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Technical analysis of anomalies in respect of the test set out in point (b) of Article 2(3) of Regulation (EC) No 900/2008 for the determination of milk fat content in processed agricultural products for the purpose of establishing import duties, when fats other than milk fat are present

Final Report

Administrative Arrangement S12.670777-1 between DG Enterprise and Industry (DG ENTR) and Joint Research Centre (JRC)

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Abstract

The agricultural element (EA) of certain processed agricultural products (PAPs) is an element of the tariff classification and the determination of import duties of imported products. Commission Regulation (EC) No 900/2008 lays down provisions and analysis methods for certain parameters necessary for the determination of the agricultural element. The milk fat content is one of the parameters related to the agricultural element. A problem became apparent when the analysis of an instantised whey protein concentrate (WPC) imported from the USA into the EU revealed that the milk fat contained in the product was much below the expected one. This caused the classification of the product under a different additional code in the "Meursing" table, leading to a disadvantage of the importer. The Administrative Arrangement (AA) S12.670777-1 between DG Enterprise (DG ENTR) and DG Joint Research Centre (DG JRC) was set up to elucidate the reasons for this anomaly, to characterise the magnitude of the underestimation across relevant dairy products, and to propose a solution for the determination of the appropriate additional tariff code of concerned PAPs.

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EXECUTIVE SUMMARY

The agricultural element (EA) of certain processed agricultural products (PAP) is an element of the tariff classification and the determination of import duties of imported products. Commission Regulation (EC) No 900/2008 lays down provisions and analysis methods for certain parameters necessary for the determination of the agricultural element. The milk fat content is one of the parameters related to the agricultural element.

Point (a) of Article 2(3) of Commission Regulation (EC) No 900/2008 defines the procedure for the evaluation of the milk fat content of PAPs when all fat contained in the product is milk fat. In this case the milk fat content is determined by hydrolysis of the product with hydrochloric acid followed by extraction with light petroleum. However, in case any other fat than milk fat was added to the PAP, the proportion of milk fat in the total fat content has to be determined according to point (b) of Article 2(3). For this purpose, the butyric acid content serves as a quantitative marker for milk fat. The milk fat content in the total fat fraction is determined by the proportion of butyric acid, determined as its methyl ester, of the fat fraction multiplied by a factor of 25. Hence, a content of 4 % butyric acid methyl ester would indicate 100 % milk fat.

A problem became apparent when the analysis of an instantised[1] whey protein concentrate (WPC) imported from the USA into the EU revealed that the milk fat contained in the product was much below the expected one. This caused the classification of the product under a different additional code in the "Meursing" table[2], leading to a disadvantage of the importer. The Administrative Arrangement (AA) S12.670777-1 between DG Enterprise[3] (DG ENTR) and DG Joint Research Centre (DG JRC) was set up to elucidate the reasons for this anomaly, to characterise the magnitude of the underestimation across relevant dairy products, and to propose a solution for the determination of the appropriate additional tariff code of concerned PAPs. The effect of certain processes used by the dairy industry, such as i) centrifugation (skimming), ii) coagulation (cheese making) and iii) churning (butter making) were studied at the pilot plant as well as the industrial scale. EU dairy industry provided powdered milk products differing in milk fat content such as whole milk and skim milk powder, whey powder and whey protein concentrates. The analysis of all samples revealed that the ratio of butyric acid methyl ester to total fat changes during skimming, coagulation, and churning, irrespective of the provenance of the samples. We

[1] "instantised" means with addition of emulsifiers such as lecithin
[2] Table 1 to Annex 1 to section I to Part three of Annex I to Regulation (CEE) No 2658/87
[3] Since 01.01.2015: DG for the Internal Market, Industry, Entrepreneurship and SMEs (DG GROW)

assume that this effect is due to the separation of large fat globules, containing the majority of butyric acid, from small fat globules during the skimming, coagulation, and churning process. The latter are, compared to the large milk fat globules, richer in phospholipids, which do not contain butyric acid. The butyric acid methyl ester content of the tested skim milk and whey powders were in the range between 1.8 % to 2.5 % instead of 4 %, the latter being the basis of the calculation of the milk fat amount. For this reason a conversion factor of 50 instead of 25 might be more appropriate for the calculation of the milk fat amount in the case of low-fat high-protein containing dairy ingredients.

The effect of the depletion of butyric acid on tariff classification according to CN codes and according to additional Meursing codes of PAPs was further investigated and potentially affected CN codes were identified. Skimmed dairy products having a depleted butyric acid content in their constituent fat are contained in a number of food products, which are covered by different CN codes. Issues with tariff classification might affect products covered by CN codes 1806 9070, 2106 1080, and potentially also for products falling under CN 1901 9099. The Directorate-General for the Internal Market, Industry, Entrepreneurship and SMEs (DG GROW) in collaboration with the Directorate-General Taxation and Customs Union (DG TAXUD) screened import declarations of the last three years. They identified also under other CN codes PAPs containing low- milk fat and high-milk protein levels. Based on the declared composition of these PAPs, DG GROW expects potential effects on tariff classification of these products as well.

TERMS OF REFERENCE

The purpose of the Administrative Arrangement (AA) JRC S12.670777-1 between DG Enterprise[4] (DG ENTR) and the Joint Research Centre (JRC) was:

(i) to provide scientific support to clarify the reason for anomalies in respect of the test set out in point (b) of Article 2(3) of Regulation (EC) No 900/2008 for the determination of the milk fat content resulting from high-protein and low-fat dairy ingredients in processed agricultural products;

(ii) to define under which conditions those anomalies occur;

(iii) to identify the dairy ingredients and the processed agricultural products concerned;

and

(iv) to propose a modification of the basic principles of the test to account for the anomalies.

In short, the project comprised three consecutive experimental parts. In the first part, the influence of unit operations such as creaming skimming, churning, and coagulation on the depletion of butyric acid were investigated on the laboratory scale, followed by confirmation of the findings on industrial scale. Finally, a number of industrial dairy products were investigated for estimation of the magnitude of depletion of butyric acid in the products.

The AA foresaw a clear structure of tasks that had to be realised in the frame of the project. However, for practical considerations the three different project parts were executed rather in parallel than sequential.

[4] Since 01.01.2015: DG for the Internal Market, Industry, Entrepreneurship and SMEs (DG GROW)

INTRODUCTION

Milk of ruminants is produced in large quantities. The Food and Agriculture Organization (FAO) of the United Nations estimated for 2013 a production volume of 780 million tons and the world trade (excluding EU internal trade) of dairy products to 58 million tons of milk equivalents [1]. However, milk is hardly ever traded in raw form. The collected raw milk is processed after clarification and pasteurisation to several important agricultural products such as cream, butter, skimmed and whole milk and cheese. An overview of the complexity of dairy products produced from milk is given in ANNEX 1 [2]. International trade occurs primarily in the form of powders, as the shelf life of liquid milk products is rather short. Codex Standard (CXS) 207-1999 defines the minimum requirements for milk powders and cream powders [3]. It distinguishes four classes of milk powders depending on their milk fat content: i) cream powder with a minimum of 42 % of milk fat, ii) whole milk powder (26 % to 42 % milk fat), iii) partially skimmed milk powder (1.5 % to 26 % milk fat) and iv) skimmed milk powder (<1.5% milk fat). The definitions given in CXS 207-1999 agree with the definitions specified in Annex I of Council Directive 2001/114/EC [4]. In a similar manner Codex Standard 289-1995 sets the specifications for whey powders, but in contrast to CXS 207-1999 does not specify minimum and maximum milk fat contents [5]. Alternatively, it identifies a milk fat content of 2 % (m/m) as typical. Whey protein concentrates (WPCs) are not covered by Codex Standards. However, the US Dairy Export Council provides information on the fat content of WPCs such as WPC 80, which should contain a minimum of 80 % milk protein and a milk fat content in the range of 4 % to 8 % (m/m).

Raw milk is usually composed of about 4 % fat, 3.2 % proteins, 4.6 % lactose and a number of micronutrients [6]. However, the actual composition of bovine milk is influenced by the breed, lactation stage, as well as feeding practices. The vast majority of the total fat is contained in the form of fat globules. They are synthesised and secreted in the mammary gland. Fat globules consist of triglycerides, which are covered by a phospholipid membrane. The size of the droplets varies in raw milk over a wide range, from 0.1 µm to 15 µm in diameter [7]. The majority of triglycerides is contained in the large fat globules [7]. The triglycerides in milk fat contain, in contrast to other non-ruminant fats and vegetable oils, butyric acid. The level of butyric acid is subject to natural variability, which depends to a great extent on the type of feed consumed. Jensen et al [8] reported for bovine milk an average butyric acid content of 3.5 %.

The fat globules are dispersed in the milk serum. As well as carbohydrates and minerals, the milk serum contains casein micelles, which form the basis for the production of cheese. In this process, casein is coagulated by the addition of either acid producing starter bacteria, or the enzyme rennet, or a combination of both. Fat globules are enclosed in the coagulated casein matrix. The remaining serum is whey, which was in former times either disposed of or used for the production of feed. Whey contains proteins such as lactoglobulins and lactalbumins, lactose and other carbohydrates, vitamins, and minerals. The fat content of whey is usually low (in the range of less than 0.1 %). However, industry developed a number of products that increased the commercial value of this by-product from cheese production enormously. Nowadays it is notably used in drinks, in cosmetics, as a baking ingredient in breads and rolls, for cheese production, in cheese spreads, chocolates and in candies. Of high commercial value are WPCs, which are traded in the form of powders. These concentrates, with varying protein content, are used in athlete nutrition and for the preparation of diet food for the reduction of weight.

Processed agricultural products (PAPs) are subject to tariff classification (CN nomenclature and additional codes) in international trade. For some categories of PAPs, the applicable tariffs depend on the agricultural element (EA) of the respective product. The agricultural element is, in the case of dairy based and many other PAPs containing milk or milk fractions, determined by the milk fat and milk protein content. Commission Regulation (EC) No 900/2008 lays down methods of analysis and other technical provisions necessary for the arrangement of import of certain goods resulting from the processing of agricultural products [9]. Article 2 (3) of this Regulation defines the procedure for determining the milk fat content of PAPs. In the absence of foreign fats (i.e. non-milk fat), the milk fat content is determined by the extraction of the total fat of the respective good with light petroleum, preceded by hydrolysis with hydrochloric acid. However, in the presence of fats other than milk fat, the fat extracted as described before is converted into fatty acid methyl esters, and analysed by gas chromatography. Butyric acid methyl ester is used as a marker for the presence of milk fat, and the proportion of milk fat in the extracted total fat is derived by multiplying the per cent ratio of butyric acid methyl ester (g/100 g extracted fat) by the factor of 25, assuming thereby a constant butyric acid content of milk fat of 3.4 g/100 g fat (equal to 4 g butyric acid methyl ester /100g fat).

Recent analyses done by the JRC pointed to a reduction of butyric acid in the fat extracted from whey protein concentrates, which were imported from USA into the EU, by about

50 % compared to butter fat. It was postulated that the depletion is due to size discrimination of milk fat globules during the production process of whey. As a consequence of such depletion, the milk fat content was underestimated by the prescribed analysis method. Therefore, concerned goods were, based on the additional code in the Meursing tables, classified into a different tariff category, to the financial disadvantage of the importer. For this reason DG GROW commissioned JRC to carry out research to estimate the magnitude of the depletion of butyric acid, at which stage of milk processing the depletion occurs, which products are affected and how this can be considered in relevant legislation. The goal was to find a solution that keeps also in mind the practical implementation of relevant analytical procedures in customs laboratories.

EXPERIMENTAL

Milk fat extraction and determination of butyric acid content of dairy powders

Solid samples were extracted by application of the Weibull-Stoldt fat extraction method, which corresponds with the principles described in Commission Regulation (EC) No 900/2008. The weight of the extracted residue was determined gravimetrically and fatty acids contained in triacylglycerols and other lipids were transferred with sodium methanolate into the respective methyl esters prior to measurement by gas chromatography with flame ionisation detection (GC-FID). Methyl valerate was used as internal standard and added to the sample prior to transesterification. The analysis scheme is presented in ANNEX 2. Only esters with relative abundance above 1 % were included in the evaluation.

Milk fat extraction and determination of butyric acid content of liquids

Liquid samples were analysed prior to drying in order to study the effect of drying processes on the milk fat composition. Liquid samples were extracted according to ISO 14156:2001. The standard describes the extraction of milk lipids according to the Röse-Gottlieb extraction method. This method uses ethanol, an ammonia solution, diethyl ether, and *n*-pentane for the extraction of the lipids from the milk serum. The lipid fraction is recovered by evaporation of the organic solvent and further derivatised with sodium methanolate to the respective fatty acid methyl esters. The measurement of the esters occurred as presented before. The scheme of the Röse-Gottlieb fat extraction method is presented in ANNEX 2.

Milk fat extraction and determination of phospholipids

The lipid fraction was isolated from the samples by extraction with chloroform:methanol (2:1), as described by Le et al. [10]. A portion of the extracted fat was dissolved in the mobile phase and analysed by high performance liquid chromatography with evaporative light scattering detection, as proposed earlier by Rombaut et al. [11]. The instrument was calibrated with a commercial mixture "Phospholipid Mixture for HPLC" (Supelco cat. No

P3817-1VL; Sigma-Aldrich BVBA, Diegem, Belgium) containing phosphatidylcholine, phosphatidylinositole, and phosphatidylethanolamine. The scheme of the extraction method is presented in ANNEX 2.

SAMPLES

Raw whole milk samples for laboratory experiments were supplied by a local farmer. These samples were not processed at all. Several products along the processing chain of milk were produced at the local farm that is equipped with pilot plant sized production equipment. A short overview on the production process is given in ANNEX 3.

Industrial products were supplied by 9 different companies from the dairy industry. Not only dairy products but also some dairy based PAPs were represented in the sample set, which comprises different products. The majority of samples consisted of whey protein concentrates (WPCs) with at least 60 % protein content. Sweet whey powders, butter milk powders, and skimmed milk powders were also among the samples. Table 1 presents an overview of the samples received from industry.

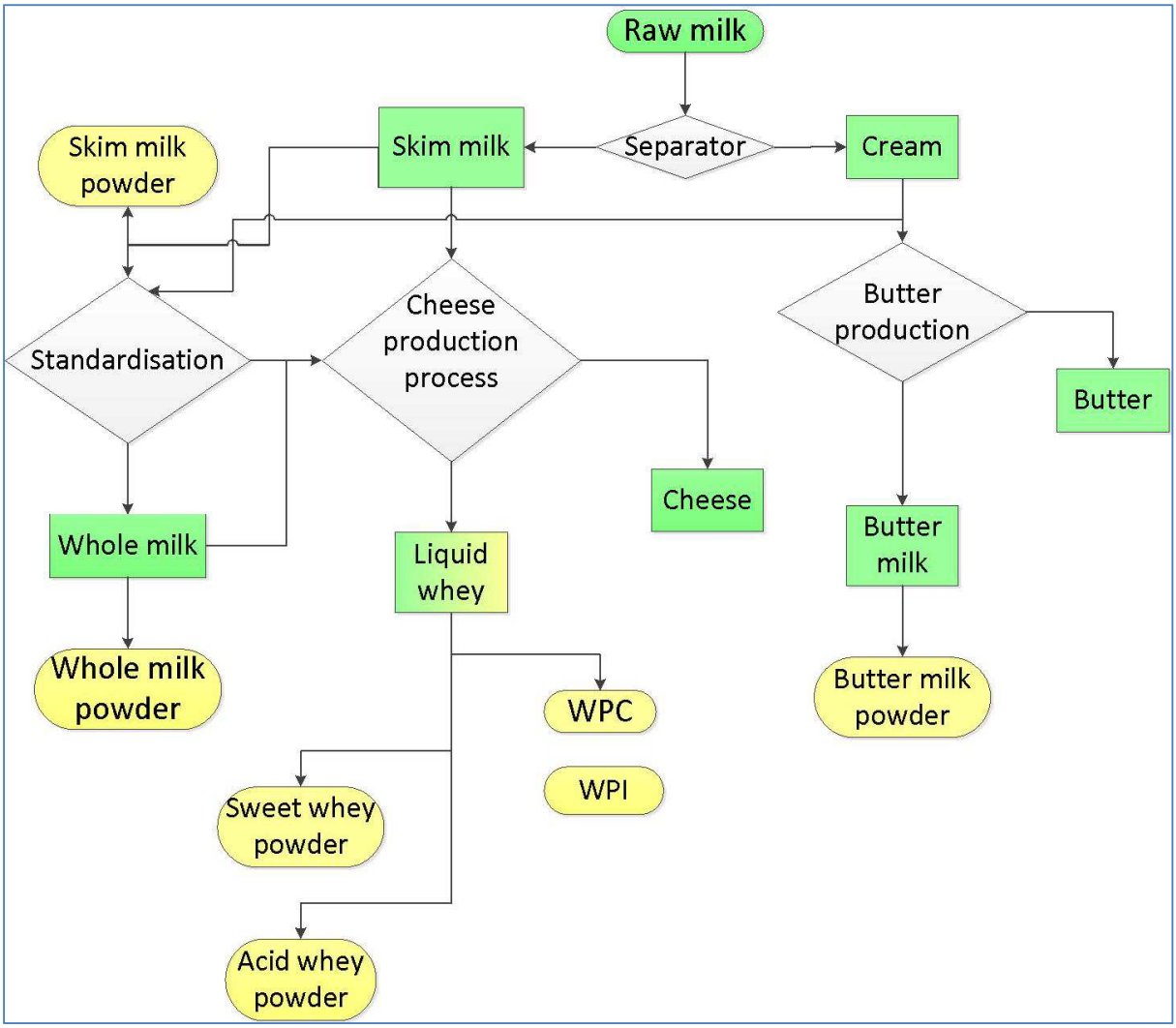
At the end of the project the question was raised whether casein and/or caseinates could be affected by a potential depletion of butyric acid as well. For a swift response, casein and caseinate samples were acquired from Sigma-Aldrich BVBA, a supplier of laboratory chemicals. The casein sample was of technical grade and stems from the USA, whereas the caseinate sample (sodium salt of casein) was produced in Germany. It should be mentioned that these samples do not necessarily represent casein/caseinates used by the food industry.

Table 1: Samples received from industry

Matrix	Number
Butter milk powder	4
Instantised skim milk powder	1
Whole milk powder	3
Skim milk powder (SMP)	4
Acid whey powder	1
Sweet whey powder	5
Sweet whey permeate powder	1
Lactalbumin concentrate	2
Total milk protein (TMP)	7
Whey protein concentrate (WPC)	17
Whey protein concentrate instantised	10
Casein and caseinate	2

Products which were studied in the course of this project are highlighted in Figure 1. Products highlighted in yellow were received from industry, whereas products highlighted in green were produced at the pilot plant.

