Food and Agriculture Organization of the United Nations

82nd JECFA - Chemical and Technical Assessment (CTA), 2016

XANTHAN GUM

Chemical and Technical Assessment (CTA)

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1. Summary

This Chemical and Technical Assessment summarizes data and information on xanthan gum submitted to JECFA by International Special Dietary Foods Industries[1] in a dossier dated 26 November 2015 and focusing on its use as thickener in infant formulae, follow-up formulae, and formulae for special medical purposes intended for infants. The Committee previously reviewed xanthan gum at its eighteenth, twenty-ninth and thirtieth meetings. At the thirtieth meeting, the Committee allocated an Acceptable Daily Intake (ADI) of "not specified" to xanthan gum. The Committee prepared specifications for xanthan gum at several of its meetings. The last specifications for xanthan gum were prepared at the fifty-third meeting in 1999. At the present meeting (eighty-second meeting), xanthan gum is being re-evaluated by the Committee with emphasis placed on the evaluation of safety data to support its intended use in infant formulae, follow-up formulae, and formulae for special medical purposes intended for infants.

Xanthan gum is a high-molecular weight polysaccharide gum comprising primarily of D-glucose and D-mannose as the dominant hexose units, along with D-glucuronic acidand pyruvic acid. It is produced by the fermentation of a carbohydrate source in a pure culture of *Xanthomonas campestris*. The fermentation medium comprises of a carbohydrate, a nitrogen source, and mineral salts. Once the fermentation process is complete, xanthan gum is recovered from the fermentation broth by alcohol precipitation in the form of a sodium, calcium, or potassium salt. The resulting coagulum is separated, rinsed, pressed, dried, and ground as part of down-stream processing.

Xanthan gum is generally used as a thickener, stabiliser, emulsifier and foaming agent. The present assessment focuses in its proposed use as a thickener in infant formulae, follow-up formulae, and formulae for special medical purposes intended for infants.

2. Description

Xanthan gum is a water-soluble, high-molecular weight (of the order of 1000 kDa) polysaccharide, produced by a pure-culture fermentation process of carbohydrate by the naturally occurring bacterium, *X. campestris*. It primarily consists of the following hexose units: D-glucose, D-mannose, and D-glucuronic acid. It is recovered from the fermentation broth by alcohol precipitation and marketed as a cream-coloured powder.

[1]Abbott Nutrition, 3300 Stelzer Road, Dept. 104070, Bldg. RP3-2, Columbus, OH 43219 USA

3. Manufacturing

3.1. Manufacturing principle

Xanthan gum is produced by *X. campestris* fermentation of a carbohydrate source. The fermentation medium comprises of a carbohydrate, a nitrogen source, and mineral salts. Once the fermentation process is complete, xanthan gum is recovered from the broth by ethanol or isopropanol precipitation. The resulting coagulum is separated, rinsed, pressed, dried, and ground as part of down-stream processing.

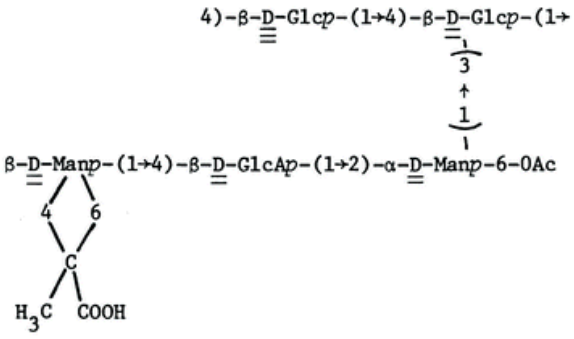
4. Chemical characterization

Specifications for xanthan gum were previously established by the Committee at the fifty-third meeting. Xanthan gum for use in infant formulae, follow-up formulae, and formulae for special medical purposes intended for infants meets the current specifications for xanthan gum as published in the FAO JECFA monographs XX (2016).

