

ENARTIS NEWS

MAXIGUM PLUS: EFFICIENT, EASY-TO-USE STABILIZER

Gum Arabic has been used in winemaking for many years due to its capacity to prevent turbidity and the formation of precipitates due to metal instability and unstable color colloids. In recent years, progress has been made in understanding Gum Arabic's mechanisms of action and the improvement of the production processes, resulting in products that are most suitable for winemaking.

GUM ARABIC: ORIGIN, COMPOSITION, USES

Gum Arabic is a dry exudate derived from *Acacia senegal* and *Acacia seyal* bushes in the sub-Saharan that extends from Sudan to Senegal. It is composed of high molecular weight polysaccharides rich in galactose and arabinose and of a small protein fraction, specifically a polypeptide. The exudate, which is produced to repair purposeful cuts to the trunk and branches, is collected, dried, cleaned from impurities and selected according to its color. These gum pieces (Figure 1) are the raw material used to produce gum Arabic intended for use in the food industry.



Figure 1: Gum Arabic Pieces

Gum Arabic has a wide range of uses as a food additive due to its capacity to emulsify and stabilize. In other words, it can prevent the separation of two immiscible liquids and the precipitation of insoluble components. In soft drink preparation, for example, it is used to prevent the sedimentation of sugar

crystals and maintain lipid-based aromatic components in suspension. These effects are due to the presence of a hydrophilic fraction in its molecular structure composed of polysaccharides and a hydrophobic protein fraction that enable it to make bonds via polar, nonpolar or Van der Waals affinity.

GUM ARABIC USE IN WINEMAKING

Gum Arabic has been used in winemaking since the late 19th century. From the beginning, it has been used to prevent turbidity and precipitates caused by metal instability and color matter. More recently, however, it has been used for tartrate stability and in sparkling wine making to improve perlage quality. Even in wine, the stabilizing ability of gum Arabic is due to its molecular composition. The hydrophobic protein interacts with colloids that are also hydrophobic and insoluble, such as ferric phosphate and color matter. The polysaccharide part, on the other hand, creates a hydrophilic layer upon contact with the hydro-alcoholic solution, hence increasing the solubility and stability of these colloids that would otherwise precipitate.

Due to its hydrophilic and hydrophobic nature, gum Arabic can form chemical bonds with aromatic components of wine modifying their volatility. This can have a more or less notable sensory impact depending on wine composition and the gum Arabic used. In some cases, gum Arabic decreases aromatic intensity, but with the advantage of greater sensory persistence. In other cases, gum Arabic heightens fruity aromas by lowering the volatility of unpleasant components. Additionally, gum Arabic can interact with polyphenols and modify taste perception, particularly by softening the astringency of more reactive tannins.

In fact, gum Arabic effectivity depends on its specific intrinsic characteristics (Table 1) and the potential structural modifications from the production process. For this reason, it is important to have a clear winemaking objective and know the characteristics of the available products in order to select the most suitable gum Arabic.

Table 1: Main physicochemical characteristics and applications of gum Arabic in winemaking. Scale of 1 (least) to 5 (greatest).

	Seyal Gum	Verek Gum
Synonyms	Dextrorotatory	Kordofan, Senegal, Levorotatory
Botanical Origin	<i>Acacia seyal</i>	<i>Acacia verek</i>
Protein Content	Approx. 1.5%	Approx. 3%
Specific Optical Rotation	Dextrorotatory: from +40° to +50°	Levorotatory: from -26° to -34°
Filterability	♦♦♦	♦
Color Stabilization	♦	♦♦♦♦♦
Metal Chelation	♦♦♦	♦♦
Tartrate Stabilization	♦♦	♦
Perlage Improvement	♦♦	♦♦♦♦

VEREK GUM ARABIC AND COLOR STABILIZATION

In comparison with Seyal gum, Verek gum, also known as Kordofan and Senegal, has a higher molecular weight and more abundant protein fraction. These features make this gum particularly effective for color stabilization, superior to that of Seyal gum. The extensive hydrophobic fraction increases its capacity to interact with unstable color molecules, which are also hydrophobic. The polysaccharide abundance, which provides a high molecular weight, makes it particularly effective in increasing its hydrophilic effect and, consequently, the color stability.

The high molecular size of this gum Arabic, however, has led to well-known filtration problems. The application of a partial hydrolysis process during Verek gum production can notably improve its filterability but at the cost of lower stabilization effectiveness.

