to the final product on the shelf. This is now expected of personal care product manufacturers.

As we move into this new age of product development, opportunity exists when brands and ingredient suppliers can combine multiple aspects of sustainability to think of it holistically. For example, this might include products derived

from renewable feedstocks, which are readily biodegradable, and comply with certifications like Cosmos and NaTrue.

Beyond product development considerations, the most critical aspect of focusing on sustainability is authenticity. With so many companies talking about "clean," "green," and "sustainable," it's extremely important that the personal care industry takes accountability and action. According to David Luttenberger, global packaging director, Mintel, this might mean replacing the term "sustainable" with "responsible." "Where sustainability often means someone else is taking action, responsibility carries a burden of personal involvement and action."<sup>1</sup>

## **ACTIONS SPEAK LOUDER THAN WORDS**

At BASF, we've come a long way in our responsibility journey. We continue to invest in innovations and processes that will create meaningful outcomes for our customers and the industry. As we introduce Care 360 – Solutions for Sustainable Life, our goal is to build a new global umbrella which connects our strengths in sustainability, digitalization and innovation. By aligning these aspects, we aim to develop a seamless experience for our customers and take accountability for the role we play in helping our planet, both the places we call home and the people that inhabit it.

Our new sustainable polymer, Caesalpinia Spinosa (Tara) Gum, comes from the Tara Spinosa. These beautiful trees contribute to the development of biodiversity, generation of biomass for carbon dioxide capture and provide fresh water for locals by extraction of water from the atmosphere. They

provide a social and economic benefit to these communities since more than 80% of production is sourced from small farms and small-scale producers. BASF uses a 100% mechanical method to obtain our nonionic polysaccharide from the sustainable and regenerative Peruvian tara seed gum, and each tree produces up to 80 years' worth of fruit.

### BENEFITS TO FORMULATORS

This new tara gum offers many benefits to formulators in creating gel systems and emulsions with different rheological properties. It can provide good thickening and very smooth, homogeneous and shapely textures. It has good compatibility with the rest of our biopolymer portfolio and supports clean beauty and healthy skin claims. It is suitable for “microbiome-friendly” skin concepts as it does not disrupt the natural balance of the skin’s microbial community. For faster processing, we recommend heating water to about 40°C to 50°C or higher prior to adding the tara gum. Incorporating this biopolymer in formulation enables the creation of interesting textures from low to high viscosity. It provides stable thickening performance at a broad pH range (3-11) and has good electrolyte tolerance. It is characterized by its smooth flow behavior. It shows a shear thinning rheology similar to xanthan gum, but its flow behavior sets it apart. At high shear stress, tara gum shows a late and smooth breaking of the polymer structure, whereas xanthan gum shows an earlier and abrupt breaking of the polymer structure. By using tara gum, this allows the formulator to control and balance the rheology of the formula as desired for a given application. It also has different viscoelastic properties than xanthan gum. It shows dominant viscous properties when subjected to slow



Tara gum can be used to thicken and stabilize emulsions and cream/gels.

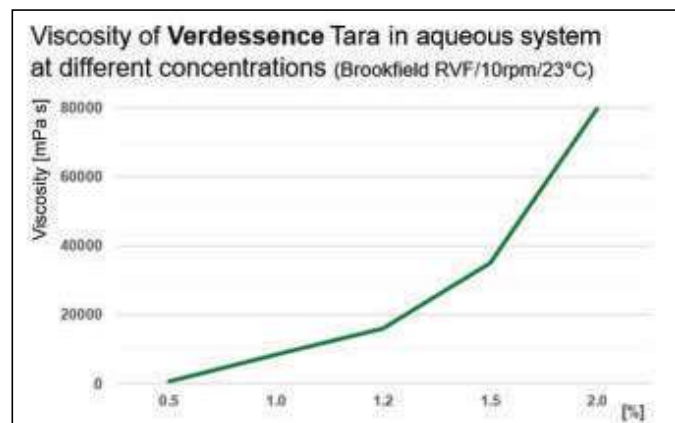
or moderate movement (frequency <1Hz), whereas xanthan gum consistently shows dominant elastic properties.

To satisfy the sensory expectations of consumers, it is necessary to appropriately balance the texture properties of a formula. Our tara gum contributes to a desirable sensory profile. It creates homogeneous formulations with smooth flow behavior, nice cushion, and reduced sliminess. High stringiness could be perceived as sticky and unpleasant, giving the product a negative perception. Tara gum, however, contributes to low stringiness and pleasant pickup, thereby satisfying consumers' current needs.