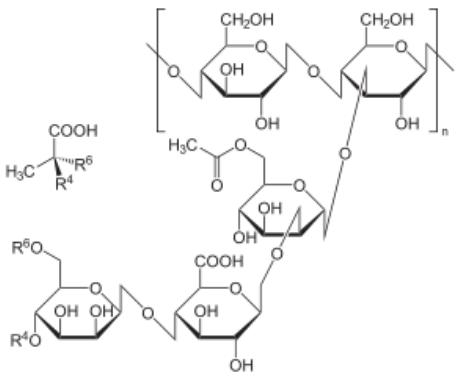
4.1. Composition

Xanthan gum is a very high molecular weight (between one and several million) polysaccharide gum containing D-glucose and D-mannose as the dominant hexose units, along with D-glucuronic acid and pyruvic acid. The beta-D-glucoses are linked (1->4) to form a backbone similar to cellulose. Alternate glucoses have a short, three-sugar branch consisting of a glucuronic acid sandwiched between two mannose units (see linkages and structural formula below). Thus, the overall repeating structure is a pentasaccharide. The mannose adjacent to the main chain may have an acetyl group attached to C6 and the terminal mannose can be linked through carbons 6 and 4 to the second carbon of pyruvic acid.The final xanthan gum product is manufactured in the form of a sodium, potassium or calcium salt and its solutions are neutral.

Schematic of linkages:



Structural formula:



From the analytical data provided by the sponsor for three different batches, commercial samples of xanthan gum contain approximately 8.8-9.4% moisture, 6.7-7.1% total ash (after drying),> 1.5% pyruvic acid and >91.0% of xanthan gum (on a dried basis).

4.2 Identification

Xanthan gum is soluble in water and ethanol. It is identified based on the formation of a firm rubbery gel when hot aqueous solution of a mixture of xanthan gum and carob bean gum (0.5% w/v each) is cooled below 40°.

4.3 Analytical methods

The specifications monograph cites general tests included in the *FAO Combined Compendium of Specifications* (FAO JECFA Monographs 1, vol. 4, 2006) and specific tests for the determination of pyruvic acid and alcohol remaining from the precipitation (isopropanol or ethanol).

Alcohols (isopropanol or ethanol) are determined by gas chromatography using a flame ionization detector. Their quantitation is performed after their extraction from xanthan gum with boiling water.Tertiary butyl alcohol is used as internal standard. External standards are used for the construction of standardcurves.

Pyruvic acid is determined spectrophotometrically (absorption maximum at 375 nm) after conversion to the corresponding hydrazone with 2,4-dinitrophenylhydrazine and extraction with ethyl acetate. The absorption of the sample is compared to that of an external standard corresponding to the minimum concentration in the sample.

4.4 Possible impurities

Possible impurities include the nitrogen source from the fermentation medium, remaining alcohols used for the precipitation (isopropanol or ethanol) and heavy metals as contaminants. Microbiological contamination has also to be excluded.

Based on analytical data provided by the sponsor for three different batches of xanthan gum lead and arsenic concentrations are below the limit of detection (4 ppb) which is 3 orders of magnitude lower than the limit in the specifications (2 ppm for lead).

Isopropanol is found at concentrations 339-467 mg/Kg, close to the specification limit of 500 mg/Kg.

4.5 Levels of lead from the use of xanthan gum in infant formula

The Codex Committee on Contaminants in Foods (CCCF) agreed at its 8th session to a maximum level (ML) of 0.01 mg/kg (as consumed, in the ready-to-use product) for lead in infant formula (CCCF, 2014). As per the Committee's request with respect to the evaluation of xanthan gum safety for use in infant formula, special consideration was given to the level of lead that could result in infant formula from the addition of xanthan gum.

The previous specification for xanthan gum as published in FAO Food and Nutrition Paper 52 Addendum 7 (JECFA, 1999) limit levels of lead to not more than 2 mg/kg. Considering the target level for xanthan gum in infant formula of 1000 mg/L as consumed (see Section 5.2) and the existing maximum permissible level of lead in xanthan gum [2 mg/kg, as per last Joint FAO/WHO Expert Committee on Food Additives (JECFA) specifications], the contribution of

lead from xanthan gum in the infant formula could be up to 0.002 mg/L . Therefore, if lead were to be present in xanthan gum at the maximum specified limit, use of xanthan gum at the proposed target level in infant formula would result in lead levels below the maximum level of lead for infant formula (0.01 mg/kg) established at the 8th session of the CCCF (2014). Additionally, data collected by CCCF while establishing the updated ML for infant formula demonstrates that the lead limit for xanthan gum appropriately controls this contaminant. The work of the CCCF electronic working group on lead demonstrates that the current control of lead in infant formula ingredients and additives is sufficient to ensure that finished infant formula meets the established limit of 0.01 ppm as consumed (97% of the samples analysedin 2014 were compliant with the ML of 0.01 ppm and 99% of the samples analysed in 2013 were compliant with the ML of 0.01 ppm).

