Guar Gum much more than one Additive in tobacco products

Introduction

Based on the EC Directive 2014/40/EU a commission implementing decision (EU) 2016/787 is laying down a priority list of additives containing in tobacco products to enhance reporting obligations. In this priority list, also Guar Gum is listed as tobacco additive.

Based on the Information of the PITOC fact sheet we have the opinion that there is not enough information about the diverse uses of Guar Gum und Guar Gum derivatives in the tobacco (including tobacco paper and cigarette paper) industry.

For that reason, we compiled our information about the divers uses of Guar Gum products in these industries.

We hope that information can clarify the situation. If you need further information or documents - please contact us.

1. Definition of “Additives”

In the PITOC fact sheet (Public Information Tobacco Control) for Guar Gum from the dkfz. (German Cancer Research Centre) the definition of an additive is:

“Additives are substances intentionally added to tobacco products by the tobacco industry in order to render toxic tobacco products palatable and acceptable to consumer.”

In the EC Directive 2014/40/EU of 3 April 2014 the definition of an additive is:

“Additive’ means a substance, other than tobacco that is added to a tobacco product, a unit package or to any outside packaging.”

2. Definition of Guar Gum

In the JECFA (Joint Expert Committee Food Additives FAO/WHO) Specification for Guar Gum (E-412) the definition is:

“Primarily the ground endosperm of the seeds from Cyamopsis tetragonolobus (L.) Taub. (Fam. Leguminosae) mainly consisting of a high molecular weight (50‘000 – 8‘000‘000) polysaccharides composed of galactomannans, the mannose:galactose ratio is about 2:1. The seeds are crushed to eliminate the germ, the endosperm is dehusked, milled and screened to obtain the ground endosperm (native guar gum).”

In the Commission Regulation (EU) Nr. 231/2012 the definition is:

“Guar Gum is the ground endosperm of the seeds of strains of the guar plant, Cyamopsis tetragonolobus (L.) Taub. (family Leguminosae). Consists mainly of a high molecular weight hydrocolloidal monosaccharide composed of Galactopyranose and Mannopyranose units combined through glycosidic linkages, which may be described chemically as galactomannan. The gum may be partially hydrolysed by either heat treatment, mild acid or alkaline oxidative treatment for viscosity adjustment,”
3. Purity requirements for food grade Guar Gum (E-412)

The purity requirements are according to the Commission Regulation (EU) Nr. 231/2012:

- Galactomannan content: Not less than 75%
- Loss on drying: Not more than 15%
- Ash: Not more than 5.5%
- Acid-insoluble matter: Not more than 7%
- Protein: Not more than 10%
- Starch: Not detectable
- Organic peroxide: Not more than 0.7 meq active oxygen/kg
- Furfural: Not more than 1 mg/kg
- Pentachlorophenol: Not more than 0.01 mg/kg
- Arsenic: Not more than 3 mg/kg
- Lead: Not more than 2 mg/kg
- Mercury: Not more than 1 mg/kg
- Cadmium: Not more than 1 mg/kg

4. Use of Guar Gum in tobacco products

According to the EU “additive definition there are a lot of different applications for Guar gum in tobacco products. From the toxicological point of view these applications have to be treated separately.

4.1. Application of Guar Gum in tobacco paper

Tobacco paper are per definition papers and board which are not burning during smoking as tipping paper, plug wrap and packaging material.

The use of additives is regulated in the “Empfehlung XXXVI” of the BfR (Federal Institute for Risk Assessment, Germany) for papers in contact with foodstuffs.

According to the Empfehlung XXXVI the use of following Guar Gums and chemically modified Guar Gums are allowed to be used as production aids for (I) sizing agents and for (IV) surface refining and coating agents.:

- Native and partly hydrolysed Guar Gum (E-412), (Mannogalactane), non-ionic.
- Carboxymethyl Guar gum, (Carboxymethylgalactomannan), anionic.
- Cationic etherified Guar gum.

These Guars and Guar derivatives are high quality products, with a high purity (low protein content) and an excellent solubility. Lump free solutions are added to the pulp before the paper machine. Only the Guar galactomannans are retained in the paper, the protein is not retained. The addition is about 0.5% (max. 0.75%) Guar galactomannan or Guar galactomannan ether calculated on the paper weight.
4.2. Application of Guar Gum in cigarette paper

Cigarette papers are per definition papers, which are burned during smoking. The use of additives is regulated in the TVO (German tobacco decree). Only food grade Guar Gum according to the specification for E-412 is allowed.