Figure 1: Dairy products covered by the project



RESULTS AND DISCUSSION

Validation of analytical methods used in the study

A chromatogram of fatty acid methyl esters obtained from one of the tested WPC samples is shown in ANNEX 2. The instrument was calibrated with F.A.M.E. Mix C4-C24 (Supelco, 18919-1AMP, Sigma-Aldrich, Diegem, Belgium), and methyl valerate (Sigma, 94560-5ML, Sigma-Aldrich, Diegem, Belgium) as internal standard. The performance of the analysis method was validated regarding precision and trueness. The relative repeatability standard deviation of replicate analyses of butyric acid methyl ester obtained from whey protein concentrate samples with fat contents between 3 % and 6 % was below 4 %. Trueness was estimated via recovery experiments, by spiking glycerol tributyrate into WPC samples. The fortification level was equal to 2 g butyric acid methyl ester /100 g fat. Recovery rates were in the range of 98.2±4.2 %. Additionally the butyric acid methyl ester content of butter was determined. The average result of replicate determinations was 4.1 % with a standard deviation of 0.2 % (three replicate analyses). Based on these results it can be stated that there is no significant difference of the measured values from the expected values. Hence, the analysis method provided correct results.

Polar lipids such as phospholipids require for their complete extraction appropriate extraction procedures such as the one proposed by Folch et al [10]. Avalli et al [12] demonstrated that phosphatidylinositol and phosphatidylserine are not sufficiently extracted by the Röse-Gottlieb extraction in comparison to the use of chloroform:methanol.

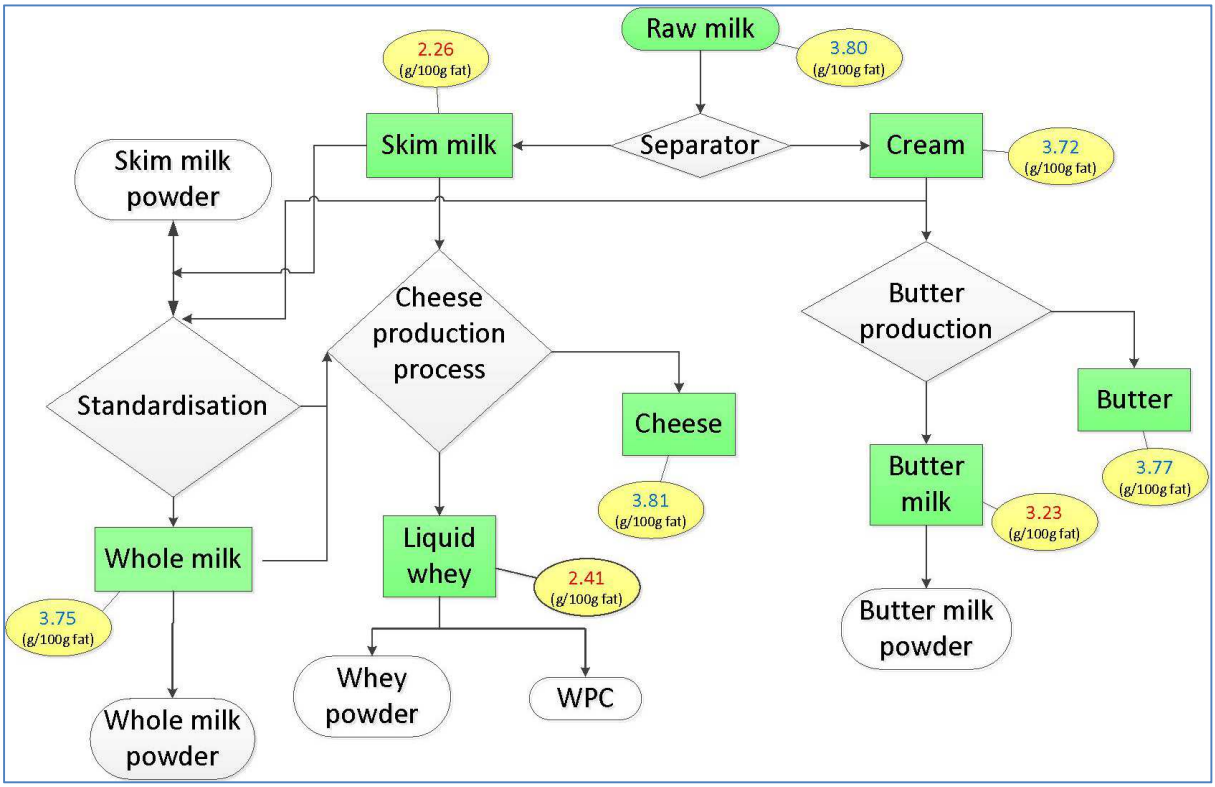
Influence of dairy unit operations on depletion of butyric acid of milk fat

The industrial production process of relevant PAPs was simulated at pilot plant scale. Cooperation with a local farmer was set up for this purpose. All studied products, which are indicated in Figure 1 in green colour, were made from the same raw milk. Liquid fractions were lyophilised and the resulting powders were analysed as described before. The unit operations studied were i) skimming, ii) churning, and iii) coagulation, which is the basis for cheese fabrication. The resulting products with low fat content in their dry matter, which are of interest for the purpose of this project, are i) skim milk, ii) buttermilk and iii) whey. Each experiment was conducted in replicate. An attempt was made to simulate industrial ultrafiltration of whey on a laboratory scale by using a laboratory scale ultrafiltration unit

(Minimate® TFF, Thermo Scientific). However, the capacity of the ultrafiltration cell was not sufficient to produce the amount of whey protein concentrate that would have been needed for the determination of the butyric acid content. For this reason, ultrafiltration at laboratory scale was not further pursued. Anyhow, the analysis of the products highlighted in green in Figure 2 allowed already identifying the processing step which caused the depletion of butyric acid. Figure 2 contains the average milk fat content determined for the different products. The butyric acid methyl ester contents given in red font were significantly different from the butyric acid content of the raw milk fat. Already the skimming process led to a depletion of butyric acid in the residual milk fat. The fat content in the dry matter was in the range of 0.1 % for whey, 1.3 % for skimmed milk to 8.5 % for buttermilk. All other products indicated in Figure 2 by green colour contained at least 31 % fat in the dry matter.

Figure 2: Milk products produced from raw milk in a pilot plant.

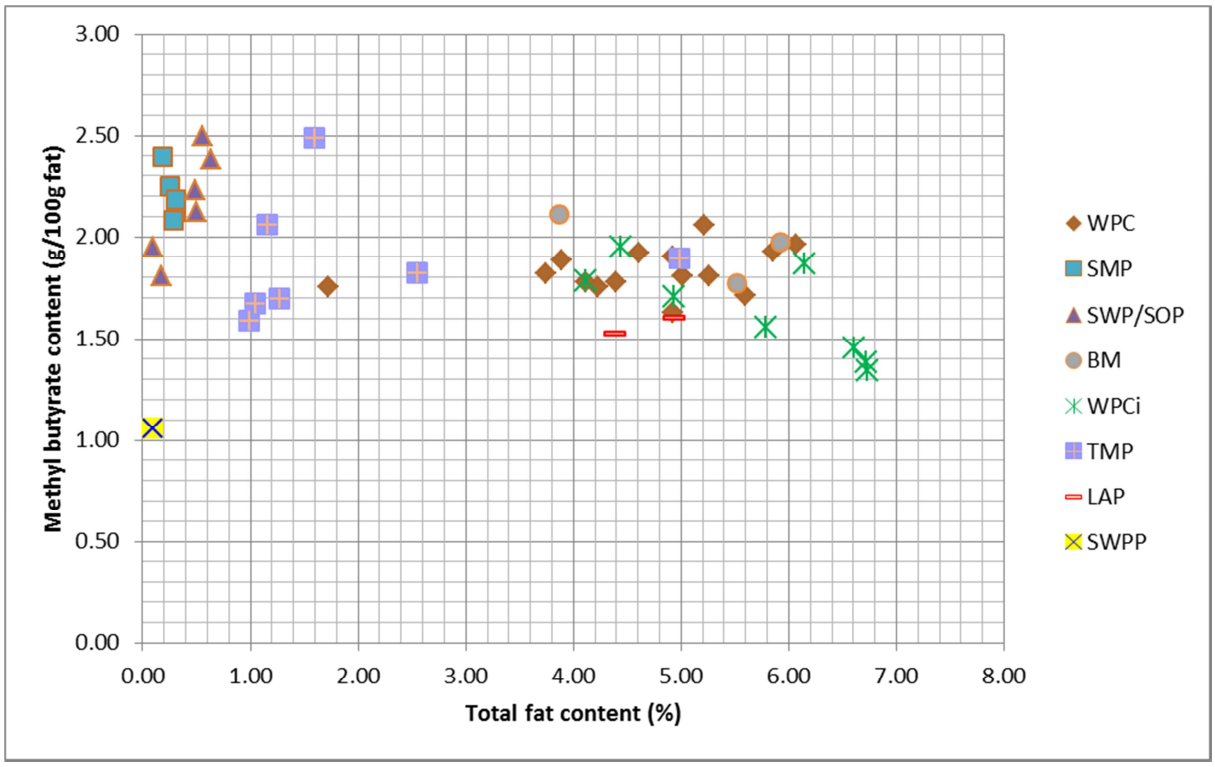
Figures represent the average butyric acid methyl ester content expressed in g/ 100 g fat



Study of industrial products

Dairy industry supplied 55 different products, as indicated in Table 1. Most samples were received in form of dry powders. The majority of samples comprised WPCs with protein contents between 60 % and 80 %. The determination of the butyric acid content of the fat extracted from industrial samples was done as described before. Figure 3 presents the results of the analyses.

Figure 3: Butyric acid methyl ester content (g/100 g fat) of industrial dairy products.



WPC: whey protein concentrate, SMP: skim milk powder, SWP: sweet whey powder, SOP: acid whey powder, BM: butter milk powder, WPCi: whey protein concentrate powder instantised, TMP: total milk protein, LAP: lactalbumin concentrate, SWPP: sweet whey permeate powder

It is obvious that the studied samples contained significantly less butyric acid (expressed as methyl ester) than literature on milk fat composition suggests [13]. The values cannot even be explained taking the biological variation of the butyric acid content of milk fat, as determined by Molkentin and Precht, into account [13]. The butyric acid methyl ester content of most samples was in the range of 1.7 to 2.2 g/100 g fat. The mean butyric acid methyl ester value was 1.90 g/100 g fat, the corresponding standard deviation was 0.28 g/100 g fat. The median (1.89 g/100 g fat) agreed well with the mean. The minimum was 1.35 g/100 g fat (WPC instantised by the addition of lecithin) and the maximum was 2.50 g/100 g fat (sweet whey powder). The very low value observed for a sweet whey permeate powder has to be seen with caution, as this product did contain almost no fat,

which made the total fat determination very difficult.

Applying the method for converting the estimated amount of butyric acid methyl ester into milk fat as specified in Commission Regulation (EC) No 900/2008, to those products, would provide relative milk fat contents of the extracted fat between 42.5 % and 55 %, which is obviously not correct as the analysed dairy products did by declaration not contain any other fat than milk fat. The total fat content of WPCs were in the expected range, whereas the total fat content of skim milk powders and whey powders was significantly lower. Figure 3 shows that the total fat content for both product groups was below 1.0 %. The butyric acid methyl ester contents in the milk fat of the tested skim milk and whey powders (sweet whey powder / acid whey powder) were in the range between 1.8 % to 2.5 %. Butyric acid methyl ester contents below 1.5 g/100 g fat were found only for three finished (instantised and flavoured) WPCs and for one sweet whey permeate powder.

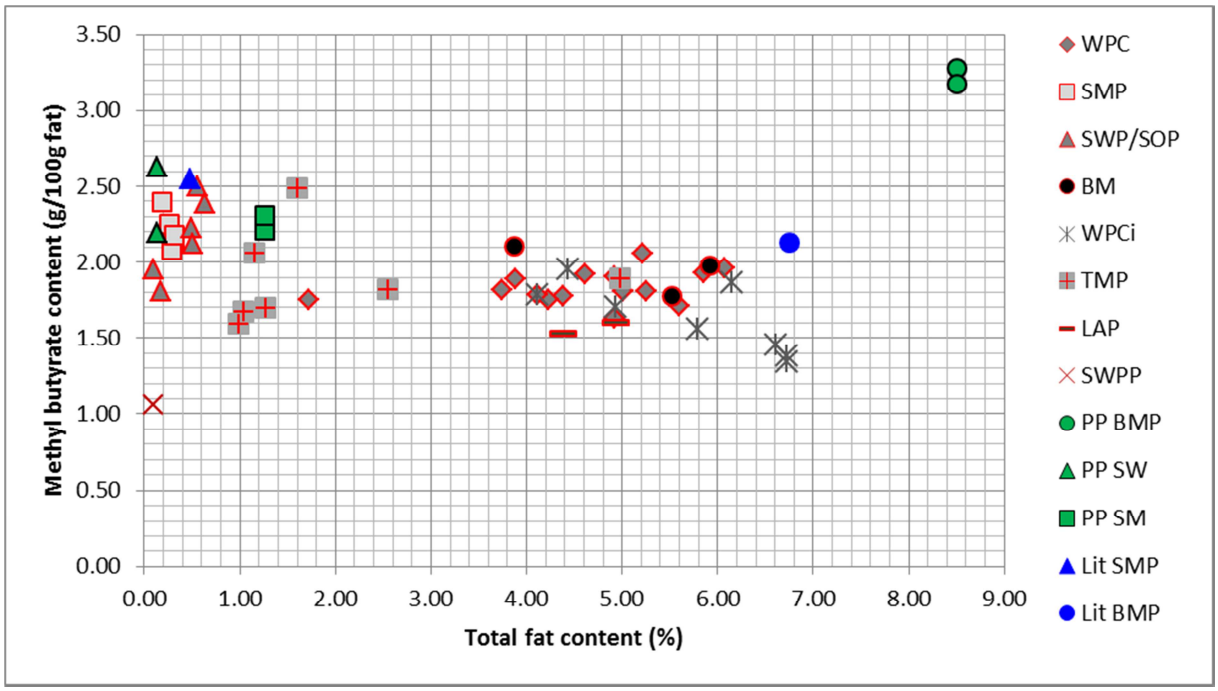
Earlier studies reported an average butyric acid content of 136 European milk fat samples of 3.42 g/100 g fat with a standard deviation of 0.144 g /100 g fat [13]. Considering the difference in molecular weight this translates to 3.96±0.167 g / 100 fat butyric acid methyl ester. The relative standard deviation equals to 4.2 %. The spread of butyric acid methyl ester content, expressed as standard deviation, was for WPCs in the range of 5.5 %. The corresponding figures for milk protein concentrates, buttermilk powders, sweet whey powders and skim milk powders were 12.6 %, 16.4 %, 12.0 %, and 5.7 % respectively. It has to be noted that the reference value (3.96 g/100 g fat), on which the method provided for in point (b) of article 2(3) of Regulation (EC) No 900/2008 was based, was determined in pure milk fat obtained by melting butter. Literature data on the butyric acid content of fat obtained from other dairy products, in particular those low in fat content, are scarce. In this respect it has to be noted that the measurement of milk fat in dry dairy powders is quite complex. It requires an extraction procedure which contains many sample manipulation steps, and due to the low fat contents of the samples the handling of small amounts of fat. Each manipulation adds a certain level of variability to the whole assay, which explains repeatability relative standard deviations of the fat determination in the range of 2 % up to about 14 %. This level of variability adds to the variability of the transesterification reaction, which yields butyric acid methyl ester, and gas chromatographic measurement.

The low amount of butyric acid methyl ester in the fat present in the studied industrial low-fat dairy products could be caused either by a depletion of butyric acid in the residual milk fat, or by the addition of foreign fats, which do not contain butyric acid. The addition of foreign fats to the products is unlikely as a high fat content does not give extra commercial value to the concerned products.

Contrary, residual lipids cause problems with regard to technological functionality of powdered milk products and development of off-flavour due to lipid oxidation [14, 15]. Residual lipids in liquid whey have also been associated with negative impact on processes such as ultrafiltration and reverse osmosis [16]. The likelihood of deliberate addition of foreign fats is further decreased by the fact that the investigated products came from different companies, which would require for e.g. for all WPCs the same level of fortification with foreign fats. Molkentin [17] reported a depletion of butyric acid in different low fat milk products obtained from the same raw milk, which was of a similar magnitude as seen in this study. The findings from the analysis of samples produced at the pilot plant confirmed the results found for the industrially produced products. Figure 4 adds to the data for industrial samples (in red) data from samples produced at the pilot plant (green symbols). Data reported by Molkentin are displayed in Figure 4 in blue colour [16]. Both data points have to be understood as mean of duplicate analysis.

The butyric acid methyl ester content of the fat in sweet whey and whole milk obtained from the pilot plant agreed with data for industrial samples. It has to be noted that the total fat contents of skim milk and buttermilk produced at the pilot plant were higher compared to samples from the dairy industry. Especially the fat content of buttermilk was much higher than that of comparable industrial samples, which can be explained by the better separation efficiency of milk centrifuges used by industry in comparison to a small scale production facility at a dairy farm. The higher fat content of the buttermilk might explain the, compared to industrial products, higher butyric acid content measured in the pilot plant sample. However, samples produced at the pilot plant and data from literature confirm the butyric acid methyl ester levels measured in industrial samples. Therefore, it is concluded that the depletion of butyric acid occurs primarily during the centrifugation of milk to separate cream from skim milk, churning of cream, which results in butter and buttermilk, and coagulation of milk which provides cheese and whey.

Figure 4: Butyric acid methyl ester contents determined in i) industrial products and ii) products from the pilot plant, complemented with iii) data from literature.