This tara gum has a different rheological profile than other natural and synthetic rheology modifiers. When compared to xanthan gum and sodium polyacrylate, tara gum has a superior flow behavior, more cushion, better pickup, and a more pleasant texture. It is more homogeneous than xanthan gum, but just as homogeneous as sodium polyacrylate. This is a great ingredient to develop formulas with smooth and even flowing textures.

Tara gum has good synergies with other biopolymers and when combined, the collected benefits allow formulators to create interesting textures with desirable aesthetics.

We compared our tara gum to alternative versions in the market and found that our newest launch shows a very similar sensory profile, but in some cases has more cushion. An olfactory comparison showed that competitive samples have a higher smell intensity, while tara gum has only a slight smell intensity. This new and improved tara gum can act as a replacement for other versions available in the market.



Viscosity of tara gum in aqueous system at different concentrations (Brookfield RVF/10rpm/23°C). Formula composed of x% tara gum, 3% glycerin, 1% phenoxyethanol/ethylhexylglycerin



Verdessence Xanthan is a natural hair care fixative that provides good stiffness and excellent curl retention.

## THE PATH FORWARD

The Verdessence portfolio is the latest sustainable product line from BASF Care Creations. Our personal care biopolymers offer solutions designed to help formulators and brands create more responsible cosmetic applications without sacrificing efficacy. We feel strongly about bringing forth a new portfolio of biopolymers because we understand how critical it is to provide proven, science-backed ingredients that help brands overcome the common challenge of choosing sustainability over performance.

### The new biopolymer lineup brings:

- Biodegradable and biobased solutions,
- Innovative production processes that allow us to offer high performing ingredients,
- Products made from sustainably sourced raw materials,
- Green manufacturing process, and
- Synergies for effective skin and hair care applications.

### The Verdessence portfolio includes five products:

- **Verdessence Tara**—Caesalpinia Spinosa Gum (Tara Gum)—Texturizing agent and sensory enhancer with smooth and natural flow behavior.
- **Verdessence RiceTouch**—Oryza Sativa (Rice) Starch—100% plant-based sensory powder with small particles that have soft edges and a smooth surface. It can be used in a variety of applications, but especially in matte-type cosmetics. It has a great sustainable story being 100% derived from natural, renewable feedstocks and

produce from non-GMO upcycled<sup>2</sup> rice sourced within the European Union; a biodegradable alternative to synthetic sensory modifiers. It also doesn't contain any preservatives.

- **Verdessence Alginate**—Algae-based, multipurpose biopolymer with good stabilization properties; leaves skin feeling hydrated, supple, radiant, baby soft; impart suppleness and improve hair manageability and feel. It can be used as a natural styling fixative in gel systems by leaving hair with a natural hold and provides long lasting curl definition even at high humidity. Good synergy with our vegan xanthan gum for natural styling agents.
- **Verdessence Glucomannan**—Natural from 100% renewable feedstock; good thickener of aqueous systems with cooling sensation; capable of creating fun formats from patches, jellies, peel off formulations to more transitional gels, fluids and serums.
- **Verdessence Xanthan**—Vegan; produced from 100% renewable feedstock, provides more clarity than regular Xanthan Gum; excellent thickener and stabilizer; extremely flexible ingredient and can be used in emulsions, cleansers, and styling formulations; natural hair care fixative that provides good stiffness and excellent curl retention.

The lineup of biopolymers showcased here is only the beginning of BASF's focus and commitment to innovation with an emphasis on sustainability. Our technical experts continue to develop bold, new solutions and use our formulation expertise to develop products with synergistic effects in a wide variety of personal care applications. Continuing on our responsibility journey means challenging ourselves to help brands create the next generation of sustainable products that delight the consumer and meet their needs. ■

## References:

1. Lutenberger, David. Mintel's Global Packaging Director . (n.d.). Mintel. Retrieved from <https://clients.mintel.com/trend/why-being-sustainable-is-no-longer-enough?fromSearch=%3Ffreetext%3Dsustainability&resultPosition=6>
2. Generally understood definition of "upcycled" applied. Please reach out to BASF with any questions about how we define upcycling

## ABOUT THE AUTHORS

Rosa Nicolini is a technical specialist for hair and body care. Juan Brito is an application specialist for skin and sun care. Hannah Cwienkala is marketing manager, sun and skin care, North America.

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