However, on a precautionary measure, and since analytical results from several batches of xanthan gum demonstrate that it is technically feasible to reduce the level of lead in the specifications, a separate level of lead for xanthan gum for use in infant formulae and formulae for special medical purposes intended for infants is being proposed.

4.6 Rationale for proposed specifications

Amendments from the specifications prepared at the 53rd JECFA (1999) and published in FNP Add 7 (1999) include:

a. Introduction of a pecific limit for lead for use in infant formula.

b. Updating of the method of determination of residual solvents (ethanol and isopropanol) to avoid unnecessary conversion to nitrite esters and replace the use of packed columns in Headspace chromatography.

b. Rephrasing the reference to Vol. 4 for the choice of method for the determination of lead in order to be more general and harmonized with the specifications of similar additives.

5. Functional uses

5.1. Technological function

Xanthan gum is used as thickener, stabiliser, emulsifier and foaming agent. The use of xanthan gum as a thickener in formulae based on hydrolysed protein increases the viscosity of the reconstituted form of the formula which may result in improvements in infant feeding tolerance (see below). As protein hydrolysis will typically result in a marked loss of viscosity of the formula following reconstitution, addition of a thickening agent is particularly desirable to formulae based on protein that has been subject to hydrolysis (e.g., formulas intended to be more easily digestible; hypoallergenic formulas). Increasing the thickness of the formula to levels that are generally considered as acceptable to infants may result in the improvement of the infants' tolerance for the formula. Spit-up or regurgitation, a common occurrence in babies, particularly in the first 6 months of life, is typically one of the symptoms identified in association with formula intolerance. Formula thickening with starch or cereal is among the several remedies traditionally employed by caregivers to manage this affliction (Lasekan et al., 2014). A study was conducted that compared the incidence of spit-up and other indicators of formula tolerance in healthy term babies provided an investigational milk protein-based low-lactose infant formula thickened with rice starch to that observed in babies fed a standard, commercially available, lactose-containing milk-based formula (Lasekan et al., 2014). In babies provided the rice starch-thickened formula, spit-up frequency was significantly lower (from 32% lower at 112 days of age to 54% lower at 56 days of age) than that observed in the group

fed the standard formula. The results of this study indicate that the thickness of the formula may have an impact on the tolerance of the formula by infants.

Xanthan gum is currently used as a thickening agent in a powder formulation of a protein hydrolysate infant formula that was previously available only in ready-to-feed (RTF) form (Alimentum® Protein Hydrolysate Formula with Iron). The RTF uses carrageenan and modified tapioca starch as thickening agents and is characterised by a viscosity of 19-50 cP. In the absence of a thickening agent, the powder equivalent of the RTF formulation possesses a viscosity of only 3-5 cP. Addition of xanthan gum at a target inclusion rate of approximately 750 mg/L increases the viscosity to 13-34 cP. **Figure 2** represents viscosity data for 411 samples of infant formula reconstituted using Alimentum® powder with xanthan gum added at a level to provide a target concentration of 750 mg/L in the reconstituted formula manufactured for the U.S. market. The viscosity of the reconstituted xanthan gum-containing formula was observed to range from 16-38 cP, with an average value of 23.66 cP.