WPC: whey protein concentrate, SMP: skim milk powder, SWP: sweet whey powder, SOP: acid whey powder, BMP: butter milk powder, WPCi: whey protein powder instantised, TMP: total milk protein, LAP: Lactalbumin concentrate, SWPP: sweet whey permeate powder, PP BMP: butter milk powder from pilot plant, PP SWP sweet whey powder from pilot plant, PP SM skim milk powder from pilot plant, Lit SMP: skim milk powder data from [16], Lit BMP buttermilk powder from [16]

The panel of samples analysed contained also instantised powders. Instantisation facilitates the dissolution of the powder in water, and occurs usually by the addition of lecithin to the product. Lecithin is a generic term comprising next to other substances different phospholipids such as phosphatidylcholine, phosphatidylethanolamine, and phosphatidylinositol. In the EU lecithin is an authorised food additive, which is indicated by the number E 332. Lecithin may be added to milk products *ad quantum satis*[5] [18]. The addition of lecithin is performed via an aqueous solution, which is sprayed onto the product granules, followed by drying. Typically, lecithin is added to the product in the range of about 0.5 % to 1 % of the dry mass of the product and will contribute to the total fat content of the product. As lecithin does not contain any butyric acid, its addition to dry dairy powders should have an impact on the butyric acid methyl ester / total fat ratio. It was also expected that the addition of lecithin would increase the total fat content compared to native products. However, this could not be proven in general. The green stars in Figure 3 respectively dark grey stars in Figure 4, indicate instantised WPCs with 80 % to 90 %

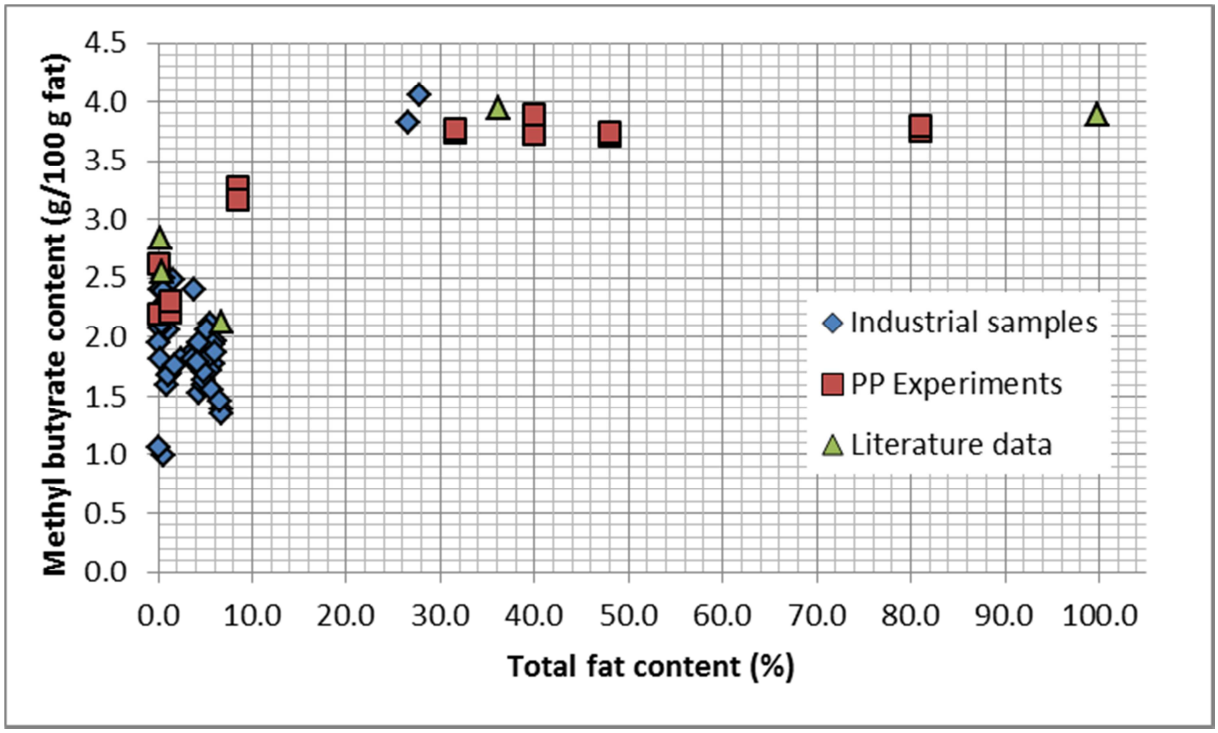
[5] '*ad quantum satis*' means "the amount which is needed"

protein content. The product specification sheets of these products clearly indicate that these products were instantised by the addition of soya lecithin. However, the butyric acid methyl ester contents did not significantly deviate from those of native WPCs. Exceptions provide three finished WPCs with butyric acid methyl ester values below 1.5 g / 100 g fat. The other instantised WPCs can neither be distinguished from native WPCs based on their fat content nor on the basis of the methyl butyrate values.

The effect of the addition of soya lecithin on the butyric acid methyl ester contents of milk fat extracted from WPCs was studied in the laboratory. Native WPC samples were spiked with 1 % (mass/mass) of pure commercial soya lecithin, which corresponds to the upper level of technical application. Compared to native samples, the dilution effect of soya lecithin reduced the measured butyric acid methyl ester content by about 0.2 g/100 g fat. Preparations with lower lecithin contents will show of course smaller differences. Hence, the natural variability of the butyric acid content of native WPCs, paired with low concentrations of lecithin might mask the influence of instantisation on the butyric acid methyl ester results. This might explain the overlap of results as demonstrated in Figure 4.

Full fat products were analysed besides skimmed products. Figure 5 presents results for industrial products, products prepared at the pilot plant and corresponding data from literature. Data for fat contents between 27 % and 36 % refer to whole milk powders. Cheese samples contained about 40 % fat, cream powder about 48 % of fat and butter about 82 % fat. The data point at 99.9 % corresponds to pure butterfat. The graph illustrates that whole milk powder and other products of high fat content are not affected by any depletion of butyric acid. This is confirmed by data presented for ripened cheese [19]. The butyric acid contents of only five out of 30 different cheeses were outside the range defined by the natural variation of milk fat. The decrease of measured butyric acid contents of these five cheeses was attributed to lipolysis of triacylglycerols during ripening.

Figure 5: Butyric acid methyl ester content in different dairy products (g/100 g fat).



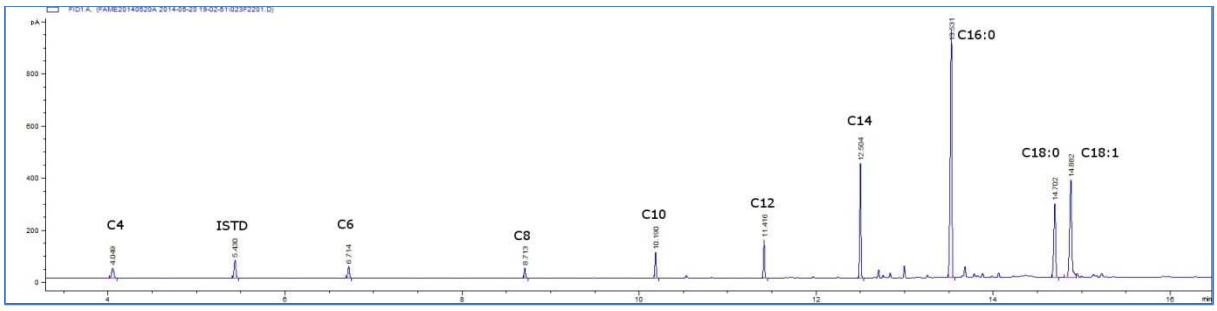
Casein and caseinates comprise low fat dairy products, which are used in different foods for altering the physical properties of the respective food, or for adding nutritional value to the food. Casein and caseinates are produced by precipitating the protein fraction of skimmed milk. Precipitation is initiated by rennet, inorganic acids, or lactic acid. After precipitation and separation of whey, casein is washed several times, and finally pressed and dried. Caseinates are formed by the treatment of casein with strong bases, such as sodium hydroxide. Both casein and caseinates contain typically 80-90% protein and between 0.6-1.3 % of fat.

Chemical analysis of the casein and sodium caseinate sample revealed a depletion of butyric acid content compared to cream or butter fat. The butyric acid content, expressed as butyric acid methyl ester was in the casein sample 0.55 g/100g fat, and in the sodium caseinate sample 1.61 g /100 g fat. The latter is comparable with other skimmed milk products. However, the butyric acid level of casein was much lower. This might be reasoned by differences in the production process, which generally includes several rinsing steps to remove residual whey.

Evaluation of fatty acid profiles of low fat dairy products

Fatty acid methyl ester (FAME) profiles were recorded for each studied product. Major FAMEs which contributed to the total FAME signal by more than one per cent were included in the evaluation. Figure 6 displays a chromatogram which was recorded for one WPC sample.

Figure 6: Example of FAME chromatogram recorded for a WPC sample



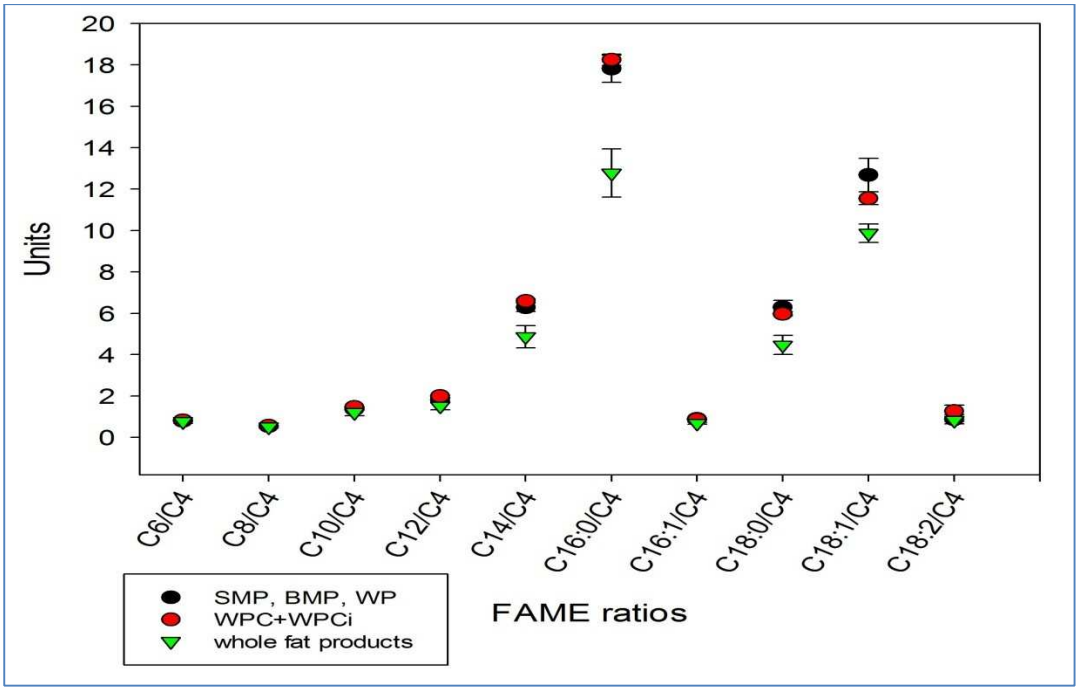
C4: butyric acid methyl ester, ISTD: valeric acid methly ester; C6: caproic acid methyl ester, C8: caprylic acid methyl ester, C10: capric acid methyl ester, C12: lauric acid methyl ester, C14: myristic acid methyl ester, C16:0 palmitic acid methyl ester, C18:0 stearic acid methyl ester, C18:1: oleic acid methyl ester

The signals of FAMEs were normalised to the signal of butyric acid methyl ester, in order to identify any changes in the profile. The samples analysed in the project were grouped into four classes. The first class comprises i) all low fat dry powders that were produced by drying of the original product without any preceding compositional modification. Skim milk powder, buttermilk powder and whey powder fall into this class. The second class is formed by ii) whey protein concentrates with 60 % to 90 % protein content. Separately considered was in the evaluation iii) the group of instantised whey protein concentrates. The data for iv) whole milk products (raw milk, whole milk powder, cheese, butter and cream) were aggregated for comparison to skimmed products. Figure 7 presents the mean ratios for each FAME plus the corresponding confidence intervals of the mean values (indicated as whiskers). Overlapping whiskers indicate that differences are statistically not significant. Hence, it was concluded that the average fatty acid methyl ester profiles of the studied skimmed products do not differ from each other.

It also becomes obvious that there is hardly any difference between whole fat products and skimmed products with regard to the normalized ratios for short chain fatty acids (C6:0/C4:0) up to medium chain fatty acids (C12:0/C4:0). However, whole fat products show lower normalized ratios for long chain fatty acid methyl esters compared to skimmed

products. The higher ratio for skimmed products is caused by the depletion of butyric acid compared to whole fat products. Similar relations can be calculated from data presented by Molkentin [17]. This data shows a depletion of butyric acid both in skimmed milk and buttermilk. However, he observed for buttermilk an additional relative depletion of volatile, short chain fatty acids of about 20 % during concentration and drying processes, if compared to the original buttermilk composition. A depletion of short chain fatty acids, such as butyric acid, in skim milk compared to cream was also reported by Timmen and Patton [20]. However, the differences found by them were small compared to the differences found in the present study and the ones derived from the data of Molkentin.

Figure 7: Product class dependent average FAME signals normalised to butyric acid methyl ester



WPC: whey protein concentrate, WPCi: instantised whey protein concentrate, SMP: skim milk powder, WP: whey powder, BMP: buttermilk powder

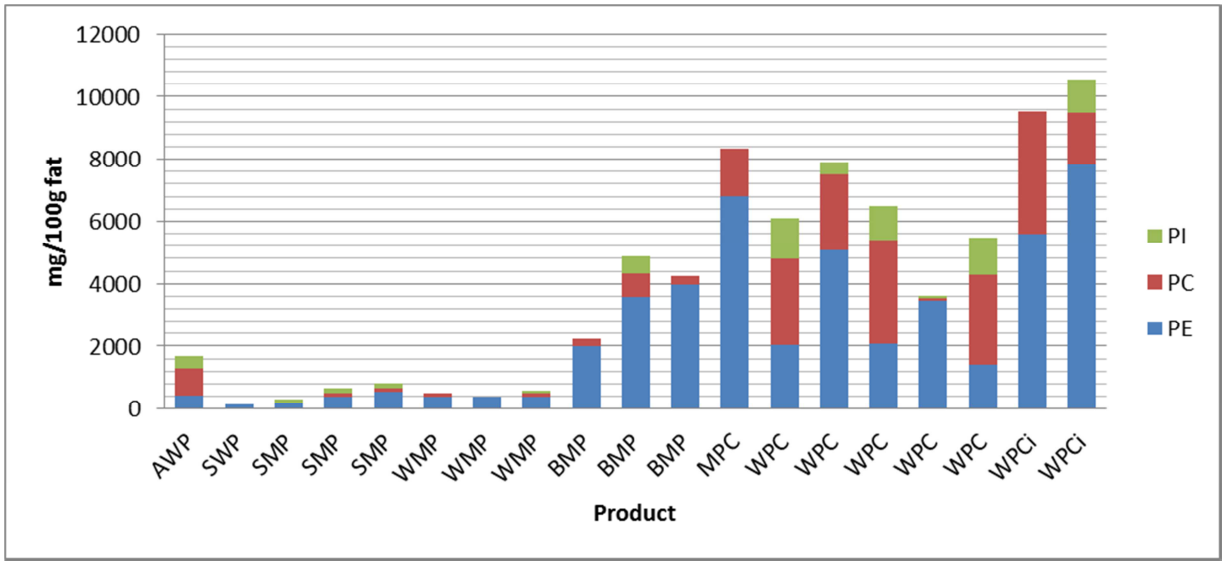
Phospholipids

Milk contains different kinds of lipids which contribute to the total fat content. The major lipid fraction is formed by triglycerides, which are dispersed in the milk serum in form of an oil-in-water emulsion. Triglyceride globules are covered by a membrane, the milk fat globule membrane (MFGM). This stabilises the globules. It contains primarily polar lipids such as different phospholipids and sphingolipids, which act as intermediary between the polar aqueous and unpolar fat phase. This membrane has a three layer structure, with uneven distribution of the different polar lipids [21, 22].

The separation of cream from the remaining skim milk causes a discrimination of the fat contained in the two phases. The cream phase consists primarily of large milk fat globules, while the lipids remaining in the milk serum are contained in small milk fat globules. The specific surface area of the small fat globules is much higher than that of the large fat globules. Inversely correlated to that is the triglyceride content. Hence, it is justified to assume a higher proportion of polar lipids in skimmed products compared to whole milk products and products from cream. Fat globules contain for example about 0.26 g of polar lipids / 100 g fat, whereas more than 22 g/100 g fat was described for the fat globule membrane [8]. The latter is enriched in buttermilk as a consequence of churning. Rombaut et al. investigated the distribution of phospho- and sphingolipids during processing of milk, butter, and whey [23]. They found polar lipids in skim milk, buttermilk, fresh cheese obtained from buttermilk, and acid whey at levels between about 19 g/100 g fat and 33 g/100g fat. This is about 20 times to 33 times higher than in raw milk.

Measurements conducted in the course of the project confirm this trend, but did not reach the levels reported by Rombaut, which can be partially explained by differences in the targeted analytes. Rombaut included in the polar lipids parameter next to the contents of phosphatidylethanolamine (PE), phosphatidylcholine (PC) and phosphatidylinnositole (PI), also the contents of phosphatidylserine (PS), sphingomyelin (SM), glucosylceramide (GLUCER), and lactosylceramide (LACCER). The data produced in this project cover only the earlier three, which account for about 55 % of the total polar lipid contents measured by Rombaut. Figure 10 presents the data acquired in this project. Noticeably, the phospholipid contents of whey powders and skim milk powders were extremely low compared to the results of Rombaut, despite the same analysis method was applied.

Figure 9: Phospholipid contents determined in different dried milk products



PI: phosphatidylinositole; PC: phosphatidylcholine; PE: phosphatidylethanolamine; AWP: acid whey powder; SWP: sweet whey powder; SMP: skim milk powder; WMP: whole milk powder; BMP: buttermilk powder; MPC: milk protein concentrate; WPC: whey protein concentrate; WPCi: instantised whey protein concentrate

Potential of alternative methods for the determination of milk fat in PAPs

A number of boundary conditions for the determination of the milk fat content for tariff classification of PAPs have to be met in general:

1. The method has to be applicable to a wide variety of PAPs differing widely in composition.

2. The method has to be accurate to enable correct classification of PAPs according to the narrow milk fat ranges laid down in the Meursing Table (additional codes for PAPs).

3. It must be possible to execute the method in customs laboratories of EU Member States.

4. The method must be robust and economic, and specifically an alternative method compared to the one currently provided in point b of article 2 (3) of Regulation (EC) No. 900/2008.

5. The method shall remediate the bias encountered with the method prescribed in Commission Regulation (EC) No 900/2008.

Suitable markers for the determination of the amount of milk fat in mixtures with other fat than milk fat shall be (i) specific for milk fat and (ii) present in (nearly) constant amounts. Only few compounds fulfil those requirements; the most reliable and widely used is butyric acid, which occurs only in milk fat of ruminants. The method described in Commission Regulation (EC) No 900/2008 makes use of this marker.

Alternative approaches to determining the amount of milk fat, such as using the information from the fatty acid, or triglyceride profile, have been developed, but have not found wide acceptance.

Fatty acid profile: The measurement of butyric acid methyl esters according to the current system can be extended with little extra efforts to the whole fatty acid profile. However, the gained information will be hardly suitable to answer the question regarding the percentage of milk fat present in a particular PAP. It has been shown that the FAME

profile is not constant. Geographical variations, seasonal variations, lactation status, and feeding practices influence the fatty acid profile, as well as milk processing.
It has to be taken into account that many PAPs contain other fats than milk fat (mainly vegetable fats), which are composed of the same major fatty acids as found in milk fat. Examples are products falling under CN Headings 1806, and 1905. Based on current knowledge, FAME profiles cannot be applied for the determination of the milk fat content of PAPs.