4.2.1. Application in the pulp

Such Guar Gums are also high quality products. The application in cigarette paper is the most sophisticated in the paper industry. Guar Gum powder is dissolved in water with special dissolving equipment und heated up to get lump free solutions. All foreign material and also gel particles would be detected by the photo-electronic ULMA detection systems in the cigarette paper online.

Only the Guar galactomannan is retained in the paper, the protein is not retained. The addition is about 0.5% (max. 0.75%) Guar galactomannan or Guar galactomannan ether calculated on the paper volume.

The addition point(s) for about 0.7% solutions depends of the refining process of the pulp und the design of the paper machine.

The effects of the Guar Gum in the product are or can be:

- As beating/refining additive:
  - To protect the cellulosic fibre and to give tensile strength.

- To control the dewatering on the sieve of the paper machine:
  - To improve the paper formation.
  - To improve opacity.
  - To control the porosity.
  - To fix the PCC (Precipitated Calcium Carbonate) and other inorganic material in the paper.
  - To avoid dusting during from the paper in the cigarette production.
  - To increase tensile strength

A production of a “state of the art” cigarette paper according to the actual specification on the existing production facilities without Guar Gum is not possible.

Nearly all cigarette paper producers tried unsuccessfully to replace Guar Gum with other products during the last high price phase of Guar when the price increased by a factor of more than 10.

4.2.2. Application in the size press

For special effects (porosity, tensile strength) partially hydrolysed (low viscous) Guar Gum is used as surface treatment in the size press. In that case the protein is not eliminated it is bound to the paper surface.

4.3. Application of Guar Gum in Reconstituted tobacco

Regarding “reconstituted tobacco”, the following is written in the PITOC fact sheet:

"Reconstituted tobacco is made up of mashed tobacco stems and other parts of the tobacco leaf that would otherwise discarded. Tobacco manufacturers reportedly add guar gum (and its derivatives) to help bind this reconstituted tobacco in cigarettes."

Some comments:

- It is true that reconstituted tobacco is used in cigarettes. This because these tobacco stems and other parts of the tobacco leaves are tobacco taxed and therefore very valuable. Therefore they must be recycled.
- The use of Guar Gum derivatives is not allowed for this application.
- Reconstituted tobacco is not only made from tobacco garbage. For the mechanical production of cigars, high quality tobacco is transformed also to reconstituted tobacco.
There are two different systems to produce reconstituted tobacco.

4.3.1. Application on “paper machine like” equipment
In that technology, a tobacco pulp is prepared and the reconstituted tobacco sheet is produced on a sieve like a paper sheet. In our experience, the process is also working without the addition of Guar Gum. If the machine has a size press partially hydrolysed (low viscous,) Guar Gum can be used.

4.3.2. Application on “belt dryer like” equipment
In this technology, the tobacco mash is dried on a stainless steel ribbon to form the tobacco sheet. In this process the mash, need a certain viscosity to give homogeneous material. To get the viscosity Guar Gum is used as thickener.

4.4. Application of Guar Gum in tobacco
We do not have a lot of information about this application. We estimate that cheap, imported Guar Gum from India or Pakistan is used. There are most probably no requests regarding viscosity, purity and solubility.
Regarding the addition rate to the tobacco, we estimate that this application will be the biggest amount of Guar Gum for tobacco products.

5. Summary
In our opinion, the written reproach in the PITOC fact sheet that “Guar Gum as additive is added by the tobacco industry in order to render toxic tobacco products palatable and acceptable for consumers” is not correct for the application 4.1. to 4.3.2. In these cases, Guar Gum is a production aid for the production of “state in the art” products.
From the toxicological, point of view the use of Guar Gum galactomannan for the production of cigarette paper is not a problem. We do not expect a difference of the formation of toxic substances if a cigarette paper of 100% cellulose or a cigarette paper of 99.25% cellulose and 0.75% Guar galactomannan is burnt.

Another point is the addition of Guar Gum (containing protein) to tobacco for cigarettes in relatively high concentrations. That application as additive needs further research.