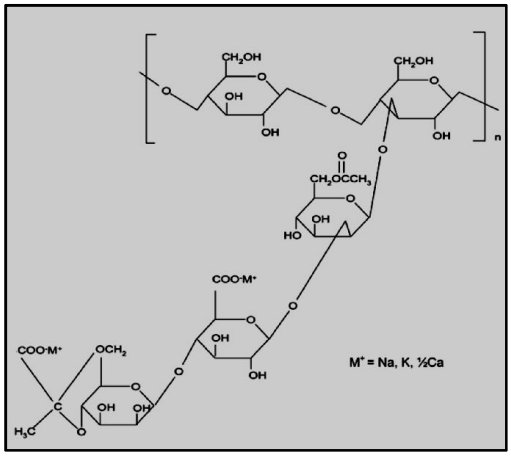
Xanthan gum in food industry

The excellent solubility and stability of xanthan gum under acidic or alkaline conditions, its stability in the presence of salts and its enzymes resistance, make of xanthan gum as one of the major polymers used in the food industry.

Xanthan gum is a high molecular weight polysaccharide, obtained by carbohydrates fermentation by the bacterium *Xanthomonas Campestris*. Xanthan gum is completely soluble in hot or cold water, is quickly hydrated when dispersed and facilitates water retention producing highly viscous solutions at low concentration. In addition, their solutions have uniform viscosities at different temperatures ranges, from freezing to near the boiling point, with excellent thermal stability. Good solubility and stability of xanthan gum under acidic or alkaline conditions, its stability in the presence of salts and its enzymes resistance, make of xanthan gum as one of the major polymers used in the food industry.



Chemical structure of xanthan gum

Xanthan gum properties

Xanthan gum solutions are highly pseudoplastic and have almost no hysteresis. This pseudo-plasticity improves the sensory characteristics (mouthfeel, flavour release, etc.) of final product and ensures a high degree of mixing, pumping and discharge. Xanthan gum solutions are no sensitive to changes in pH. Between pH 1 to 13, the viscosity of a xanthan solution is practically constant. At pH of 9 or higher, xanthan gum loose diacetyl gradually, but this has little effect on the properties of the solution. The viscosity of aqueous solution of xanthan gum is nearly independent of temperature over a wide range. The viscosity of xanthan gum solution is not practically affected by the temperature from the freezing point to the boiling point of water. Therefore, the rheological properties of the final products are stable whether stored under refrigeration, at ambient temperature or in hot areas. Xanthan gum interacts synergistically with galactomannans such as guar gum and locust bean gum resulting in an increased viscosity of the solution; the observed viscosity is greater than the sum of viscosities of each of the two

gums alone. In case of locust bean gum, a large increase in viscosity is observed at low concentrations and as the concentration increased, a thermo-reversible gel is formed. This synergism allows the use of xanthan gum in various applications such as in ice cream, pasteurized cream cheese and spreads products, as well as in a variety of frozen desserts. Xanthan gum is resistant to enzymatic degradation by various enzymes, including protease, cellulase, hemicellulase, pectinase and amylase. Besides all this, xanthan is a useful dietary supplement because it facilitates intestinal transit without side effects. Xanthan gum consume increases daily fibre intake improving the functionality of the digestive system.

Xanthan gum application

Drinks

Xanthan gum is used to flesh out the drinks and fruit juices. When these beverages containing fruit pulp particles, the use of xanthan gum helps maintain the suspension giving better appearance. Xanthan gum is rapidly and completely soluble at low pH and has excellent suspension of insoluble particles. In addition, is compatible with most of the drink components.

Dairy

Blends of xanthan gum with guar gum, locust been gum or both, can be used as stabilizers for ice cream, sorbet and chocolate milk products. Xanthan gum combined with methyl cellulose and carboxymethylcellulose works well in frozen dairy and in combination with carboxymethylcellulose is suitable for yogurts prepared by direct acidification.

Similar mixtures are used in desserts like pudding, acidified milk gels and others. The mixture of xanthan, guar and locust bean gum is employed to give firmness, and to improve the release of flavour in spread cheese. Xanthan gum thick dressings like “cottage cheese” and provide good syneresis control. Finally, xanthan gum improves the consistency of acid creams, reducing the syneresis.

Sauces and dressings

Savoury sauces and dressings accompany almost all foods giving a "personal touch" to the product. Xanthan gum provides stability to the emulsions for up to 1 year. Thanks to the obtained rheological properties, the dressings can be easily pumped during the filling operation and subsequently

facilitates the flow of the bottle during use. Xanthan gum is widely used in salad dressings (alone or in combination with propylene glycol alginate or pectins) providing a clean mouth feel. Due to its high pseudoplasticity also helps keep the dressing on the top of the salad.

Bakery and Pastry

In bakery industry, xanthan gum is used primarily to increase water retention during baking and thus extending shelf life of bakery products and refrigerated doughs. In some types of breads, xanthan gum can also be used as egg substitute, in concrete can reduce the content of the egg without affecting the appearance and taste of the product. It is also widely used in gluten-free products to cover the absence of said biopolymer. In this case, it is often combined with hydroxypropyl methylcellulose (HPMC).

Syrups, toppings and seasonings

The excellent properties of solutions containing xanthan gum allow to be used in syrups, toppings, condiments and sauces. Butter creams and chocolate coatings containing xanthan gum have excellent consistency and flow properties due to its high viscosity at rest. This gives dense and appetizing products appearance to ice cream and baked goods. Xanthan gum is an excellent thickening for these kinds of products due to its high stability in acidic media and as imparts pseudoplastic flow properties. The high viscosity at rest avoids the penetration of seasonings and sauces on buns; giving to the consumers more aesthetically and appealing foods.

Dr. Alessandro Angioloni

Product manager at Emilio Peña, S. A.