Triglyceride profile: Triglyceride profiles can be applied to identify certain fats and oils and to identify potential adulterations. ISO 17678:2010 / IDF 202:2010 provides a reference method for the determination of milk fat purity by the gas chromatographic analysis of triglycerides [24]. It provides a highly precise method that is able to detect the addition of 14 different edible fats and oils to pure milk fat in the low percentage range. Similar approaches were used to identify the addition of cocoa butter equivalents to dark chocolate as well as to milk chocolate [25, 26]. ISO 17678:2010 / IDF 202:2010 applies to bulk milk and products made thereof, containing pure milk fat[6]. The scope of the standard explicitly excludes the application to milk fat obtained from skim milk or buttermilk. It may be only applied to products for which an unchanged milk fat composition can be assumed, in particular cream, whole milk, and whole milk powder The standard may further not be applied to fat that is gained by acidic hydrolysis as Commission Regulation (EC) No 900/2008 prescribes.

The application of single triglycerides, e.g. 1-palmitoyl-2-stearoyl-3-butyroyl-glycerol (PSB), as marker for the milk fat content, as it was proposed for milk chocolate has not been explored yet [27]. The performance of the single triglyceride method was for milk chocolate equal to the method based on butyric acid methyl ester. However, the single triglyceride method is applicable to chocolate containing whole milk fats. The applicability to other PAPs which might contain milk fats with depleted butyric acid contents (e.g. stemming from buttermilk powder) is questionable, as the PSB content might be depleted as well.

Other parameters such as the phospholipid profile and cholesterol content are not specific for milk fat.

In conclusion, for the time being no alternative analytical method exists that allows determining the milk fat content in PAPs without measuring butyric acid in either free form

[6] Pure milk fat is identified by the standard as "milk fat with unchanged composition, such as butter, cream, milk and milk powder".

(as an ester) or in form of triglycerides. Either approach might lead to wrong conclusions on the milk fat content of the respective PAP in case butyric acid depleted dairy products were used for its preparation.

Evaluation of the impact of potential depletion of butyric acid in milk fat on tariff classification of PAPs

An impact on tariff classification is experienced only if the depletion of butyric acids in the fat of the particular milk product leads, by application of the analysis method prescribed by Commission Regulation (EC) No 900/2008, to a change in categorization according to the table defining the agricultural component (EA) of the tariff, as required by Regulation from the Parliament and the Council (EC) No 510/2014 [28] and Council Regulation (EEC) No 2658/87 [29], or to a change in tariff classification. The recipes of many food products include dairy ingredients potentially depleted in butyric acid such as skim milk powder, whey powder or buttermilk powder, though the amounts are frequently low. The US Dairy Export Council (USDEC) has on its website (www.usdec.org) a number of recipes for download indicating the typical amounts of dairy products used in certain fields of application. Considering typical fat contents of e.g. buttermilk powder (4,5 % to 7 %), a certain PAP would have to contain between 22 % and 14 % (weight by weight) of buttermilk powder to add 1 % of fat to the product. The contribution to the total fat content by skim milk powder or whey powder would be even lower as they contain typically less than 1.25 % of fat. The application of high amounts of dairy products for the preparation of certain PAPs is also limited by their contribution to other classes of nutrients. Table 2 provides information on the typical composition of selected dairy products. The information was retrieved from the webpage of the US Dairy Export Council and from the webpage of the New Zealand Institute of Chemistry [30].

Table 2: Typical composition of US dairy products (column 1, 2 and 3), and expected depletion of butyric acid content in the milk fat (column 4)

	Protein content (%) (1)	Fat content (%) (2)	Lactose content (%) (3)	Expected butyric acid depletion in the milk fat* (4)
Whole milk powder	24.5 – 27.0	26.0 – 40.0	36.0 – 38.5	not depleted
Skim milk powder	34.0 – 37.0	0.6 – 1.25	49.5 – 52.0	depleted
Buttermilk powder	30.0 - 33.0	4.5 – 7.0	36.5 – 49.0	depleted
Sweet whey powder	11.0 – 14.5	1.0 – 1.5	63.0 – 75.0	depleted
Reduced lactose whey powder	18.0 – 24.0	1.0 – 4.0	52.0 – 58.0	depleted
WPC 34 powder	34.0 – 36.0	3.0 – 4.5	48.0 – 52.0	depleted
WPC 80 powder	80.0 – 82.0	4.0 – 8.0	4.0 – 8.0	depleted
Whey protein isolate powder	90.0 – 92.0	0.5 – 1.0	0.5 – 1.0	depleted
Sweet whey permeate powder	3 – 8	<1.5	65 - 85	depleted
Casein and caseinates**	80.0-91.0	0.8 – 1.3	0.1	depleted***

Source: US Dairy Export Council: www.usdec.org

* Based on data in this report

** Source: New Zealand Institute of Chemistry

*** Finding based on samples obtained from laboratory chemicals supplier.

This information was taken into account for the evaluation of the potential implication of butyric acid depleted products on the tariff classification of selected PAPs.

PAPs produced by using milk fat from butter, cream, whole milk, or whole milk powder as the only dairy ingredient are not affected by a depletion of butyric acid. Hence, it is justified to expect that the method for determining the milk fat content according to point b of Article 2(3) of Commission Regulation (EC) No 900/2008 will continue to provide correct results.

A detailed evaluation of selected products falling under CN codes for which the EA contributes to the applicable tariff is presented in ANNEX 4. This project is intended to

provide an indicative list of PAPS containing milk fat with a depleted butyric acid content. It has to be stressed that this analysis included only some products, which are directly available to the consumer. An exhaustive analysis of all relevant products imported into EU, including also intermediate products, was not feasible within this project.

Based on this limited survey it was already possible to identify CN codes for which wrong tariff classification (according to the additional Meursing codes) might occur. These CN codes cover i.a. PAPs which contain high amounts of low fat dairy products (on basis of e.g. skimmed milk, buttermilk, or whey), and which lack any other sources of milk fat. These products are found under the codes 1806 90 70 (preparations containing cocoa for making beverages), 2106 10 80 (protein concentrates and textured protein substances), and also products falling under CN code 1901 90 99 (other preparations in the group: Malt extract; food preparations of flour, groats, meal, starch or malt extract, not containing cocoa or containing less than 40 % by weight of cocoa calculated on a totally defatted basis, not elsewhere specified or included; food preparations of goods of headings 0401 to 0404, not containing cocoa or containing less than 5% by weight of cocoa calculated on a totally defatted basis, not elsewhere specified or included).

The Directorate-General for the Internal Market, Industry, Entrepreneurship and SMEs (DG GROW) screened in collaboration with the Directorate-General Taxation and Customs Union (DG TAXUD) import declarations of PAPs containing more than 30% milk protein and less than 6% milk fat over the period 2011-2013. They identified also PAPs which comply with this criterion under other CN codes.

The analysis performed by DG GROW revealed declarations of high milk protein, low milk fat contents for some PAPs falling under the codes 1806 20 95, 1806 90 90 and 2106 90 98.

The same analysis of all import declarations, has shown that, although rather unexpected, some products falling under the CN codes 0405 20 10, 0405 20 30, 1704 90 51, 1704 90 55, 1704 90 65, 1704 90 71, 1704 90 81, 1806 20 10, 1806 20 70, 1806 90 11, 1806 90 50, 1806 90 60, 1905 20 10, 1905 31 11, 1905 31 19, 1905 31 91, 1905 32 11, 1905 32 99, 1905 40 10, 1905 90 30, 2101 20 98, 2103 90 90, 3302 10 29 could also have a high milk protein (above 30%) and a low milk fat content (below 6%).

Moreover, DG GROW pointed out that some products classified under CN 1901 90 91, 2106 10 20 and 2106 90 92 (PAPs containing less than 1,5 % milk fat) may also contain

considerable quantities of dairy ingredients affected by a decreased butyric acid content. These goods do not bear an agricultural element in their import duty, but they are affected because of their description (Containing no milk fats, sucrose, isoglucose, glucose, or starch, or containing, by weight, less than 1,5 % milk fat, 5 % sucrose or isoglucose, and 5 % glucose or starch).

It has to be noted that all of the above mentioned CN codes cover both PAPs with and PAPs without high content of dairy products with a high milk protein and low milk fat content. Those codes cover thus both PAPs with a normal and PAPs with depleted butyric acid content in the milk fat they contain. It is thus impossible to make, on basis of the Combined Nomenclature Code, a distinction between PAPs with a depleted and PAPs with a normal butyric acid content in the contained milk fat.

For PAPs containing exclusively dairy products with a high milk protein and a low milk fat content, it might be possible to revise the method for the determination of the milk fat content as laid down in Commission Regulation (EC) No 900/2008 [9]. The current project showed that the depletion of butyric acid in industrial dried low fat (<6.7 % fat content) dairy products introduced bias of about 52 % in the calculation of the per cent milk fat content. Hence, a viable solution for evaluating the milk fat content of PAPs, which are declared to contain besides other fats than milk fat only low fat dairy products, could be to increase for these products the factor for calculating the milk fat content per 100 g of fat from currently 25 to 50.

Available data on casein and caseinates do not allow drawing solid conclusions on the magnitude of depletion of butyric acid. However, the question was raised whether products containing casein respectively caseinates could be misclassified under CN 2106 90 92 (PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES > MISCELLANEOUS EDIBLE PREPARATIONS >Food preparations not elsewhere specified or included > Other > Containing no milkfats, sucrose, isoglucose, glucose or starch or containing, by weight, less than 1.5% milkfat, 5% sucrose or isoglucose, 5% glucose or starch) or CN 2106 90 98 (PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES > MISCELLANEOUS EDIBLE PREPARATIONS > Food preparations not elsewhere specified or included > Other > Other). Two aspects have to be addressed in that respect - the technological use of casein/caseinates, and the impact of the technological use of casein on tariff classification of the particular product.
Table 3 provides an overview of the technological use and application levels of casein and

caseinates in different products intended for human consumption. The presented data was published in 1998 by Southward from the New Zealand Dairy Research Institute [30].

Table 3: Application of casein and caseinates in products for human consumption [30]

Food category	Casein product	Use level[b]	Function
Baked products	Casein, caseinates	1-25%	Nutrition, water binding
Cheese products	Rennet casein, acid casein, caseinates	2-25%	Fat and water binding, texture, matrix formation
Coffee whiteners	Sodium caseinate	1-10%	Fat emulsification
Confectionery	Caseinates (whole and hydrolysed)	1-25%	Texture
Cultured products	Sodium caseinate	2-3%	Fat emulsifier, stabiliser
High fat powders	Sodium caseinate	up to 10%	Fat emulsifier
Ice cream	Sodium caseinate	1-5%	Texture, stabiliser
Infant foods	Whole or hydrolysed casein[a]	1-25%	Nutrition
Instant breakfasts and beverages	Sodium caseinate	2-30%	Nutrition
Meat products	Sodium caseinate	3-20%	Nutrition, fat emulsifier, water binding, texture
Nutritional food bars	Casein, caseinates	10-20%	Nutrition, texture
Pasta and snacks	Casein, caseinates	5-20%	Nutrition, texture
Pharmaceuticals	Casein, caseinates, hydrolysed casein	5-95%	Nutrition
Soups and gravies	Sodium caseinate	5-20%	Nutrition, thickener
Sports drinks	Sodium caseinate	2-10%	Nutrition
Whipped toppings	Sodium caseinate	5-10%	Film former, fat emulsifier, stabiliser, bodying agent

Note[a]: Hydrolysed casein ("hydrolysates") is derived from whole casein by reacting it in solution with a proteolytic enzyme. Hydrolysates are generally used in nutritional, pharmaceutical or medical applications where the whole protein is not readily digestible.

Note[b]: Typical or estimated values.

The technological application range in food is between 1 % and maximum 30 %, and in pharmaceuticals up to 95 %. However, the two CN codes are applicable to food only. Hence, it is justified to assume a maximum casein/caseinate content in the concerned food products of 30 %.

Table 4 gives an overview of the contribution of certain amounts of high protein, low fat dairy products to the total fat content of PAPs. The presented data is based on theoretical considerations. The aim of the calculations was to estimate the maximum contribution of the dairy ingredient to the milk fat content in the PAP assuming that all milk protein is provided by the dairy ingredient. The minimum specifications of milk protein contents and maximum specification of milk fat contents, as provided by the US Dairy Export Council, were applied in the calculations of the amount of dairy ingredient in the PAP and of the contribution of the dairy ingredient to the milk fat content of the PAP [31]. The contribution of other ingredients of the PAP to the milk protein content was set to zero.

For example, if a milk protein content of 6 % would have to be realised in a PAP with sweet whey powder as the only dairy ingredient, with a minimum milk protein content of 11 % and maximum milk fat content of 1.5 %, the PAP would have to contain up to 54.5 % sweet whey powder. The contribution of this amount of sweet whey powder to the milk fat content of the respective PAP would be at maximum 0.82 g / 100 g product. Similar simulations were performed for other dairy ingredients, as can be seen in Table 4.

The calculated figures clearly demonstrate that the potential depletion of butyric acid in the high protein/low fat source material used for the preparation of a PAP has in many cases no effect on the tariff classification of the product, as the contribution of the low fat dairy ingredient to the milk fat content of the PAP is below the lowest milk fat threshold value of 1.5 %. A potential effect on tariff classification might be expected in PAPs with high milk protein content such as special dietary products for athletes, weight reduction, etc.

Table 4: Contribution of high protein/low fat dairy product to the milk fat content of a PAP with milk protein contents at threshold levels.

	Milk protein content for tariff classification	Minimum milk protein content of dairy ingredient	Maximum milk fat content of dairy ingredient	Amount of dairy ingredient in PAP	Milk fat content added to PAP
	%	%	%	%	g/100 g product
Sweet whey powder	4	11	1.5	36.4	0.55
Sweet whey powder	6	11	1.5	54.5	0.82
Sweet whey powder	12	11	1.5	> 100	max 1.5
Sweet whey powder	15	11	1.5	> 100	x
Sweet whey powder	18	11	1.5	> 100	x
Sweet whey powder	30	11	1.5	> 100	x
Sweet whey powder	60	11	1.5	> 100	x
Acid whey powder	4	11	1.5	36.4	0.55
Acid whey powder	6	11	1.5	54.5	0.82
Acid whey powder	12	11	1.5	> 100	x
Acid whey powder	15	11	1.5	> 100	x
Acid whey powder	18	11	1.5	> 100	x
Acid whey powder	30	11	1.5	> 100	x
Acid whey powder	60	11	1.5	> 100	x
Reduced lactose WP	4	18	4.0	22.2	0.89
Reduced lactose WP	6	18	4.0	33.3	1.33
Reduced lactose WP	12	18	4.0	66.7	2.67
Reduced lactose WP	15	18	4.0	83.3	3.33
Reduced lactose WP	18	18	4.0	100.0	4.00
Reduced lactose WP	30	18	4.0	> 100	x
Reduced lactose WP	60	18	4.0	> 100	x
Demineralized whey powder	4	11	1.8	36.4	0.65
Demineralized whey powder	6	11	1.8	54.5	0.98
Demineralized whey powder	12	11	1.8	> 100	x
Demineralized whey powder	15	11	1.8	> 100	x
Demineralized whey powder	18	11	1.8	> 100	x
Demineralized whey powder	30	11	1.8	> 100	x
Demineralized whey powder	60	11	1.8	> 100	x
WPC 34 powder	4	34	4.5	11.8	0.53
WPC 34 powder	6	34	4.5	17.6	0.79
WPC 34 powder	12	34	4.5	35.3	1.59
WPC 34 powder	15	34	4.5	44.1	1.99
WPC 34 powder	18	34	4.5	52.9	2.38
WPC 34 powder	30	34	4.5	88.2	3.97
WPC 34 powder	60	34	4.5	> 100	x
WPC 50 powder	4	50	6.0	8.0	0.48
WPC 50 powder	6	50	6.0	12.0	0.72
WPC 50 powder	12	50	6.0	24.0	1.44
WPC 50 powder	15	50	6.0	30.0	1.80
WPC 50 powder	18	50	6.0	36.0	2.16
WPC 50 powder	30	50	6.0	60.0	3.60
WPC 50 powder	60	50	6.0	> 100	x

Table 4: continued

	Milk protein content for tariff classification	Minimum milk protein content of dairy ingredient	Maximum milk fat content of dairy ingredient	Amount of dairy ingredient in PAP	Milk fat content added to PAP
	%	%	%	%	g/100 g product
WPC 60 powder	4	60	7.0	6.7	0.47
WPC 60 powder	6	60	7.0	10.0	0.70
WPC 60 powder	12	60	7.0	20.0	1.40
WPC 60 powder	15	60	7.0	25.0	1.75
WPC 60 powder	18	60	7.0	30.0	2.10
WPC 60 powder	30	60	7.0	50.0	3.50
WPC 60 powder	60	60	7.0	100.0	7.00
WPC 75 powder	4	75	9.0	5.3	0.48
WPC 75 powder	6	75	9.0	8.0	0.72
WPC 75 powder	12	75	9.0	16.0	1.44
WPC 75 powder	15	75	9.0	20.0	1.80
WPC 75 powder	18	75	9.0	24.0	2.16
WPC 75 powder	30	75	9.0	40.0	3.60
WPC 75 powder	60	75	9.0	80.0	7.20
WPC 80 powder	4	80	8.0	5.0	0.40
WPC 80 powder	6	80	8.0	7.5	0.60
WPC 80 powder	12	80	8.0	15.0	1.20
WPC 80 powder	15	80	8.0	18.8	1.50
WPC 80 powder	18	80	8.0	22.5	1.80
WPC 80 powder	30	80	8.0	37.5	3.00
WPC 80 powder	60	80	8.0	75.0	6.00
WPI powder	4	90	1.0	4.4	0.04
WPI powder	6	90	1.0	6.7	0.07
WPI powder	12	90	1.0	13.3	0.13
WPI powder	15	90	1.0	16.7	0.17
WPI powder	18	90	1.0	20.0	0.20
WPI powder	30	90	1.0	33.3	0.33
WPI powder	60	90	1.0	66.7	0.67
Buttermilk powder	4	30	7.0	13.3	0.93
Buttermilk powder	6	30	7.0	20.0	1.40
Buttermilk powder	12	30	7.0	40.0	2.80
Buttermilk powder	15	30	7.0	50.0	3.50
Buttermilk powder	18	30	7.0	60.0	4.20
Buttermilk powder	30	30	7.0	100.0	7.00
Buttermilk powder	60	30	7.0	> 100	x
Skimmed milk powder	4	34	1.3	11.8	0.15
Skimmed milk powder	6	34	1.3	17.6	0.22
Skimmed milk powder	12	34	1.3	35.3	0.44
Skimmed milk powder	15	34	1.3	44.1	0.55
Skimmed milk powder	18	34	1.3	52.9	0.66
Skimmed milk powder	30	34	1.3	88.2	1.10
Skimmed milk powder	60	34	1.3	> 100	x

Conclusions

The project aimed to evaluate which dairy products are affected by a depletion of butyric acid. Representative samples covering whole milk powder, skim milk powder, whey powder, whey protein concentrates and whey protein isolates were supplied by industry. The chemical analysis of these products revealed a depletion of butyric acid by about 50 % in skimmed milk products. Therefore, an adaptation of the factor to convert the amount of butyric acid methyl ester in milk fat to the amount of milk fat contained in the PAP should be considered. Since the content of butyric acid methyl ester in the fat extracted from skimmed dairy products was reduced by approximately 50 % compared to the butyric acid methyl ester content of whole milk fat, an increase of the conversion factor given in point (b) of Article 3(2) of Regulation (EC) No 900/2008 from 25 to 50 appears to be appropriate. Discrimination of milk fat lipids according to the size of fat globules during milk processing was identified as most likely reason for the depletion.