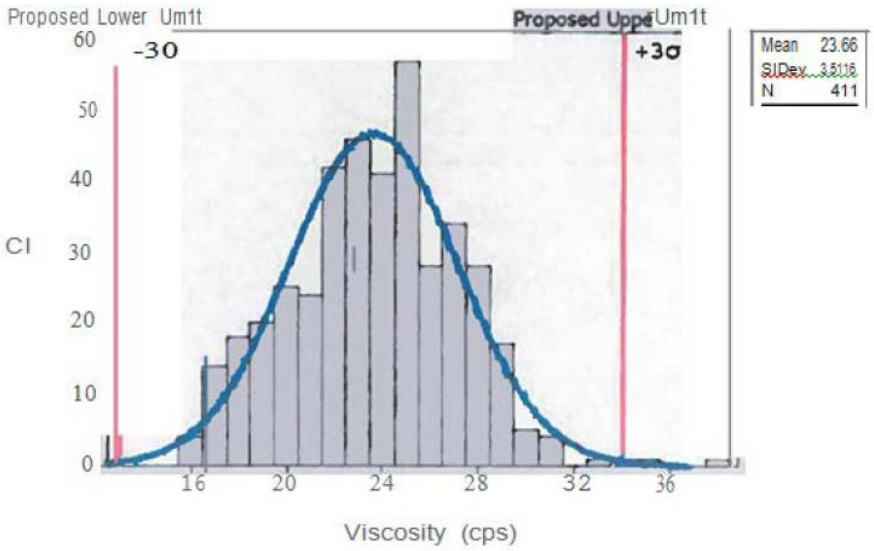


Figure 2 Viscosity data for an infant formula powder (Alimentum® powder) containing xanthan gum at a target concentration of 750 mg/L

A study was conducted to determine the tolerance of a xanthan gum-containing infant formula powder [Ross Products Division, Pediatric Nutrition Research & Development, 1998 (CP-AE 97). The viscosity of the already marketed Ready-to-Feed (RTF) formulation is in the range of 19 to 50 cps. Without the addition of a thickener, the viscosity of the powder equivalent is in the range of only 3 to 5 cps. This study was performed as part of a series of investigations designed to assess the safety and tolerability of a powdered version of an already marketed ready-to-feed formula (Alimentum® Protein Hydrolysate Formula with Iron Ready to Feed).A total of 182 infants were enrolled into the study and were started on the RTF formula for 1 week (baseline period). Of these infants, 137 completed the 1-week period. A total of 45 infants exited the study during the first week (baseline period). Of the 45 exits, 34 were due to formula intolerance or parental dissatisfaction. In the remaining 11 cases, most reasons cited for exit related to study incompliance (e.g., failure to feed formula, missed visit). One infant exited as a result of choking, crying, and gagging.

During the testing period of this study (1 week), infants were provided with one of four formulas: a hypoallergenic formula powder, based on extensively hydrolysed protein without xanthan gum (di-acetyl tartaric acid esters of monoglycerides and mono- and diglycerides were used as emulsifiers/stabilisers in the powder) or the same formula powder with xanthan gum added such that reconstituted formulae would contain 500, 1000 or 1500 mg xanthan gum/L.

Addition of xanthan gum to the powder formulation increased the viscosity of the formula from 4.2 cps (formula without xanthan gum) to 15.7, 40.1, and 68.5 cps in formula with 500, 1,000, and 1,500 mg xanthan gum/L, respectively (see **Table 1** below).

Table 1: Summary of the Viscosity of Formula With and Without XanthanGum, Formula Tolerance, and Stool Characteristic

Concentration of xanthan gum in formula (mg/L)	Viscosity of reconstituted formula (cps)	Early exits from study due to formula intolerance or parental dissatisfaction	Number of stools passed per day	Watery stools (%)
Baseline (1-week)*	19-50	34/182 (19%)	2.5±0.3 to 2.7±0.2	6.9±2.3 to 13.2±3.6
0[1]	4.20	8/37 (22%)	2.7±0.2	29.0±6.1
500	15.7	2/35 (6%)	1.6±0.2	22.6±5.
1,000	40.1	0/28 (0%)	1.9±0.2	11.0±4.3
1,500	68.5	1/37[2] (3%)	2.1±0.3	14.2±4.2

* ready-to-feed version of the test period powder formula (carrageenan as the emulsifier/stabiliser - commercially-labelled Alimentum® Protein Hydrolysate Formula with Iron Ready to Feed)
[1] hypoallergenic formula powder, based on extensively hydrolysed protein without xanthan gum.
[2] 1 additional exit in this group due to onset of high temperature.