THE ENARTIS GUM ARABIC RANGE

Enartis, after many years of production experience, practical trials and scientific research, offers a wide range of gum Arabic products (Table 2) that have been created to meet specific winemaking objectives without compromising ease-of-use.

Recently, the use of an innovative filtration process has allowed for the creation of two new Verek gums with higher stabilization effectivity (Figure 2) and high filterability (Figure 3), making it possible for use before final filtration.

Table 2: Main characteristics and applications of Enartis Gum Arabic Range. Scale of 1 (least) to 5 (greatest).

	Aromagum	Citrogum	Citrogum Plus	EnartisGreen Gomma Verek	Maxigum	Maxigum F	Maxigum Plus
Composition	Seyal Gum + Verek Gum	Seyal Gum	Seyal Gum + Mannoproteins	Verek Gum	Verek Gum	Verek Gum	Verek Gum + Mannoproteins
Color Stabilization	♦♦	♦	♦	♦♦♦♦	♦♦♦♦	♦♦♦♦	♦♦♦♦
Tartrate Stability	♦♦	♦♦♦	♦♦	♦	♦	♦	♦
Perlage Improvement	♦	♦♦	♦♦♦	♦♦	♦♦♦	♦♦	♦♦♦
Filterability	♦♦	♦♦♦♦	♦♦♦♦	♦	♦	♦♦♦	♦♦♦
Other Characteristics	Enhances sensory characters	Increases sweet sensations	Increases sweet sensations	Certified organic			Softens tannins

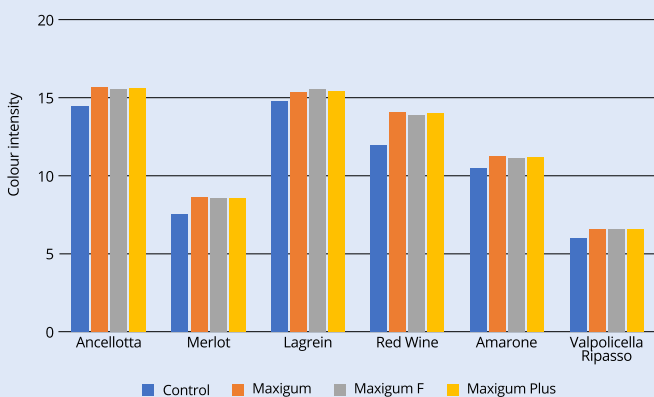


Figure 2: Stabilization Effectivity of Verek Gum - Maxigum Range
 Dosage: 200 mL/hL. Color stability test performed by leaving wine for 24 hours at -4°C.

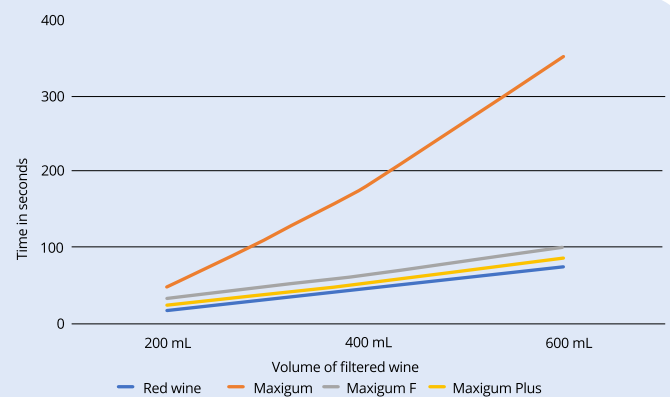


Figure 3: Filterability of Verek Gum - Maxigum Range
 Dosage: 200 mL/hL. Filterability test performed by direct filtration across 0.65 µm membrane.

MAXIGUM F is a Verek gum Arabic solution produced by solubilization and purification in conditions that maintain its original dimensions, followed by a specific filtration which changes the three-dimensional structure of the molecule, hence, making it microfilterable - technical product that has no sensory impact on wine.

MAXIGUM PLUS is composed of high molecular weight microfilterable Verek gum Arabic and mannoproteins that further improve stabilizing effects. Along with stabilizing color, Maxigum Plus also has a pleasant sensory effect due to the interactions between mannoproteins and the polyphenolic components, which soften and sweeten wine tannins.

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