Potentially significant effects of the butyric acid depletion of dairy ingredients on the tariff classification of processed agricultural products were identified for a number of CN codes. These are the codes 1806 9070, 2106 1080, and products falling under CN code 1901 9099.

However, additional research done by DG GROW of CN codes of PAP imports into the EU over a period of three years revealed that more CN codes are involved.

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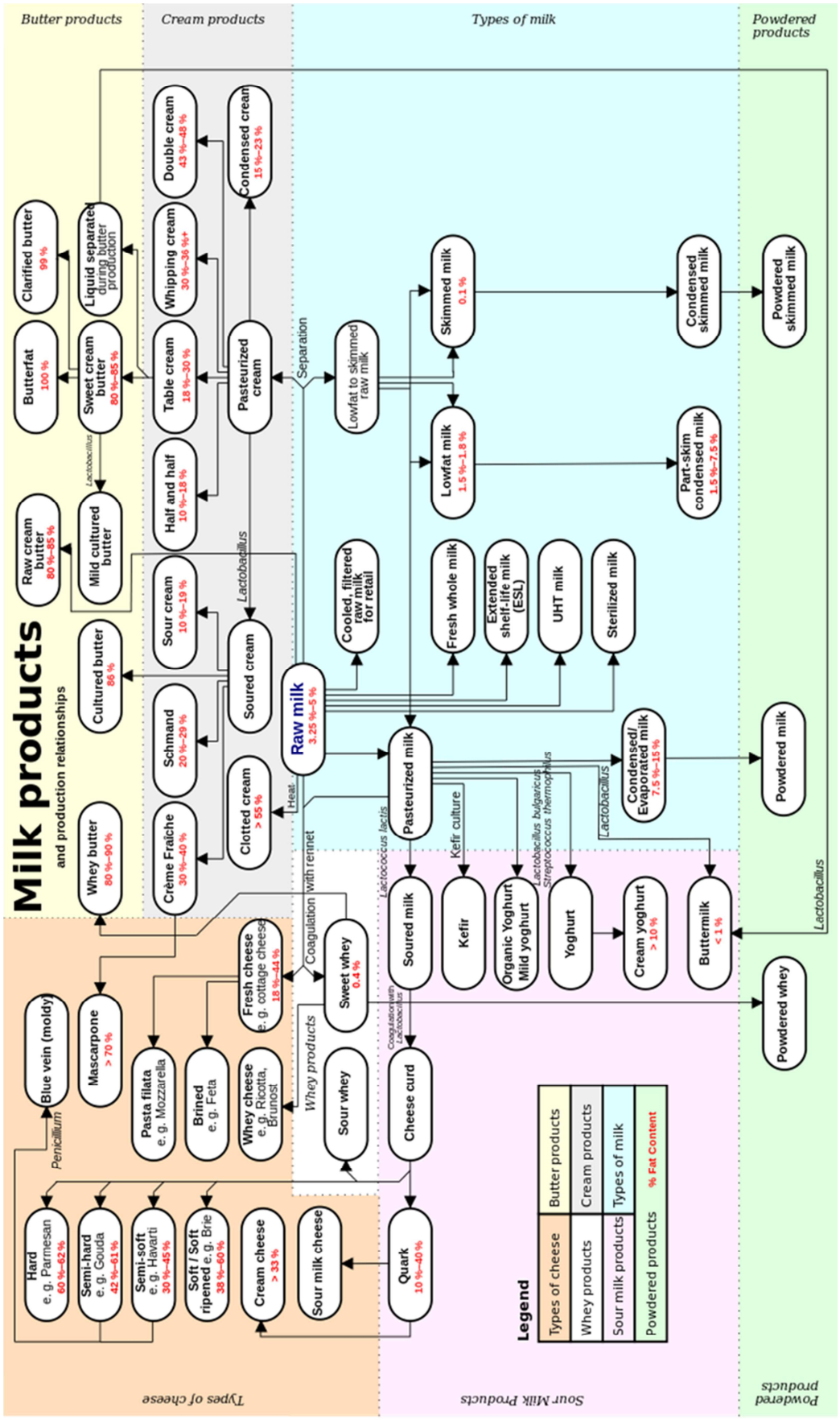
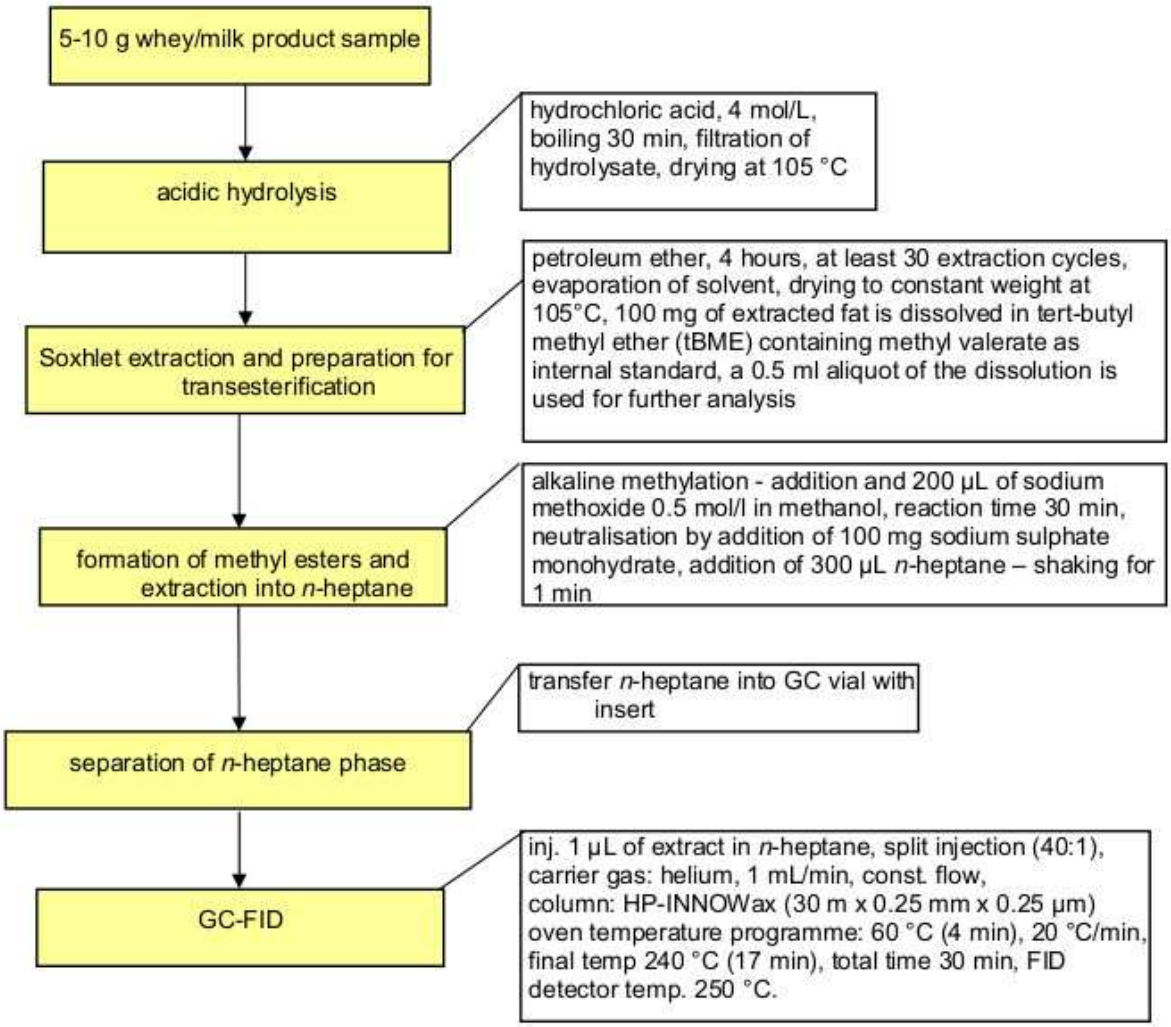
ANNEX 1 Dairy products produced from raw milk [2]

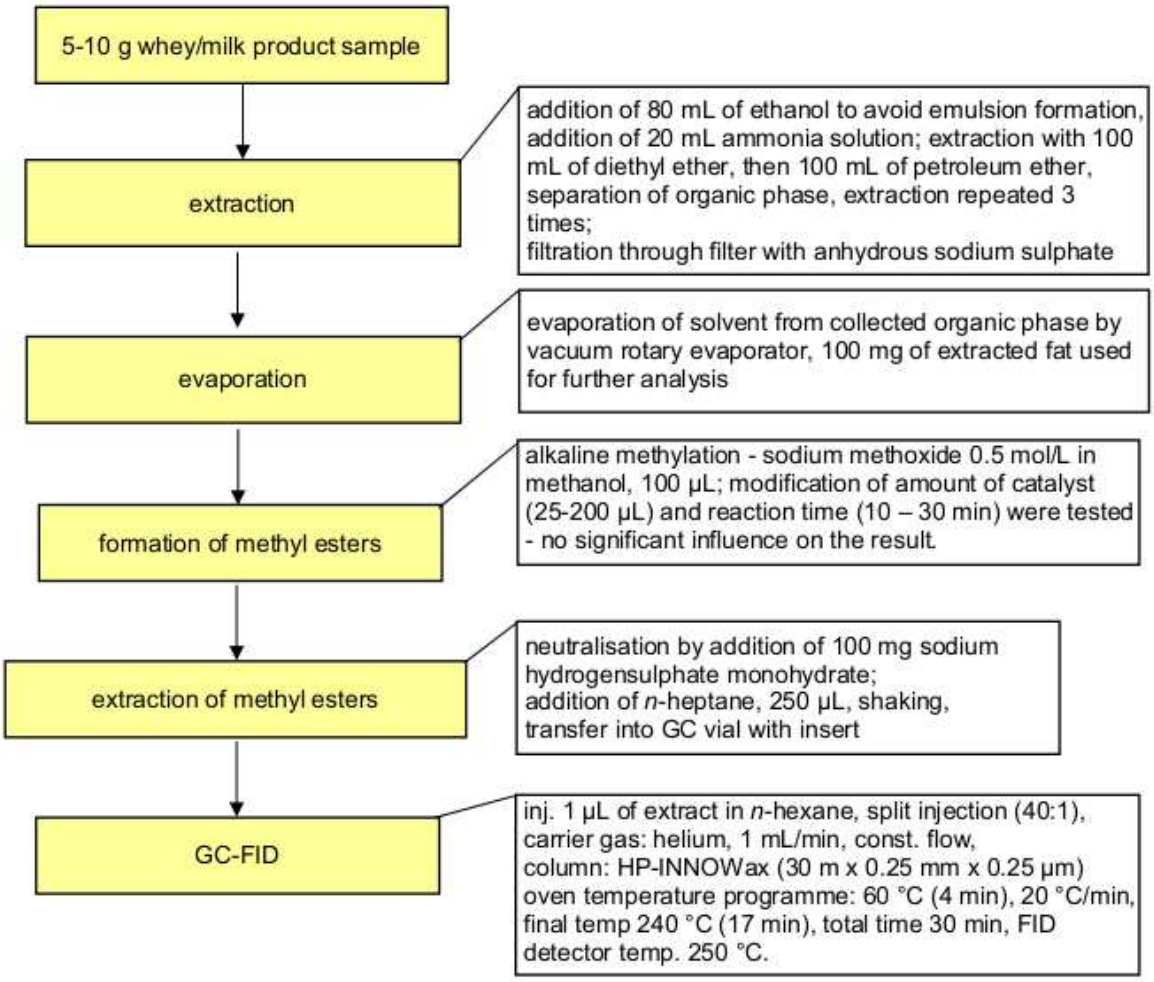


ANNEX 2 Details of chemical analyses

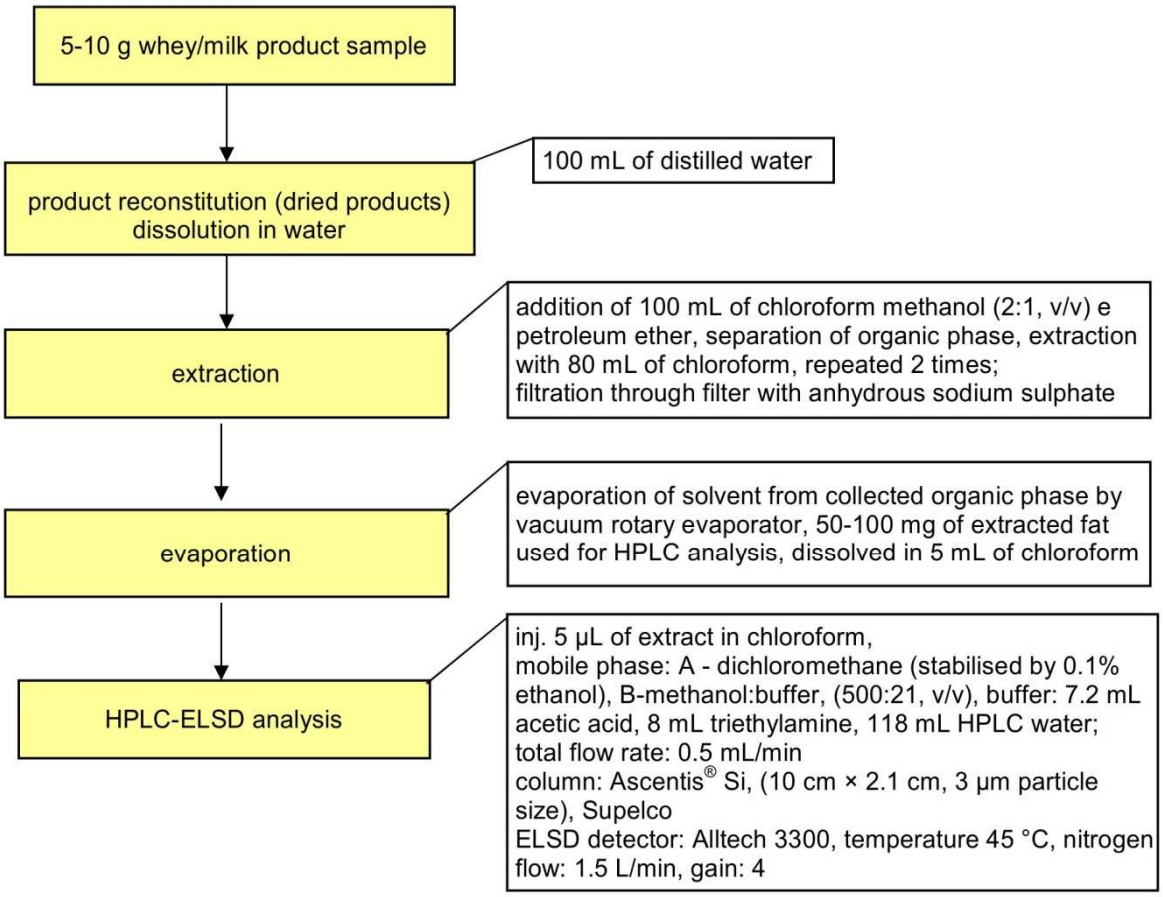
Flow scheme of the fat extraction method according to Weibull-Stoldt followed by alkaline transesterification and analysis by gas chromatography with flame ionisation detection (GC-FID).



Flow scheme of the fat extraction method according to ISO 14156:2012 to (Röse-Gottlieb) followed by alkaline transesterification and analysis by gas chromatography with flame ionisation detection (GC-FID).



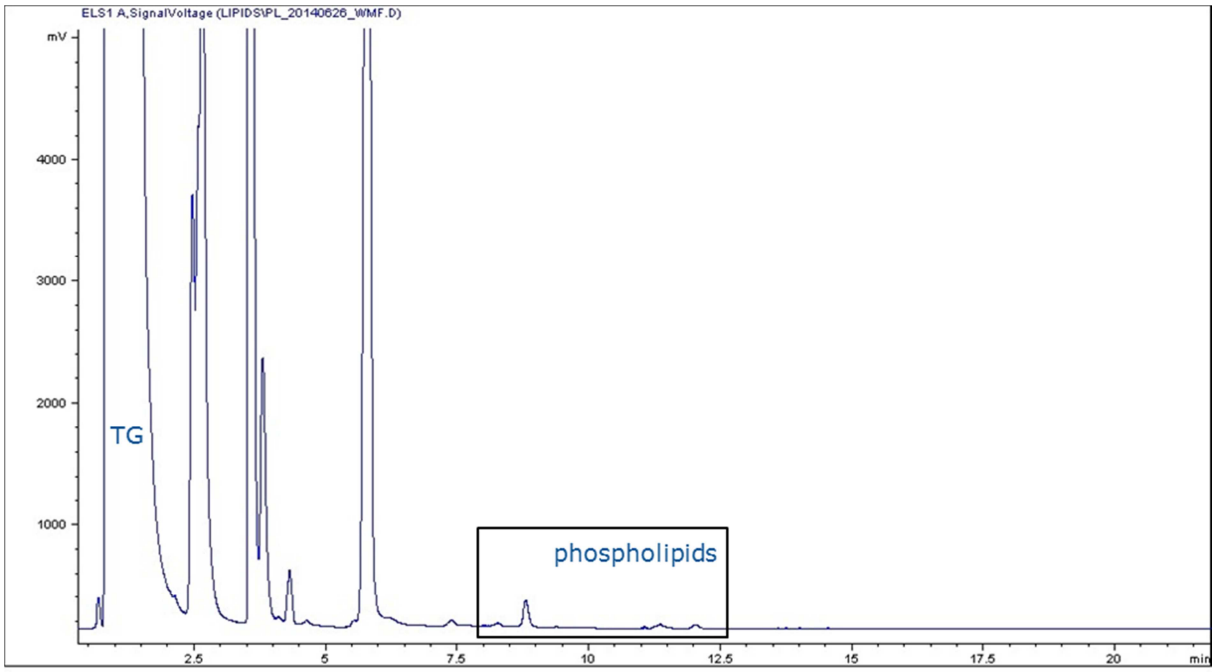
Flow scheme of the fat extraction method and determination of phospholipids by HPLC-ELSD as described by Le et al. [10].



PL instrument calibration solutions were prepared by dilution of the Phospholipid Mixture for HPLC from Soybean (Supelco cat. No. P3817-1VL) with chloroform to concentrations of 50, 75, 100, 150 and 200 µg/mL.

HPLC-ELSD chromatogram of the lipids extracted from a whole milk sample.

(TG: triglycerides)



ANNEX 3: Overview on production conditions of pilot plant samples

Raw milk: Raw milk of about 20 cows was aggregated for the experiments. It was neither pasteurised nor homogenised.

Skim milk: Raw milk of about 20 cows was aggregated and skimmed with a GEA Westphalia MTC milk separator.