The increase in the viscosity of the formula preparations was accompanied by improved infant tolerability of the formulas. As presented in Table 1, during the intervention period, more infants in the 0 mg xanthan gum/L group exited the study (8/37) compared to the study exits in the other three groups with varying levels of xanthan gum added to the powder formula. With the exception of one infant in the 1500 mg xanthan gum/L group who exited the study early as a result of hospitalisation (onset of high temperature – considered a serious adverse event), reasons cited for all other exits during the testing period were limited to formula intolerance (e.g., spit up, diarrhoea, fussiness, vomiting, refusal to feed, spitting, gassiness, and constipation)or parental dissatisfaction.

The incidence of watery stools in infants feeding on formula with no xanthan gum or 500 mg xanthan gum/L (29.0±6.1 and 22.6±5.4% watery stools, respectively) was higher than those observed during the baseline period (6.9±2.3 to 13.2±3.6% watery stools); however, in infants provided the test formula with greater amounts of xanthan gum, incidences of watery stools approached those observed during the baseline period (11.0±4.3 and 14.2±4.2% watery stools in the 1000 and 1500 xanthan gum/L groups, respectively). Overall, the results of the study showed that addition of xanthan gum to an extensively hydrolysed-protein based formula appeared to improve the formula's tolerability, decreased the number of stools passed by the infants, and had a mild stool firming effect. Based on the improvements in measures related to formula tolerability and stool properties observed in this study with increasing concentrations of xanthan gum in reconstituted formula and corresponding increases in formula viscosity, it can be concluded that the addition of xanthan gum to an extensively hydrolysed protein based powdered formula appears to improve the infants' tolerance to the formula.

In addition to the improvement in formula tolerance as demonstrated by the results of the above study, use of xanthan gum as a thickener in infant formulae is also associated with several technological benefits. Xanthan gum can be used at relatively low levels to achieve significant viscosity without gelling and does not need to be heated to be hydrated. Since xanthan gum is easily hydrated with relatively low temperature water, it is ideal for use in infant formula powders that are typically reconstituted with room temperature water. Xanthan gum also is suitable for use in dry-blended infant formulations. Furthermore, as per the already established specifications for xanthan gum, the hydrocolloid must meet stringent limits for potential microbial contaminants. A low microbial load is of particular importance for an ingredient intended for use in infant formulas.

Furthermore, since xanthan gum is carbohydrate-based and is derived from a source that is typically not associated with allergenicity, inclusion of xanthan gum in hypoallergenic formulae

as a thickening agent presents minimal risk of allergenicity or sensitisation potential. Evaluated in guinea-pigs, xanthan gum was shown to be non-sensitising [Hendrickson & Booth (sine data) – in FAS 21].

5.2. Food categories and use levels

As per the General Standard for Food Additives (GSFA) of the Codex Alimentarius Commission, xanthan gum (INS 415) is presently permitted for use in a wide range of food as an emulsifier, foaming agent, stabiliser, and thickener (GSFA, 2015). (See relative link or **Appendix 1**for the food categories and maximum use levels.)

With the exception of complementary foods for infants and young children in which xanthan gum can be added at levels of up to 10 000 mg/kg, in all other food categories, use of the polysaccharide is limited only by good manufacturing practice.

Further to the already permitted uses, xanthan gum is additionally being proposed for use in infant formulae, follow-up formulae, and formulae for special medical purposes intended for infants (GSFA Food Category No. 13.1.1, 13.1.2 and 13.1.3, respectively), which are based predominantly on partially or extensively hydrolysed protein, at levels up to 1000 mg/L (as consumed) (see **Table 2** for proposed uses and use-levels based on the General Standard for Food Additives food categorisation system). While **Table 2** specifies the maximum levels for the addition of xanthan gum to formulae, the actual levels required to achieve the technical effect (up to the maximum level) will depend on the specific formula under consideration. Specifically, the level of xanthan gum addition will be affected by the viscosity of the base formula. In the case of formulae based on hydrolysed protein, the level of addition will depend on the degree of protein hydrolysis. For example, highly hydrolysed formulae may require addition of more xanthan gum (up to approximately 1000 mg/L). Therefore, ultimately, the rate of addition of xanthan gum will be such as to achieve a level of viscosity of the reconstituted formula that is found to be acceptable by the infant.

