



TECHNICAL APPLICATION
INFORMATION



**Pectin as Gelling Agent
in Gummy and Jelly Products**

INTRODUCTION

Shocked by the current discussion on health hazards and sensitised, especially in reference to food and food additives of animal origin, the consumer very critically eyes the use of food additives.

Not only the aspect of the naturalness of an ingredient or additive is of vital importance but also the kind of quality of the raw material and its production process.

Pectin is a gelling agent which is traditionally used in the food industry. It is a polysaccharide which can be found in nearly all plant tissue. The naturally good gelling properties remain due to the careful production process. These gelling properties are successfully applied in the confectionery industry.

With pectins gummy products and jelly fruits can be produced either with or without fruit pulp. The great firmness of the gel structure with a very elastic texture distinguishes gummy products.

The texture may have a different tailing.

Gummy products which are produced with gelatine have a viscous texture with a long tailing whereas gummy products which are produced with pectin show a short tailing which is equivalent to a gel structure that has no tough properties.

Other products are jelly fruits which get their fruity character from a dosage of fruit flavour. A typical example are jelly bananas. Both gummy products and jelly fruits can be produced from fruit pulp. Jelly fruits with fruit pulp are also called Pâtes de Fruits.

Production of Gummy Products with Classic Pectin

When discussing the texture of confectionery articles, the definition of the terms, which describe the texture, are vital. Gelled products, which sensorically present a solid body, have next to elastic properties also viscous properties. An ideal elastic solid body stores the deformation energy under pressure and thus finds its initial state by re-deforming after the pressure is relieved.

An ideal viscous substance loses the excess energy under deformation, for example in form of heat, and it deforms under pressure.

Gummy products show both viscous and elastic flowing and deforming behaviour. This definition gives no clues as to the toughness, i.e. tailing properties of a product.

The Classic Pectins of Herbstreith & Fox allow the production of a gummy product with a viscoelastic texture and firm chewing properties.

The products with pectin show textural differences to those with traditional gelling agents, as for example gelatine.

For the production of gummy products high-ester pectins are used which will be standardised to setting temperature, setting time and gel texture for the application in question.

This standardisation is made with dextrose and so-called buffer salts (retarding agents), for example sodium citrate or tartrates which influence specifically the gelling behaviour of a pectin. High-ester Classic Pectins result in elastic gels with more or less highly viscous parts. In contrast to traditionally produced gummy products based on gelatine, which show very tough chewing properties and which have an elastic gel structure, pectin also shows an elastic yet slightly brittle gel texture with a brilliant fracture.

By using 2.5% Pectin Classic CS 502 or 2.5% Pectin Classic AS 509 soft, viscously gelled gummy products with a soft and agreeable bite can be produced.

By increasing the pectin dosage to up to 4% it is possible to produce firmly gelled products.

Rheologically Pectin Classic AS 509 forms visco-elastic gels with highly viscous parts so that a smoother gel structure with a strong mouth-feel forms. By using Pectin Classic AS 507, standardised with a different retardator, relatively compact, firmly gelled gummy products with a short tailing are achieved.

The Pectin Classic AS 507 forms gels which show a slightly more brittle gel texture forming very firm gels and which are judged to have firm chewing properties.

Because of the very firm gelation of these pectins, gummy products can be produced which in texture and consistency are an alternative to the traditional gummy products.

This enables the confectionery industry to develop – next to conventional products – new products with a new texture. It is also able to additionally meet the demands of the quality conscious consumers for the use of plant hydrocolloids by using Classic Pectins.

Production of Jelly Fruits with Pectin

Next to gummy products, which have a characteristically compact gummy-like texture, jelly fruits with their short visco-elastic texture are classical products with pectin.

By adding pectin as a gelling agent these products will get their typical consistency.

Herbstreith & Fox KG offers high-ester apple and citrus pectins for these products. The pectins Classic AS 501 and Classic CS 501 are two unbuffered pectins, each with a typical gelling behaviour.

Pectin AS 501 forms visco-elastic gels with highly viscous parts and a smooth gel structure.

Products manufactured with this apple pectin excel with a distinctive mouth-feel so that the flavour can particularly develop.

Technologically this pectin shows all known properties of apple pectin, it is for example tolerant towards deviations of the filling temperature and the calcium content of other ingredients used.

Pectin Classic CS 501 is a typical citrus pectin, which is suitable for the production of more elastic gelled jelly fruits with a brilliantly brittle fracture.

By using these pectins, which are only standardised with dextrose, a separate retardator must be added to the product batch. By using Pectin Classic AS 502, standardised with sodium citrate, the separate dosage of a retardator can be omitted.

As already mentioned above, the jelly fruits will have higher viscous components with apple pectins.

The retardator sodium citrate will enhance this. If more elastic, brittle properties are requested, pectins which are standardised with K-Na-tartrate should be used (for example Pectin Classic

AS 507), whereas the combination citrus pectin and tartrate as in Pectin Classic CS 502 will enhance this tendency. Typical pectin dosages for jelly fruits are 1.3% unbuffered pectin or 1.7% buffered pectin.

Production of Gummy and Jelly Products with Fruit

The addition of fruit pulp will enhance the fruity character of such gummy or jelly products.

Pâtes de Fruits are jelly fruits with 25% fruit content; for the consumer in France it would be hard to imagine life without them.

These products have a natural character compared to jelly fruits, which is viewed very positively in today's open discussions on products being produced as natural as possible. Pâtes de Fruits have a typical structure formed by the fruit pulp, and by using pectin as gelling agent, they have a visco-elastic texture which enhances the fresh-fruity flavour.

The above-mentioned pectins, standardised with or without retardator, can be also applied for these products. Pectin Classic AS 507 or Pectin Classic CS 502 are especially suitable because of their firm, elastic gelation.

Process for the Production of Gummy and Jelly Products

In the production of gummy and jelly products with pectin as gelling agent, certain issues of the production process have to be taken into consideration.

Because of the gelling properties of high-ester pectin, the pH-value of the product with a soluble solids content of 78° Brix should be between 3.2 and 3.5. Here the products will have a fresh and fruity character which enhances the development of the fruit flavour.

In the production process in batches pectin is dispersed in water in form of a dry mix with sugar and dissolved in the ensuing cooking process. It is important that the pectin is homogeneously distributed in the sugar to prevent lump building when stirring into the product batch.

While working with sugar syrups, the pectin can be dispersed by slowly stirring it into ten times the amount of sugar syrup. By adding water, the pectin will be dissolved.

By means of a pressure dissolver a pectin solution can be produced which will be added to the hot batch.

This production process is especially recommendable in a continuous process. After adjusting the soluble solids colour and flavour will be added. Before filling the quantity of citric acid, which is necessary for adjusting the required pH-value, will be added, whereas after a specific time lapse a dissociation balance between the necessary buffer salts and the citric acid will be achieved.

Thus the pH-value decreases slowly and the gelling process starts irreversibly.

The quick gelation of pectin determines the application of a high filling temperature of 85° to 95° C in mogul plants and on the other hand allows a quick processing of the products.

After forming or after removing the starch from the product the gummy or jelly products will be coated with sugar or wax (gummy products) as a separating agent and then they will be packed.

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