Fresh cheese: Milk of about 20 cows was aggregated and skimmed. About 60 l of the skim milk was pasteurised at 80 °C, followed by cooling to 20 °C. Rennet and lactic bacteria were added to the cooled skim milk. Liquid whey was removed from the cheese after 24 h.

Butter: Cream was isolated from raw milk with a GEA Westphalia MTC milk separator. Lactic acid bacteria were added and buttermilk was separated from butter after 24 h by churning.

ANNEX 4: Evaluation of impact of potential depletion of butyric acid on tariff classification of PAPs

CN code	Product	Example	Total protein	Total fat	Starch/ Glucose	Sugar	Ingredients	Expected impact of butyric acid depletion	Evaluation
			g/100g	g/100g	g/100g	g/100g			
0405	**Butter and other fats and oils derived from milk; dairy spreads**								
0405 2010	SECTION I: LIVE ANIMALS; ANIMAL PRODUCTS > DAIRY PRODUCE; BIRDS' EGGS; NATURAL HONEY; EDIBLE PRODUCTS OF ANIMAL ORIGIN, NOT ELSEWHERE SPECIFIED OR INCLUDED > Butter and other fats and oils derived from milk; dairy spreads > **Dairy spreads > Of a fat content, by weight, of 39% or more but less than 60%**	Hazelnut-chocolate spread	6.64	41	58.2	57.6	sucre de canne*, huile de tournesol*, chocolat* 16,5% (sucre de canne*, poudre de cacao maigre*, beurre de cacao*), purée de noisettes* 10%, poudre de lait écrémé*, farine de soja*, émulsifiant : lécithine de soja, extrait de vanille Bourbon*.	no	Very low amount of skim milk powder. Hence the milk fat content will not exceed the threshold of 1.5 %. Consequently impact of potential depletion of butyric acid on classification of product is not expected.
		Fat reduced butter	3.5	40	2.8	0	Butter, Wasser, Buttermilch (11%), Speisegelatine, modifizierte Stärke, Emulgator Mono- und Diglyceride von Speisefettsäuren, Speisesalz (0,25%), Konservierungsstoff Kaliumsorbat, Säureregulator Citronensäure, Aroma, Farbstoff Carotin.	no	Product is produced with whole milk fat. Hence depletion of butyric acid is not expected.
0405 2030	SECTION I: LIVE ANIMALS; ANIMAL PRODUCTS > DAIRY PRODUCE; BIRDS' EGGS; NATURAL HONEY; EDIBLE PRODUCTS OF ANIMAL ORIGIN, NOT ELSEWHERE SPECIFIED OR INCLUDED > Butter and other fats and oils derived from milk; dairy spreads > **Dairy spreads > Of a fat content, by weight, of 60% or more but not exceeding 75%**	Fat reduced butter	0.3	60	0.3	0.3	Butter (41%), Water, Vegetable Oil (27%), Buttermilk, Salt (1.1%), 60% Fat Blend (33% Milk Fat, 27% Vegetable Oil)	no	Product contains primarily butter. Hence depletion of butyric acid is not expected.
1704	**Sugar confectionery (including white chocolate), not containing cocoa**								
1704 9051	SECTION IV: PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES > SUGARS AND SUGAR CONFECTIONERY > **Sugar confectionery (including white chocolate), not containing cocoa > Other > Pastes, including marzipan, in immediate packings of a net content of 1kg or more**	Marzipan	6.3	13.4	68.7	65.1	Sugar, Almonds (24%), Glucose Syrup, Invert Sugar Syrup	no	Product does not contain milk based ingredients
		White chocolate	7.9	38.5	51	50.6	Raw Cane Sugar #, Cocoa Butter #, Whole Milk Powder #, Emulsifier (Soya Lecithin), Vanilla Pod #, Vanilla Extract #, White Chocolate: minimum Cocoa Solids 30%, minimum Milk Solids 26%, Cocoa, Sugar, Vanilla	no	Product is produced with whole milk powder. Hence depletion of butyric acid is not expected.
	Given example is only relevant from compositional point of view,but not regarding packaging size.	White Chocolate Bars 4 Pack 100G	7.6	31.6	58	57.6	Sugar, Whole Cows Milk (26%) (that's been dried), Cocoa Butter (made from Cocoa Beans), Whey Powder (from Milk), Vegetable Fat (from Tropical Plants), Emulsifier Lecithin (made from Soya Beans and holds the ingredients together), Natural Flavouring, Contains Vegetable Fat (from Tropical Plants) in addition to Cocoa Butter	no	The application of 26 % whole milk powder provides primarily whole milk fat,which is not depleted in butyric acid. Hence the current method is expected to work.

CN code	Product	Example	Total protein	Total fat	Starch/ Glucose	Sugar	Ingredients	Expected impact of butyric acid depletion	Evaluation
			g/100g	g/100g	g/100g	g/100g			
1704 9055	SECTION IV: PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES > SUGARS AND SUGAR CONFECTIONERY > Sugar confectionery (including white chocolate), not containing cocoa > Other > **Throat pastilles and cough drops**	Remedy Pastilles 50G	Composition not provided				Bulking Agents (Sorbitol, Isomalt), Gelling Agent (Gum Arabic), Natural Flavour (Elderflower, Orange), Sweetener (Xylitol), Glazing Agent (Vegetable Oil, Beeswax), Flower Essences (Helianthemum, Nummularium, Clematis Vitalba, Impatiens Glandulifera, Prunus Cerasifera, Ornithogalum Umbellatum	no	Product does not contain milk based ingredients
		Cough 20 Pastilles	Composition not provided				Active ingredients: Menthol 0.813% w/w, Pumilio Pine Oil 0.604% v/w, Eucalyptus Oil 0.022% v/w, Other ingredients: Sucrose*, Liquid Glucose*, Modified Starch (Tapioca, Maize), Thymol, Marshmallow Root Liquid Extract, Carmoisine (E122)*, Vegetable Oil, Beeswax, Water, *See enclosed leaflet for further information	no	Product does not contain milk based ingredients
1704 9061	SECTION IV: PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES > SUGARS AND SUGAR CONFECTIONERY > Sugar confectionery (including white chocolate), not containing cocoa > Other > **Sugar-coated (panned) goods**	Confectionery in shrimps and banana form	2.9	0.3	90.5	81.1	Sugar, Glucose Syrup, Water, Dextrose, Beef Gelatine, Maize Starch, Colours (Curcumin, Beetroot Red), Flavourings	no	Product does not contain milk based ingredients
1704 9065	SECTION IV: PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES > SUGARS AND SUGAR CONFECTIONERY > Sugar confectionery (including white chocolate), not containing cocoa > Other > **Gum confectionery and jelly confectionery including fruit pastes in the form of sugar confectionery**	Fruit Pastilles Bag 170G (Fruit Pastilles are fruit flavoured gummy sweets with a sugar coating)	4.1	0.1	82.2		Sugar, Glucose Syrup, Fruit Juices from Concentrate (25%) (Grape, Apple, Lime, Strawberry, Blackcurrant, Orange, Lemon), Gelatine, Gum Arabic, Modified Starch, Acids (Malic Acid, Citric Acid, Lactic Acid), Acidity Regulator (Trisodium Citrate), Naturally Sourced Colours (Anthocyanins, Beta-Carotene, Copper Complexes of Chlorophyllins, Curcumin), Flavourings	no	Product does not contain milk based ingredients
		Jelly confectionery	5.1	0	72	72	Glucose Syrup, Sugar, Water, Gelling Agent (Gelantine), Dextrose, Citric acid, Malic acid, Caramelised Syrup, Flavourings, Colours (Quinoline Yellow, Sunset Yellow Fcf, Ponceau, Indigo Carmine, Green 5)	no	Product does not contain milk based ingredients
1704 9071	SECTION IV: PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES > SUGARS AND SUGAR CONFECTIONERY > Sugar confectionery (including white chocolate), not containing cocoa > Other > **Boiled sweets, whether or not filled**	Candy with cherry and watermelon aroma 46.7G	0.1	0	93.3		Dextrose, Sugar, Malic Acid, Corn Syrup, Flavouring, Carnauba Wax, Gum, Colours: Brilliant Blue, Allura Red, Tartrazine	no	Product does not contain milk based ingredients

CN code	Product	Example	Total protein	Total fat	Starch/ Glucose	Sugar	Ingredients	Expected impact of butyric acid depletion	Evaluation
			g/100g	g/100g	g/100g	g/100g			
1704 9075	SECTION IV: PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES > SUGARS AND SUGAR CONFECTIONERY > Sugar confectionery (including white chocolate), not containing cocoa > Other > **Toffees, caramels and similar sweets**	Toffees 135G	3.7	14.9	71.4	40.8	Glucose Syrup, Sweetened Condensed Skimmed Milk (21.6%), Sugar, Vegetable Fat, Humectant: Sorbitol Syrup, Whey Powder, Cream (3.9%), Condensed Whey, Butter (2.5%), Salt, Cane Sugar Syrup, Emulsifier: Soya Lecithin, Flavouring	no	Major milk fat fraction originates from butter. The low protein content does not tolerate high contents of potentially butyric acid depleted skim milk powder. Hence significant impact on the butyric acid ratio is not expected.
		Dairy Toffee 200G	1.8	17.7	73	47.9	Glucose Syrup, Sugar, Palm Oil, Skimmed Milk, Butter (Milk) (5%), Salt, Emulsifiers (Soya Lecithins, Mono- and Di-Glycerides of Fatty Acids)	no	Major milk fat fraction originates from butter. The low protein content does not tolerate high contents of potentially butyric acid depleted skim milk powder. Hence significant impact on the butyric acid ratio is not expected.
1704 9081	SECTION IV: PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES > SUGARS AND SUGAR CONFECTIONERY > **Sugar confectionery (including white chocolate), not containing cocoa > Other > Compressed tablets**	Sugar confectionery, pressed, for dispenser	0	1.6	94.6	94.6	Sugar, Glucose Syrup, Citric Acid, Acidity Regulator (Tri-Sodium-Citrate), Hydrogenated Vegetable Fat, Emulsifier (Mono- and Diglycerides of Fatty Acids), Flavour, Colouring Foodstuffs: Lemon: (Concentrate of Safflower), Lemon Juice Concentrate, Orange: (Concentrate of Paprika), Cherry: (Concentrates of Grapes, Black Currant and Black Carrots), Strawberry: (Concentrates of Black Currant and Black Carrots)	no	Product does not contain milk based ingredients
1704 9099	SECTION IV: PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES > SUGARS AND SUGAR CONFECTIONERY > **Sugar confectionery (including white chocolate), not containing cocoa > Other > Other**	Sugar Butterflies 35G	0.7	5.2	91	86	Sugar, Rice Flour, Cocoa Butter, Thickener: Tragacanth, Colours: Anthocyanins, Carotenes, Carmines, Safflower Extract, Spirulina Concentrate	no	Product does not contain milk based ingredients
		Mouth Candy Spray 23G					Water, Sugar, Acid: Citric Acid, Humectant: Glycerine, Flavouring, Preservative: (E202)	no	Product does not contain milk based ingredients
		Popping Candy Strawberry	0	0	100	100	Sugar, Lactose (from Milk), Glucose, Artificial Flavour, Colour (E-133), Carbon Dioxide E-290	no	Product does not contain milk fat.

CN code	Product	Example	Total protein	Total fat	Starch/ Glucose	Sugar	Ingredients	Expected impact of butyric acid depletion	Evaluation
			g/100g	g/100g	g/100g	g/100g			
1806	**Chocolate and other food preparations containing cocoa**								
1806 2010	SECTION IV: PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES > COCOA AND COCOA PREPARATIONS > Chocolate and other food preparations containing cocoa > Other preparations in blocks, slabs or bars weighing more than 2kg or **in liquid, paste, powder, granular or other bulk form in containers or immediate packings, of a content exceeding 2kg**	Chocolate bars						low	Preparations for industry: It is likely that milk fat content of these products originates from whole milk powder, cream or butter, as milk chocolate has to contain at least 3.5 % milk fat. Hence the probability of significant impact of potential butyric acid depletion on the classification of the product is expected to be low.
1806 2030	SECTION IV: PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES > COCOA AND COCOA PREPARATIONS > Chocolate and other food preparations containing cocoa > Other preparations in blocks, slabs or bars weighing more than 2kg or in liquid, paste, powder, granular or other bulk form in containers or immediate packings, of a content exceeding 2kg > **Containing a combined weight of 25% or more, but less than 31% of cocoa butter and milkfat**	Milk Chocolate Chips	6	29	60	60	Sugar, Full Cream Milk Powder, Cocoa Butter, Cocoa Mass, Emulsifier: Soya Lecithins, Flavourings, Cocoa Solids 25% minimum, Milk Solids 14% minimum	no	Preparation contains whole milk fat. Hence depletion of butyric acid is not expected
1806 2050	SECTION IV: PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES > COCOA AND COCOA PREPARATIONS > Chocolate and other food preparations containing cocoa > Other preparations in blocks, slabs or bars weighing more than 2 kg or in liquid, paste, powder, granular or other bulk form in containers or immediate packings, of a content exceeding 2 kg > Other > **Containing 18% or more by weight of cocoa butter**	Choco crisps, packaging size 10 to 25 kg	Details not known				88% chocolate, 11.9 % cacao biscuit granules, 0.1 % salt	no	If contained at all, milk fat will originate primarily from whole milk powder. Hence depletion of butyric acid is not expected

CN code	Product	Example	Total protein	Total fat	Starch/ Glucose	Sugar	Ingredients	Expected impact of butyric acid depletion	Evaluation
			g/100g	g/100g	g/100g	g/100g			
1806 2070	SECTION IV: PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES > COCOA AND COCOA PREPARATIONS > Chocolate and other food preparations containing cocoa > Other preparations in blocks, slabs or bars weighing more than 2kg or in liquid, paste, powder, granular or other bulk form in containers or immediate packings, of a content exceeding 2kg > **Chocolate milk crumb**	Chocolate milk crumb					Milk chocolate crumb is a vacuum dried, crystallized mixture made from milk, sugar and cocoa liquor	no	Preparation contains whole milk powder. Depletion of butyric acid is not expected.
1806 2080	Últimos elementos clasificados en la categoría SECTION IV: PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES > COCOA AND COCOA PREPARATIONS > Chocolate and other food preparations containing cocoa > Other preparations in blocks, slabs or bars weighing more than 2 kg or in liquid, paste, powder, granular or other bulk form in containers or immediate packings, of a content exceeding 2kg > **Chocolate flavour coating**	Cocoa-truffel glazing; packaged in plastic buckets of 20 kg					Dark brown, thick, truffle mass made from cocoa powder, milk powder, vegetable fat, sugar, and other additives. The product contains cocoa butter at less than 18% by weight and the sucrose content, including invert sugar expressed as sucrose, is less than 70%.	no	Milk powder means most likely whole milk powder, for which butyric acid depletion is not expected.
1806 2095	SECTION IV: PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES > COCOA AND COCOA PREPARATIONS > Chocolate and other food preparations containing cocoa > Other preparations in blocks, slabs or bars weighing more than 2 kg or in liquid, paste, powder, granular or other bulk form in containers or immediate packings, of a content exceeding 2kg > **Other**	DARK CHOCOLATE CHIPS, PACKAGED FOR SALE IN BAGS 2.273 KGS						no	Dark chocolate does not contain milk fat.
		Milk chocolate, for supply of industry						no	Milk chocolate chips contain at least 3.5% milk fat, which comes primarilly from whole milk fat. Hence depletion of butyric acid is not expected.
1806 3100	SECTION IV: PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES > COCOA AND COCOA PREPARATIONS > **Chocolate and other food preparations containing cocoa > Other, in blocks, slabs or bars > filled**	Chocolate Bar With Coconut & Caramel	5.4	28.6	61.9	44.9	MILK Chocolate 34.1% (Sugar, Cocoa Butter, Whole MILK Powder, Cocoa Mass, Vegetable Fat, Whey Powder - from MILK, Emulsifier - SOYA Lecithin and E476 - Polyglycerol Polyricinoleate, Flavour), Sugar, Hydrogenated Vegetable Fat, WHEAT Flour, Glucose Syrup, Inverted Sugar Syrup, Condensed MILK, Desiccated Coconut 3.7%, Whey Powder (from MILK), HAZELNUTS (2.3%), Butter (from MILK), Rice Crisps 1.5% (contain WHEAT Flour and Malt BARLEY Extract), MILK Powder, Stabilizer (Sorbitol), Starch, Malt Extract (from BARLEY), Salt, Flavours, Emulsifier (SOYA Lecithin, E471 - Mono- and Diglycerides of Fatty Acids), Cream Powder (from MILK), Raising Agents (E500 - Sodium Carbonates, E503 - Ammonium Carbonates), Caramel Mass 32.9%	no	The milk fat content of this product originates primarily from whole milk powder and butter. The low protein content limits the amount of potentially butyric acid depleted milk fat in that product. Hence significant impact of contained potentially butyric acid depleted dair products on the classification of the is not expected.