Table 2 Proposed expansion of food uses for xanthan gum (INS 415) for incorporation in the General Standard for Food Additives (Xanthan Gum) of the Codex Alimentarius Commission

Food category no	Food category	Maximum level
13.1.1	Infant formulae	1000 mg/kg
13.1.2	Follow-up formulae	1000 mg/kg
13.1.3	Formulae for special medical purposes for infants	1000 mg/kg

6. Reactions and fate in foods

Xanthan gum has been shown to demonstrate excellent heat stability in food systems, even at very high temperatures, including the thermal conditions a nutritional formula is exposed to during processing (Rocks, 1971; Anon, 1974). Its viscosity building function is relatively independent of temperature over a wide range. Stability of xanthan gum under conditions involving thermal treatment can be further enhanced in the presence of relatively low salt concentration. Xanthan gum is compatible and stable in acid, alkaline and high concentration salt solutions, and does not react with ingredients that are typically found in foods. The viscosity of xanthan gum in aqueous solutions is nearly independent of pH between pH 6 and pH 9. Xanthan gum is also resistant to prolonged periods of shear.

Xanthan gum has been shown to be shelf-stable in a powdered infant formula based on an extensively hydrolysed protein. Specifically, in order to examine the stability of xanthan gum in infant formula, the viscosity of a reconstituted formula prepared from a xanthan gum-

containing powder of extensively hydrolysed protein (Alimentum®; concentration of xanthan gum in the reconstituted formula: 750 mg/L) was monitored following storage of the powder for up to 12 months. Results of the analysis (every 3 months) revealed only slight variability in the viscosity of the formula with xanthan gum (**Table 3**).

Table 3: Viscosity of reconstituted xanthan gum-containing formula (750 mg xanthan gum/L) following storage of the formula powder for up to 12 months.

	Viscosity (cP)				
Sample	Baseline	3 Months	6 Months	9 Months	12 Months
No. 1	24.8	24.4	24.6	22.8	NT
No. 2	23.7	27.5	26.4	NT	27.5

cP, centipoise; NT, not tested.

7. References

Anon (1974). Xanthan gum offers versatility, safety. Food Technol. 28(6):18-21.

CCCF (2014). Proposed draft maximum levels for lead in infant formula and formula for special medical purposes intended for infants and for follow-up formula. Appendix II. In: Joint FAO/WHO Food Standards Program, Codex Alimentarius Commission. 37th Session Geneva, 14-18 July 2014 / Report of the Eighth Session of the Codex Committee on Contaminants in Foods, The Hague, The Netherlands, 31 March – 4 April 2014. Rome: Codex Committee on Contaminants in Foods (CCCF), Codex Alimentarius Commission (CAC); 41. (REP14/CF; ftp://ftp.fao.org/codex/Reports/Reports_2014/REP14_CFe.pdf).

Hendrickson AP, Booth AN (sine data). Supplementary acute toxicological studies of polysaccharide B-1459 (xanthan gum). Unpublished report from Western Regional Research Laboratory, United States Department of Agriculture, Albany, CA [cited in JECFA, 1987].

GSFA (2015). Xanthan gum (415). In: Codex General Standard for Food Additives (GSFA) Online Database. Updated up to the 38th Session of the Codex Alimentarius Commission (2015). Rome: Codex Alimentarius Commission (CAC). (GSFA, Codex STAN 192-1995; http://www.fao.org/gsfaonline/additives/details.html?id=48).

JECFA (1999). Xanthan gum. In: Compendium of food additive specifications (addendum 7). 53rd Meeting of the Joint FAO/WHO Expert Committee on Food Additives (JECFA), June 1-10, 1999, Rome. Rome: Food and Agriculture Organization of the United Nations (FAO). (FAO Food and Nutrition Paper, no 52, add 7;
http://www.fao.org/DOCREP/X3860E/X3860E00.HTM).