CN code	Product	Example	Total protein	Total fat	Starch/ Glucose	Sugar	Ingredients	Expected impact of butyric acid depletion	Evaluation
			g/100g	g/100g	g/100g	g/100g			
1806 3210	SECTION IV: PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES > COCOA AND COCOA PREPARATIONS > **Chocolate and other food preparations containing cocoa > Not filled > With added cereal, fruit or nuts**	Candy Bar 53.8G	7.5	20.6	78.5	52.3	Corn Syrup, Sugar, Ground Roasted Peanuts, Hydrogenated Palm Kernel Oil, Cocoa, Molasses, Whey Powder, Corn Flake, Non Fat Milk, Salt, Lactic Acid Esters of Fatty Acids, Emulsifier: Soy Lecithin, Soy Bean Oil, Corn Starch, Flavouring, Antioxidants, Tertiary Butyl Hydroquinone, Citric Acid, Colours: Tartrazine, Allura Red	no	The protein content (coming from skim milk powder and whey powder) limits the milk fat content to a level below 1.5 % . Hence potential butyric acid depletion has no impact on classification.
1806 3290	SECTION IV: PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES > COCOA AND COCOA PREPARATIONS > **Chocolate and other food preparations containing cocoa > Not filled > Other**	Milk Chocolate Bar 114G	6.6	32.5	56.1	55.4	Sugar, Cocoa Ingredients (Cocoa Butter, Cocoa Mass), Skimmed Milk Powder, Milk Fat, Lactose, Whey Powder, Vegetable Fat, Emulsifier (Soya Lecithin), Natural Vanilla Extract, Milk Chocolate contains Milk Solids 14% minimum and Cocoa Solids 25% minimum, Milk Chocolate contains Vegetable Fats in addition to Cocoa Butter	no	The milk fat content of this productoriginates primarilly from whole milk. Milk chocolate has to contain at least 3.5 % milk fat. Hence it may be expected that the milk fat content of this product is between 3.5% and 6 %
1806 9019	SECTION IV: PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES > COCOA AND COCOA PREPARATIONS > Chocolate and other food preparations containing cocoa > Other > Chocolate and chocolate products, **Chocolates, whether or not filled > containing alcohol**	Plain chocolate housing containing cherries and cherry liqueur	3.2	19.7	57.8		sugar, cocoa mass, cocoa butter, emulsifier: soya lecithin, flavours, sugar, cherry (18%), liqueur (13%), cocoa butter. Dark chocolate contains a minimum of 48% cocoa solids.	no	Product does not contain milk fat
1806 9019	SECTION IV: PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES > COCOA AND COCOA PREPARATIONS > Chocolate and other food preparations containing cocoa > Other, **Chocolate and chocolate products , Chocolates, whether or not filled> Other**	Chocolate Box 96G	5.9	34	52	49	Sugar, Cocoa Mass, Cocoa Butter, Dried Whole Milk, Palm Kernel Oil, Palm Oil, Hazelnuts, Dried Skimmed Milk, Coconut Oil (contains Soya Lecithin), Butter (from Milk), Fat Reduced Cocoa Powder, Single Cream (from Milk), Milk Fat, Lactose (from Milk), Humectant (Sorbitol), Glucose Syrup, Emulsifier (Soya Lecithin, E471), Double Cream (from Milk), Marc de Champagne, Dried Whey (from Milk), Ground Coffee, Flavourings, Cocoa Powder, Freeze-Dried Instant Coffee, Salt, Coffee Liqueur Extract, Stabiliser (Invertase), Acidity Regulator (Lactic Acid), Acid (Citric Acid), Raising Agent (Sodium Hydrogen Carbonate), Milk Chocolate contains: Cocoa Solids 30% minimum, Milk Solids 20% minimum, Dark Chocolate contains: Cocoa Solids 60% minimum, May contain: Other Nuts, Egg	no	Major portion of milk fat comes from butter and cream. Hence a depletion of butyric acid is not expected.
1806 9031	SECTION IV: PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES > COCOA AND COCOA PREPARATIONS > **Chocolate and other food preparations containing cocoa > Other > filled**	Banana puree coated with chocolate	2	12	67		sugar, glucose syrup, cocoa mass, banana pulp (6%), cocoa butter, humectant sorbitol, gelling agents: agar-agar, acid: citric acid, flavorings, emulsifier E322, color E104	no	Product does not contain milk fat

CN code	Product	Example	Total protein	Total fat	Starch/ Glucose	Sugar	Ingredients	Expected impact of butyric acid depletion	Evaluation
			g/100g	g/100g	g/100g	g/100g			
1806 9039	SECTION IV: PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES > COCOA AND COCOA PREPARATIONS > **Chocolate and other food preparations containing cocoa > Not filled > Other**	Milk Chocolate Bar 114G	6.6	32.5	56.1	55.4	Sugar, Cocoa Ingredients (Cocoa Butter, Cocoa Mass), Skimmed Milk Powder, Milk Fat, Lactose, Whey Powder, Vegetable Fat, Emulsifier (Soya Lecithin), Natural Vanilla Extract, Milk Chocolate contains Milk Solids 14% minimum and Cocoa Solids 25% minimum, Milk Chocolate contains Vegetable Fats in addition to Cocoa Butter	no	The milk fat content of this product originates primarilly from whole milk. Milk chocolate has to contain at least 3.5 % milk fat. Hence it may be expected that the milk fat content of this product is between 3.5% and 6 %
1806 9060	SECTION IV: PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES > COCOA AND COCOA PREPARATIONS > Chocolate and other food preparations containing cocoa > Other > **Spreads containing cocoa**	Chocolate Spread 400G	2.9	38	55.5	55	Sugar, Vegetable Oil, Milk Sugar, Vegetable Fat, Whey Powder, Dried Skimmed Milk, Fat Reduced Cocoa Powder (4%), Emulsifier (Soya Lecithins), Natural Vanilla Flavouring, Salt, Hazelnuts	no	The low protein content (coming from skim milk powder and whey powder) limits the milk fat content to a level below 1.5 % . Hence potential butyric acid depletion has no impact on classification.
1806 9070	SECTION IV: PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES > COCOA AND COCOA PREPARATIONS > Chocolate and other food preparations containing cocoa > **Other > Preparations**	Organic Cacao Powder 200G	25.6	11.5	50.8	1.9	100% Organic Cacao Powder	no	Product does not contain milk fat
		Drinking Chocolate Add Milk 500G	6.2	5.8	76	72.5	Sugar, Cocoa Powder, Salt, Flavouring, May contain Milk, Cocoa Solids: 25% minimum	no	Product does not contain milk fat
		Instant Chocolate & Orange Sachet 11G	12.3	6.9	49.2		Whey Powder, Fat-Reduced Cocoa Powder (20%), Acacia Gum, Belgian Chocolate (6%) (Sugar, Cocoa Mass, Fat-Reduced Cocoa Powder, Flavouring), Dried Glucose Syrup, Skimmed Milk Powder, Coconut Oil, Salt, Natural Orange Flavouring, Thickener (Xanthan Gum), Sweetener (Aspartame), Emulsifier (Soy Lecithin), Anti-Caking Agent (E551), Stabiliser (E340), Contains: Milk and Soya, Contains a source of Phenylalanine	no	Skimmed milk powder contains only small amounts of milk fat - milk fat content is certainly below 1.5 %
		Traditional Drinking Chocolate 500G	5.5	5.5	81.2	78.5	Sugar, Cocoa Powder, Salt, Cocoa solids 25% minimum	no	Product does not contain milk fat
		Barely-Makt drink Light 500G	11.9	9.2	68.7	38.7	Barley Malt Extract (46%), Skimmed Milk Concentrate, Glucose Syrup, Vegetable Oil, Fat-Reduced Cocoa Powder (6%), Whole Milk Powder, Salt, Milk Proteins, Stabilisers (E340, E452), Vitamins (C, E, Niacin, A, Pantothenic Acid, B12, B6, B2, B1, Folic Acid, Biotin), Calcium Phosphate, Calcium Carbonate, Emulsifier (E471, E472e), Magnesium Carbonate, Sweetener (Acesulfame K), Anti-Caking Agent (E551), Iron, Colour (E160a)	no	Milk fat content of this product originates primarily from whole milk powder. The impact of skim milk concentrate on the milk fat content is considered minor. Hence wrong classification due to potential butyric acid depletion is not expected.
		Malted Drink 350G	4.2	0.5	89.1	56.9	Barley Malt Extract (72%), Whey Permeate Powder (Milk), Sugar, Anti-caking Agent (Silicon Dioxide), Stabilisers (Guar Gum, Carboxymethylcellulose)	no	Whey permeate powder does not contain significant amounts of milk fat

CN code	Product	Example	Total protein	Total fat	Starch/ Glucose	Sugar	Ingredients	Expected impact of butyric acid depletion	Evaluation
			g/100g	g/100g	g/100g	g/100g			
	containing cocoa for making beverages	Whey Protein formula witch chocolate flavour	71.1	5.8	8.4	4.4	100% Whey Protein Complex (Whey Protein Blend including Whey Protein Isolate*, Hydrolysed Whey Protein*, Whey Protein Concentrate*, Glutamine Peptides), Glycine, Cocoa Powder, Flavouring, Guar Gum (Stabiliser), Sodium Chloride, Acesulfame Potassium (Sweetener), Xanthan Gum (Stabiliser), *Sources of Lactose and Milk Protein	yes	Product contains primarily whey protein concentrate - wrong classification possible - class 1.5 % < 3 % milk fat instead of class 3 % < 6 %
		Diet whey drinking powder with chocolate flavour	68	5.5	11	5	Premium Protein Blend (Whey Protein Concentrate* (27%), Milk Protein Concentrate* (26%) (of which 56% is Micellar Casein), Soy Protein Isolate), Cocoa Powder, Waxy Barley Flour, Golden Brown Flaxseed Powder, Thickeners (Acacia Gum, Guar Gum, Xanthan Gum), Flavouring, CLA Powder (contains Milk Protein*, Lecithin, Vitamin E), Acetyl L-Carnitine, Green Tea Extract, Sodium Chloride, Sweetener (Sucralose), *From Milk	yes	Product contains primarily whey protein concentrate - wrong classification possible - class 1.5 % < 3 % milk fat instead of class 3 % < 6 %
		Hydrolyzed Whey Protein Powder to Build Muscle	76.9	2.6	5.1	2.6	Hydrolyzed Whey Protein Isolates, Micronized Branched Chain Amino Acids (L-Leucine, L-Isoleucine, L-Valine), Natural And Artificial Flavors, Cookie Crums (Enriched Flour [Wheat Flour, Niacin, Reduced Iron, Thiamine Mononitrate, Riboflavin, Folic Acid], Sugar, Palm And Plam Kernel Oil, Cocoa [Processed With Alkali], High Fructose Corn Syrup, Corn Flour, Salt, Dextrose, Sodium Bicarbonate, Soya Lecithin), Lecithin, Contains 1.5% Or Less Of: Creamer (Sunflower Oil, Maltodextrin, Modified Food Starch, Dipotassium Phosphate, Tricalcium Phosphate, Tocopherols), Salt, Cellulose Gum, Sucralose, Acesulfame Potassium, Enzyme Blend (Aminogen®, Amylase, Protease, Cellulase, Beta-D-Galactosidase, Lipase).	no	Milk fat content is below 1.5 %, as hydrolized whey protein, the only dairy ingredient, does not contain more milk fat
1806 9090	SECTION IV: PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES > COCOA AND COCOA PREPARATIONS > **Chocolate and other food preparations containing cocoa > Other > Other**	Mix of cornflakes and nuts glazed with chocolate	9.6	30.2	53		Milk chocolate, rosted peanuts, cornflakes. modified starch, glucose syrup, E904.	no	Milk chocolate contains primarily whole milk fat. Hence a depletion of butyric acid is not expected.

CN code	Product	Example	Total protein	Total fat	Starch/ Glucose	Sugar	Ingredients	Expected impact of butyric acid depletion	Evaluation
			g/100g	g/100g	g/100g	g/100g			
1901	**Malt extract; food preparations of flour, groats, meal, starch or malt extract, not containing cocoa or containing less than 40 % by weight of cocoa calculated on a totally defatted basis, not elsewhere specified or included; food preparations of goods of headings 0401 to 0404, not containing cocoa or containing less than 5 % by weight of cocoa calculated on a totally defatted basis, not elsewhere specified or included**								
1901 1000	SECTION IV: PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES > PREPARATIONS OF CEREALS, FLOUR, STARCH OR MILK; PASTRYCOOKS' PRODUCTS > Malt extract; food preparations of flour, groats, meal, starch or malt extract, not containing cocoa or containing less than 40 % by weight of cocoa calculated on a totally defatted basis, not elsewhere specified or included; food preparations of goods of headings 0401 to 0404, not containing cocoa or containing less than 5 % by weight of cocoa calculated on a totally defatted basis, not elsewhere specified or included > Preparations for infant use, put up for retail sale	7 Month Summer Fruits Cereal 120G	13.0	5.3	73.7	28.0	Fruits (41%, Apple, Apricot, Banana, Raspberry, Blackcurrant), Flours (40%, Rice, Maize, Millet), Skimmed MILK Powder (17%), Sugar, Maltodextrin, Lemon Juice from Concentrate, Palm Oil, MILK Protein, Prebiotic Fibre (Inulin), Calcium Carbonate, Flavourings, Vitamin C, Zinc Sulphate, Vitamin E, Niacin, Iron, Riboflavin, Vitamin B6, Thiamin, Vitamin A, Folic Acid, Vitamin D, Vitamin B12, ALLERGENS: see capitalised ingredients, Gluten Free	no	Milk fat content expected to be below 1.5 %. Hence potential depletion does not have any impact.

CN code	Product	Example	Total protein	Total fat	Starch/ Glucose	Sugar	Ingredients	Expected impact of butyric acid depletion	Evaluation
			g/100g	g/100g	g/100g	g/100g			
1901 2000	SECTION IV: PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES > PREPARATIONS OF CEREALS, FLOUR, STARCH OR MILK; PASTRYCOOKS' PRODUCTS > Malt extract; food preparations of flour, groats, meal, starch or malt extract, not containing cocoa or containing less than 40 % by weight of cocoa calculated on a totally defatted basis, not elsewhere specified or included; food preparations of goods of headings 0401 to 0404, not containing cocoa or containing less than 5% by weight of cocoa calculated on a totally defatted basis, not elsewhere specified or included > **Mixes and doughs for the preparation of bakers' wares of heading 1905**	Classic Vanilla Cake Mix 450G	5.0	13.3	42.6	25.1	Sugar, Wheat Flour, Palm Fat, Raising Agents: Monocalcium Phosphate, Sodium Bicarbonate, Modified Corn Starch, Salt, Emulsifiers: Propane- 1, 2-Dial Esters of Fatty Acids, Mono-Diglycerides of Fatty Acids, Flavouring, Stabiliser: Xanthan Gum	no	Product does not contain milk fat.
		Baking mix: Sponge Mix 230G	6.0	5.0	59.3	24.5	Wheat Flour, Sugar, Icing Sugar, Dextrose, Raising Agents (Glucono-Delta-Lactone, Sodium Bicarbonate), Palm Oil, Rice Starch, Emulsifiers (Polyglycerol Esters of Fatty Acids, Mono- and Di-Glycerides of Fatty Acids), Rapeseed Oil, Salt, Flavourings	no	Product does not contain milk fat.
		Baking mix: Cake Kit 473G	4.19	15.5	58.1	36	Cake Mix: Wheat Flour, (Wheat Flour, Calcium Carbonate, Iron, Niacin, Thiamin), Sugar, Vegetable Oil, (Palm, Rapeseed), Raising Agents: Glucono Delta Lactone, Sodium Bicarbonate; Modified Maize Starch, Skimmed Milk Powder, Maltodextrin, Emulsifiers: E471, E472b, E477; Stabilisers: E450i, E450iii, Chocolate Frosting: Sugar, Cornflour, Fat Reduced Cocoa Powder (9.5%), Colours: Plain Caramel, Beetroot Red, Vegetable Carbon; Dried Glucose Syrup, Flavourings, Sugar Sprinkles: Sugar, Rice Flour, Cocoa Butter, Thickener: Tragacanth; Flavouring, Plant Extract: Safflower, Spirulina; Colours: Carmine, Carotenes, Copper Complexes of Chlorophylls, Anthocyanins, The Sugar Sprinkles are manufactured on a site that also processes Nuts	no	The milk fat content is expected to be below 1.5%. Hence potential depletion of butyric acid does not have any impact.
		Mini Chocolate Tortes 240G	4.6	30.3	39.3	36.2	Mini Chocolate Torte Mix (58%) [Sugar, Fat Reduced Cocoa Powder, Flavouring], Dark Chocolate Chunks (42%) [Sugar, Cocoa Mass, Cocoa Butter, Emulsifier (Soya Lecithin), Flavouring], Not suitable for Milk allergy sufferers	no	Product does not contain milk fat.
1901 9099	SECTION IV: PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES > PREPARATIONS OF CEREALS, FLOUR, STARCH OR MILK; PASTRYCOOKS' PRODUCTS > Malt extract; food preparations of flour, groats, meal, starch or malt extract, not containing cocoa or containing less than 40 % by weight of cocoa calculated on a totally defatted basis, not elsewhere specified or included; food preparations of goods of headings 0401 to 0404, not containing cocoa or containing less than 5% by weight of cocoa calculated on a totally defatted basis, not elsewhere specified or included > **Other > Other**	Classic Vanilla; Cream Base for cooking, baking and refining	4.1	15	2.8		Consists of: cream (16,2% fat), sugar, gelatin, starch, vanilla extract, flavoring, color beta carotene	no	Product does not contain potentially butyric acid depleted milk products.
		Colostrum powder	Composition unknown				Skimmed colostrum powder, lactose reduced, hydroxypolymethyl cellolose (HPMC)	unknown	There might be an effect depending of the residual fat content
		Ice base powder	Composition unknown				Dextrose, Skim milk powder, Sugar, E412-E415, Sweet whey powder, Salt	potential	Effect depends of the total fat content. If milk fat content is higher than 1.5 %, a depletion of butyric acid in the milk fat fraction might lead to wrong classification. However it is questionnable whether fat other than milk fat will be declared.
		Ice base powder, vanilla flavour	Composition unknown				Whole milk powder (26%), Skim milk powder, Butermilk powder, lyophilized yolk, locus bean gum, sodium alginate, sodium chloride, flavours, E471, Colour: annatto	potential	Depends of the whole milk powder/buttermilk powder ratio. If milk fat content is higher than 1.5 %, a depletion of butyric acid in the milk fat fraction might lead to wrong classification. However it is questionnable whether fat other than milk fat will be declared.

CN code	Product	Example	Total protein	Total fat	Starch/ Glucose	Sugar	Ingredients	Expected impact of butyric acid depletion	Evaluation
			g/100g	g/100g	g/100g	g/100g			
1904	**Prepared foods obtained by the swelling or roasting of cereals or cereal products (for example, corn flakes); cereals (other than maize (corn)) in grain form or in the form of flakes or other worked grains (except flour, groats and meal), pre-cooked or otherwise prepared, not elsewhere specified or included**								
1904 2010	SECTION IV: PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES > PREPARATIONS OF CEREALS, FLOUR, STARCH OR MILK; PASTRYCOOKS' PRODUCTS > Prepared foods obtained by the swelling or roasting of cereals or cereal products (for example, corn flakes); cereals (other than maize (corn)) in grain form or in the form of flakes or other worked grains (except flour, groats and meal), pre-cooked or otherwise prepared, not elsewhere specified or included > Prepared foods obtained from unroasted cereal flakes or from mixtures of unroasted cereal flakes and roasted cereal flakes or swelled cereals > **Preparation of the Müsli type based on unroasted cereal flakes**	No Added Sugar Muesli 1Kg	11.8	6.4	59.9	15	Oat Flakes, Malted Toasted Wheat Flakes, Raisins (16%), Whey Powder, Hazelnuts (2%), Almonds (1.5%), Sunflower Oil, Malted Toasted Wheat Flakes contain: Wheat, Barley Malt Extract	no	Milk fat content expected to be below 1.5 %. Hence potential butyric acid depletion has no impact on classification.
		Muesli: Crisp Four Nut 500G	13.1	21.6	56.9	26.3	British Conservation Grade™ Wholegrain Cereals (49%) (Oat Flakes, Barley Flakes, Oat Flour), Raw Cane Sugar, Nuts (Flaked Almonds (6%), Roasted Hazelnuts (5%), Chopped Brazil Nuts (3%), Chopped Pecan Nuts (1%)), Vegetable Oil (Rapeseed Oil, Palm Oil), Rice Flour, Desiccated Coconut, Hazelnut Paste	no	Product does not contain milk fat
		Muesli: No Added Sugar 1.1Kg	11.1	5.2	65.1	16.3	Wholegrain Wheat (42%), Wholegrain Rolled Oats (36%), Raisins (15%), Dried Skimmed Milk, Milk Whey Powder, Roasted Sliced Nuts (2.5%) (Hazelnuts & Almonds), Malted Barley Extract, Salt	no	Milk fat content expected to be below 1.5 %. Hence potential butyric acid depletion has no impact on classification.