Lasekan JB, Linke HK, Oliver JS, Carver JD, Blatter MM, Kuchan MJ et al. (2014). Milk protein-based infant formula containing rice starch and low lactose reduces common regurgitation in healthy term infants: a randomized, blinded, and prospective trial. J Am CollNutr. 33(2):136–46.

Rocks JK (1971). Xanthan gum. Food Technol. 25(5):22–31.USP (2011).

United States Pharmacopeia. 34th ed. & National Formulary,29th ed. Rockville (MD): U.S. Pharmacopeia (USP) Convention Inc., pp. 1711-1712.

APPENDIX 1

GSFA Provisions for Xanthan gum

Number	Food Category	Max Level	Notes
14.1.5	Coffee, coffee substitutes, tea, herbal infusions, and other hot cereal and grain beverages, excluding cocoa	GMP	Note 160
13.2	Complementary foods for infants and young children	10,000 mg/kg	Note 239 Note 273
09.2.4.1	Cooked fish and fish products	GMP	Note 327 Note 241
06.4.2	Dried pastas and noodles and like products	GMP	Note 256
01.2.1.2	Fermented milks (plain), heat-treated after fermentation	GMP	Note 234
01.2.1.1	Fermented milks (plain), not heat-treated after fermentation	GMP	Note 234 Note 235
04.2.2.7	Fermented vegetable (including mushrooms and fungi, roots and tubers, pulses and legumes, and aloe vera) and seaweed products, excluding fermented soybean products of food categories 06.8.6, 06.8.7, 12.9.1, 12.9.2.1 and 12.9.2.3	GMP	
08.1.2	Fresh meat, poultry, and game, comminuted	GMP	Note 281
08.1.1	Fresh meat, poultry, and game, whole pieces or cuts	GMP	Note 326 Note 16
06.4.1	Fresh pastas and noodles and like products	GMP	Note 211
09.2.4.3	Fried fish and fish products, including mollusks, crustaceans, and echinoderms	GMP	Note 41
09.2.2	Frozen battered fish, fish fillets, and fish products, including mollusks, crustaceans, and echinoderms	GMP	Note 177
10.2.2	Frozen egg products	GMP	
09.2.1	Frozen fish, fish fillets, and fish products, including mollusks, crustaceans, and echinoderms	GMP	Note 37
09.2.3	Frozen minced and creamed fish products, including mollusks, crustaceans, and echinoderms	GMP	
10.2.1	Liquid egg products	GMP	
11.4	Other sugars and syrups (e.g., xylose, maple syrup, sugar toppings)	GMP	Note 258
01.4.1	Pasteurized cream (plain)	GMP	Note 236
01.2.2	Renneted milk (plain)	GMP	
12.1.2	Salt Substitutes	GMP	
09.2.5	Smoked, dried, fermented, and/or salted fish and fish products, including mollusks, crustaceans, and echinoderms	GMP	Note 300
01.4.2	Sterilized and UHT creams, whipping and whipped creams, and reduced fat creams (plain)	GMP	

Note: Unless otherwise specified, food additive provisions apply to the food category indicated (e.g. Dairy), as well as to all subcategories of that category (e.g. Cheese, Ripened Cheese, etc.).

GSFA Table 3 Provisions

Xanthan gum is a food additive that is included in **Table 3**, and as such may be used in the following foods under the conditions of good manufacturing practices (GMP) as outlined in the Preamble of the Codex GSFA. Although not listed below, Xanthan gum could also be used in heat-treated butter milk of food category 01.1.1 and spices of food category 12.2.1. Note that food categories listed in the **Annex to Table 3** were excluded accordingly. **Xanthan gum** is acceptable in foods conforming to the following commodity standards: CS 117-1981

Number	Food Category
01.1.2	Dairy-based drinks, flavoured and/or fermented (e.g., chocolate milk, cocoa, eggnog, drinking yoghurt, whey-based drinks)
01.3	Condensed milk and analogues (plain)
01.4.3	Clotted cream (plain)
01.4.4	Cream analogues
01.5	Milk powder and cream powder and powder analogues (plain)
01.6.1	Unripened cheese
01.6.2	Ripened cheese
01.6.4	Processed cheese
01.6.5	Cheese analogues
01.7	Dairy-based desserts (e.g., pudding, fruit or flavoured yoghurt)
01.8.1	Liquid whey and whey products, excluding whey cheeses
02.2.2	Fat spreads, dairy fat spreads and blended spreads
02.3	Fat emulsions mainly of type oil-in-water, including mixed and/or flavoured products based on fat emulsions
02.4	Fat-based desserts excluding dairy-based dessert products of food category 01.7
03.0	Edible ices, including sherbet and sorbet
04.1.2	Processed fruit
04.2.2.2	Dried vegetables (including mushrooms and fungi, roots and tubers, pulses and legumes, and aloe vera), seaweeds, and nuts and seeds
04.2.2.3	Vegetables (including mushrooms and fungi, roots and tubers, pulses and legumes, and aloe vera), and seaweeds in vinegar, oil, brine, or soybean sauce
04.2.2.4	Canned or bottled (pasteurized) or retort pouch vegetables (including mushrooms and fungi, roots and tubers, pulses and legumes, and aloe vera), and seaweeds
04.2.2.5	Vegetable (including mushrooms and fungi, roots and tubers, pulses and legumes, and aloe vera), seaweed, and nut and seed purees and spreads (e.g., peanut butter)
04.2.2.6	Vegetable (including mushrooms and fungi, roots and tubers, pulses and legumes, and aloe vera), seaweed, and nut and seed pulps and preparations (e.g., vegetable desserts and sauces, candied vegetables) other than food category 04.2.2.5
04.2.2.8	Cooked or fried vegetables (including mushrooms and fungi, roots and tubers, pulses and legumes, and aloe vera), and seaweeds
05.0	Confectionery
06.3	Breakfast cereals, including rolled oats
06.4.3	Pre-cooked pastas and noodles and like products
06.5	Cereal and starch based desserts (e.g., rice pudding, tapioca pudding)
06.6	Batters (e.g., for breading or batters for fish or poultry)
06.7	Pre-cooked or processed rice products, including rice cakes (Oriental type only)
06.8	Soybean products (excluding soybean-based seasonings and condiments of food category 12.9)
07.0	Bakery wares
08.2	Processed meat, poultry, and game products in whole pieces or cuts
08.3	Processed comminuted meat, poultry, and game products
08.4	Edible casings (e.g., sausage casings)

09.3	Semi-preserved fish and fish products, including mollusks, crustaceans, and echinoderms
09.4	Fully preserved, including canned or fermented fish and fish products, including mollusks, crustaceans, and echinoderms
10.2.3	Dried and/or heat coagulated egg products
10.3	Preserved eggs, including alkaline, salted, and canned eggs
10.4	Egg-based desserts (e.g., custard)
11.6	Table-top sweeteners, including those containing high-intensity sweeteners
12.2.2	Seasonings and condiments
12.3	Vinegars
12.4	Mustards
12.5	Soups and broths
12.6	Sauces and like products
12.7	Salads (e.g., macaroni salad, potato salad) and sandwich spreads excluding cocoa- and nut-based spreads of food categories 04.2.2.5 and 05.1.3
12.8	Yeast and like products
12.9	Soybean-based seasonings and condiments
12.10	Protein products other than from soybeans
13.3	Dietetic foods intended for special medical purposes (excluding products of food category 13.1)
13.4	Dietetic formulae for slimming purposes and weight reduction
13.5	Dietetic foods (e.g., supplementary foods for dietary use) excluding products of food categories 13.1 - 13.4 and 13.6
13.6	Food supplements
14.1.4	Water-based flavoured drinks, including "sport," "energy," or "electrolyte" drinks and particulated drinks
14.2.1	Beer and malt beverages
14.2.2	Cider and perry
14.2.4	Wines (other than grape)
14.2.5	Mead
14.2.6	Distilled spirituous beverages containing more than 15% alcohol
14.2.7	Aromatized alcoholic beverages (e.g., beer, wine and spirituous cooler-type beverages, low alcoholic refreshers)
15.0	Ready-to-eat savouries
16.0	Prepared foods

Note: Unless otherwise specified, food additive provisions apply to the food category indicated (e.g. Dairy), as well as to all subcategories of that category (e.g. Cheese, Ripened Cheese, etc.).