CN code	Product	Example	Total protein	Total fat	Starch/ Glucose	Sugar	Ingredients	Expected impact of butyric acid depletion	Evaluation
			g/100g	g/100g	g/100g	g/100g			
1905	**Bread, pastry, cakes, biscuits and other bakers' wares, whether or not containing cocoa; communion wafers, empty cachets of a kind suitable for pharmaceutical use, sealing wafers, rice paper and similar products**								
1905 3111	SECTION IV: PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES > PREPARATIONS OF CEREALS, FLOUR, STARCH OR MILK; PASTRYCOOKS' PRODUCTS > Bread, pastry, cakes, biscuits and other bakers' wares, whether or not containing cocoa; communion wafers, empty cachets of a kind suitable for pharmaceutical use, sealing wafers, rice paper and similar products > **Sweet biscuits > Completely or partially coated or covered with chocolate or other preparations containing cocoa**	Sweet buiscuit balls covered with choclate	6.0	23.8	64.3	50.0	Sugar, Glucose Syrup, Wheat Flour, Cocoa Butter, Full Cream Milk Powder, Cocoa Mass, Palm Fat, Lactose, Whey Powder (from Milk), Skimmed Milk Powder, Milk Fat, Butter (from Milk), Emulsifiers (Soya Lecithin, E471), Rapeseed Fat, Glucose-Fructose Syrup, Salt, Raising Agents (E500, E503), Glazing Agent (Pectin), Natural Vanilla Extract, Milk Chocolate contains Milk Solids 14% minimum	no	Milk fat content originates primarily from full cream milk and butter. Contribution of potentially butyric acid depleted dairy products to total fat content is considered negligible. Hence significant impact on classification of the product is not expected.
1905 3119	SECTION IV: PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES > PREPARATIONS OF CEREALS, FLOUR, STARCH OR MILK; PASTRYCOOKS' PRODUCTS > Bread, pastry, cakes, biscuits and other bakers' wares, whether or not containing cocoa; communion wafers, empty cachets of a kind suitable for pharmaceutical use, sealing wafers, rice paper and similar products > Sweet biscuits > **Other**	Dark Chocolate Covered Vanilla Marshmallows 380G	2.8	21.7	57.6	48.2	Dark Chocolate 28% (Sugar, Cocoa Mass, Cocoa Butter, Milk Fat, Emulsifiers: Soya Lecithin and E476, Flavouring), Sugar, Glucose Syrup, Butter, Sweetened Condensed Milk, Invert Sugar Solution, Dried Egg White, Gelling Agent (Agar), Acidity Regulator (Citric Acid), Preservative (E202), Flavouring, Natural Vanilla Flavouring, Dark Chocolate: Cocoa Solids 47% minimum, Contains Milk, Egg, Soya, May contain Peanuts, Nuts, Cereals	no	Milk fat content originates primarily from full cream milk and butter. Contribution of potentially butyric acid depleted dairy products to total fat content is considered negligible. Hence significant impact on classification of the product is not expected.
1905 3130	SECTION IV: PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES > PREPARATIONS OF CEREALS, FLOUR, STARCH OR MILK; PASTRYCOOKS' PRODUCTS > Bread, pastry, cakes, biscuits and other bakers' wares, whether or not containing cocoa; communion wafers, empty cachets of a kind suitable for pharmaceutical use, sealing wafers, rice paper and similar products > **Sweet biscuits > Other >containing 8% or more by weight of milk fat**							no	8 % milk fat content can be achived only with dairy products that are not depleted in butyric acid

CN code	Product	Example	Total protein	Total fat	Starch/ Glucose	Sugar	Ingredients	Expected impact of butyric acid depletion	Evaluation
			g/100g	g/100g	g/100g	g/100g			
1905 3211	SECTION IV: PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES > PREPARATIONS OF CEREALS, FLOUR, STARCH OR MILK; PASTRYCOOKS' PRODUCTS > Bread, pastry, cakes, biscuits and other bakers' wares, whether or not containing cocoa; communion wafers, empty cachets of a kind suitable for pharmaceutical use, sealing wafers, rice paper and similar products > **Waffles and wafers > Other**	Waffle			5<x<25	5<x<30	Quaderförmige, mit der Unterseite in Schokolade getunkte Schnitten (jeweils ca. 5,5 x 5,5 x 1,6 cm) mit süßem Geschmack, in Form von drei flachen, beigefarbenen, zartknusprigen, wabenartig gemusterten Gebäcklagen mit einer Zwischenlage einer kakaohaltigen Haselnusscreme und einer Zwischenlage einer weißen Milchcrememasse; Waffeln mit einem Wassergehalt von weniger als 10 GHT, teilweise mit Schokolade oder kakaohaltigen Überzugsmassen überzogen, in unmittelbarer Umschließung mit einem Gewicht des Inhalts von weniger als 85 g; im Wesentlichen bestehend aus Zucker (Saccharose), Weizenmehl, Pflanzenfett, feingeriebenen Haselnusskernen, Kakaobestandteilen, Magermilch- und Süßmolkenpulver, wenig Butterreinfett, Lactose, Aroma, Kochsalz, einem Emulgator, einem Backtriebmittel, sowie geringfügigen anderen Zutaten; mit Gehalt an: Milchfett: weniger als 1,5 GHT; Milchprotein: weniger als 2,5 GHT; Stärke/Glucose: mehr als 5 GHT, jedoch weniger als 25 GHT; Saccharose/Invertzucker/Isoglucose: mehr als 5 GHT, jedoch weniger als 30 GHT (Meursingcode: 7006); aufgemacht in einem bedruckten Siegelrand-Schlauchfolien	no	Declared milk fat content is below 1.5 %. Hence potential butyric acid depletion has no impact on classification.
1905 3219	SECTION IV: PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES > PREPARATIONS OF CEREALS, FLOUR, STARCH OR MILK; PASTRYCOOKS' PRODUCTS > Bread, pastry, cakes, biscuits and other bakers' wares, whether or not containing cocoa; communion wafers, empty cachets of a kind suitable for pharmaceutical use, sealing wafers, rice paper and similar products > **Waffles and wafers > Other**	Chocolate glaced wafers with hazelnut cream	6	28	61	48	Sugar, Wheat flour, vegetable fat, cocoa, hazelnuts, whey powder, fructose, modified tapioca starch, emulgators, glucose syrup, flavouring, salt	no	The milk fat fraction is expected to be below 1.5 %. Hence potential depletion of butyric acid does not have any effect on classification of product.
1905 3291	SECTION IV: PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES > PREPARATIONS OF CEREALS, FLOUR, STARCH OR MILK; PASTRYCOOKS' PRODUCTS > Bread, pastry, cakes, biscuits and other bakers' wares, whether or not containing cocoa; communion wafers, empty cachets of a kind suitable for pharmaceutical use, sealing wafers, rice paper and similar products > **Waffles and wafers > Other > Salted whether or not filled**	Mini Waffels Cream Cheese & Chive 6Pk 144G	8.8	7.5	75.4	2.1	Wholegrain Rye Flour (87%), Rye Flour, Vegetable Oil, Cream Cheese and Chive Flavour (Flavouring with Milk and Celery Ingredients), Salt	no	Milk fat fraction originates from cheese. Hence significant impact on the butyric acid ratio is not expected.

CN code	Product	Example	Total protein	Total fat	Starch/ Glucose	Sugar	Ingredients	Expected impact of butyric acid depletion	Evaluation
			g/100g	g/100g	g/100g	g/100g			
1905 4010	SECTION IV: PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES > PREPARATIONS OF CEREALS, FLOUR, STARCH OR MILK; PASTRYCOOKS' PRODUCTS > **Bread, pastry, cakes, biscuits and other bakers' wares**, whether or not containing cocoa; communion wafers, empty cachets of a kind suitable for pharmaceutical use, sealing wafers, rice paper and similar products > **Rusks**, toasted bread and similar toasted products > **Rusks**	Milk Rusks 620G	11	12.5	78	23	Wheat Flour (70%), Sugar, Vegetable Fat, Milk and Skimmed Milk Powder (4.1%), Butter, Yeast, Salt, Enzyme (Amylase), Emulsifier [Sodium Stearoyl-2-Lactylate] and Antioxidant (Ascorbic Acid)	no	Major part of milk fat originates from butter and whole milk powder. Hence significant depletion of butyric acid is not expected.
1905 4090	SECTION IV: PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES > PREPARATIONS OF CEREALS, FLOUR, STARCH OR MILK; PASTRYCOOKS' PRODUCTS > **Bread, pastry, cakes, biscuits and other bakers' wares**, whether or not containing cocoa; communion wafers, empty cachets of a kind suitable for pharmaceutical use, sealing wafers, rice paper and similar products > Rusks, **toasted bread and similar toasted products > Other**	Olive Oil & Sea Salt Croutons 100G	11.6	16.1	64.6	4.2	Wheat Flour, Vegetable Oil, Olive Oil (6%), Sugar, Yeast, Sea Salt	no	The product does not contain milk fat.
		Gourmet Caesar Croutons 28G	14.4	18.8	68.8	4	Bread (Enriched Flour [Wheat Flour, Malted Barley Flour, Niacin, Reduced Iron, Thiamin Mononitrate, Riboflavin, Folic Acid]), Sunflower Oil, Wheat Gluten, Salt, Yeast, Maltodextrin, Sugar, Whey Milk Powder, Garlic Powder, Onion Powder, Black Pepper, Yeast Powder, Cheese Milk Powder (Milk, Salt, Starter, Rennet), Natural Flavour, Citric Acid (E330), Flavour Enhancer (E635)	no	Milk fat content expected to be below 1.5 %. Hence potential butyric acid depletion has no impact on classification.
1905 9030	SECTION IV: PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES > PREPARATIONS OF CEREALS, FLOUR, STARCH OR MILK; PASTRYCOOKS' PRODUCTS > **Bread, pastry, cakes, biscuits and other bakers' wares,** whether or not containing cocoa; communion wafers, empty cachets of a kind suitable for pharmaceutical use, sealing wafers, rice paper and similar products > Other > Other>**not containing added honey, eggs, cheese or fruit, and containing in the dry matter by weight not more than 5 % sugar and not more than 5% of fat**	Flatbread	8	2	68		wheat flour, yeast, salt, water, vegetable oil	no	The product does not contain milk fat.

CN code	Product	Example	Total protein	Total fat	Starch/ Glucose	Sugar	Ingredients	Expected impact of butyric acid depletion	Evaluation
			g/100g	g/100g	g/100g	g/100g			
1905 9045	SECTION IV: PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES > PREPARATIONS OF CEREALS, FLOUR, STARCH OR MILK; PASTRYCOOKS' PRODUCTS > **Bread, pastry, cakes, biscuits and other bakers' wares**, whether or not containing cocoa; communion wafers, empty cachets of a kind suitable for pharmaceutical use, sealing wafers, rice paper and similar products > Other > **Biscuits**	Italienisches Salzgebäck, mit Oliven verfeinert, 150 g	Composition unknown				Zutaten: Weizenmehl, Olive* (25 %), Olivenöl, Olivenöl nativ extra*, Salz, Bierhefe, Malz	no	The product does not contain milk fat.
		Sweet Chilli Baked Bites 150G	8.8	17.1	70.8	15.6	Wheat Flour, Wholewheat Flour, Sunflower Oil, Sugar, Wheatgerm, Chilli Seasoning, Corn Starch, Invert Sugar Syrup, Salt, Barley Malt Extract, Raising Agent (Sodium Bicarbonate), Yeast, Onion Powder, Colours (Turmeric, Annatto), Chilli Seasoning contains: Sugar, Soya Bean Powder, Flavouring, Sunflower Oil, Onion Powder, Salt, Garlic Powder, Buttermilk Powder, Tomato Powder, Parsley, Citric Acid, Anti-caking (Silicon Dioxide), Emulsifier (Disodium Phosphate)	no	The protein content limits the milk fat content to a level below 1.5 %. Hence potential butyric acid depletion has no impact on classification.
1905 9055	SECTION IV: PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES > PREPARATIONS OF CEREALS, FLOUR, STARCH OR MILK; PASTRYCOOKS' PRODUCTS > **Bread, pastry, cakes, biscuits and other bakers' wares**, whether or not containing cocoa; communion wafers, empty cachets of a kind suitable for pharmaceutical use, sealing wafers, rice paper and similar products > Other > **Extruded or expanded products, savoury or salted**	Nacho Cheese Tortilla Chips 200G	6.1	24.9	59.4	2.7	Maize, Sunflower Oil, Nacho Cheese Flavour Seasoning, Nacho Cheese Flavour Seasoning contains: Cheese Powder, Whey Solids, Salt, Vegetable Oil, Yeast Extract, Sugar, Onion Powder, Flavouring, Garlic Powder, Citric Acid, Colour (Paprika Extract), Paprika, Rosemary Extract	no	The protein content limits the milk fat content to a level below 1.5 %. Hence potential butyric acid depletion has no impact on classification.
		Chilli Rice Crackers 50G	4.6	27.3	65.1	11.9	Rice (52%), Vegetable Oil, Sugar, Tapioca Starch, Soya Sauce, Salt, Chilli Powder (0.3%), Garlic Powder, Paprika Extract, Liquorice Powder, Citric Acid, Soya Sauce contains: Water, Soya Bean, Salt, Wheat	no	The product does not contain milk fat.
1905 9060	SECTION IV: PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES > PREPARATIONS OF CEREALS, FLOUR, STARCH OR MILK; PASTRYCOOKS' PRODUCTS > **Bread, pastry, cakes, biscuits and other bakers' wares**, whether or not containing cocoa; communion wafers, empty cachets of a kind suitable for pharmaceutical use, sealing wafers, rice paper and similar products > Other > Other> **with added sweetening matter**	Weight Watchers Caramel Wafers 5X18.4G	5.4	20.1	64.7	39.1	Milk Chocolate (45%) (Sugar, Cocoa Butter, Skimmed Milk Powder, Cocoa Mass, Whole Milk Powder, Milk Fat, Emulsifier: Soya Lecithin; Natural Vanilla Flavouring), Wheat Flour, Invert Sugar Syrup, Bulking Agent: Polydextrose, Vegetable Oils, Sweetened Condensed Milk, Sugar, Emulsifier: Soya Lecithin, Soya Flour, Salt, Raising Agent: Sodium Bicarbonate, Cornflour	no	Milk chocolate contains primarily whole milk fat. Hence a depletion of butyric acid is not expected.

CN code	Product	Example	Total protein	Total fat	Starch/ Glucose	Sugar	Ingredients	Expected impact of butyric acid depletion	Evaluation
			g/100g	g/100g	g/100g	g/100g			
1905 9090	SECTION IV: PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES > PREPARATIONS OF CEREALS, FLOUR, STARCH OR MILK; PASTRYCOOKS' PRODUCTS > **Bread, pastry, cakes, biscuits and other bakers' wares**, whether or not containing cocoa; communion wafers, empty cachets of a kind suitable for pharmaceutical use, sealing wafers, rice paper and similar products > **Other> Other**	all kind of diet cakes, muffin´s etc						unknown	It is unlikely that this category contains elements with more than 30 % milk protein and more than 3 % milk fat, for which wrong classification would be most unfavourable for the buisness operator
		Must be	must not be (considered by different CN codes)						
		backed	Gingerbread						
			Crispbread						
			Sweet biscuit coated with chocolate or cocoa						
			waffle or wafer						
			rusk or toasted bread						
			biscuit						
			extruded or expanded product, savory or salted						
			contain sweetening matter						
		loempia roll dough					Loempiavellen, zijnde dunne, vierkante vellen deeg, geschikt voor menselijke consumptie en bestaande -volgens opgave- uit onder meer de volgende ingrediënten: tarwemeel, water, kokosolie, zout	no	The product does not contain milk fat.
2004	**Other vegetables prepared or preserved otherwise than by vinegar or acetic acid, frozen, other than products of heading 2006**								
2004 1091	SECTION IV: PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES > PREPARATIONS OF VEGETABLES, FRUIT, NUTS OR OTHER PARTS OF PLANTS > Other vegetables p**repared or preserved otherwise** than by vinegar or acetic acid, **frozen**, other than products of heading 2006 > **Potatoes**>other>in the **form of flour, meal or flakes**	e.g. roasted frozen potatoes						no	This category does not include anything besides pure potato products, which do not contain milk fat

CN code	Product	Example	Total protein	Total fat	Starch/ Glucose	Sugar	Ingredients	Expected impact of butyric acid depletion	Evaluation
			g/100g	g/100g	g/100g	g/100g			
2005	**Other vegetables prepared or preserved otherwise than by vinegar or acetic acid, not frozen, other than products of heading 2006**								
2005 2010	SECTION IV: PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES > PREPARATIONS OF VEGETABLES, FRUIT, NUTS OR OTHER PARTS OF PLANTS > Other vegetables prepared or preserved otherwise than by vinegar or acetic acid, **not frozen**, other than products of heading 2006 > **Potatoes > In the form of flour, meal or flakes**							no	This category does not include anything besides pure potato products, which do not contain milk fat
2101	**Extracts, essences and concentrates, of coffee, tea or maté and preparations with a basis of these products or with a basis of coffee, tea or maté; roasted chicory and other roasted coffee substitutes, and extracts, essences and concentrates thereof**								
2101 2098	SECTION IV: PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES > MISCELLANEOUS EDIBLE PREPARATIONS > Extracts, essences and concentrates, of coffee, tea or maté and preparations with a basis of these products or with a basis of coffee, tea or maté; roasted chicory and other roasted coffee substitutes, and extracts, essences and concentrates thereof > **Preparations with a basis of these extracts, essences or concentrates or with a basis of coffee > Other**	Dried mate tea with added fruits for infusion drink	Extracts, essences or concentrates as well as preparations with a basis of extracts essences and concentrates are covered by different CN codes (21012020 and 21012092), without EA					no	Milk fat is in such preparations not expected, or only at low concentrations

CN code	Product	Example	Total protein	Total fat	Starch/ Glucose	Sugar	Ingredients	Expected impact of butyric acid depletion	Evaluation
			g/100g	g/100g	g/100g	g/100g			
2106	**Food preparations not elsewhere specified or included**								
2106 1080	SECTION IV: PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES > MISCELLANEOUS EDIBLE PREPARATIONS > Food preparations not elsewhere specified or included > **Protein concentrates and textured protein substances > Other**	Diet Pro Meal 1Kg Strawberry	52	3.6	37	1.6	Protein (Calcium Caseinate*, Soya Protein Isolate, Whey Protein Concentrate*, Peptide Bonded Glutamine Rich Hydrolysed Wheat Protein, Whey Protein Isolate*, Egg Albumin), Maltodextrin, Skimmed Milk Powder*, Glycine, Actilight® (Inulin Fibre), Fructose, MCT Oil, Rice Starch, Conjugated Linoleic Acid, Cellulose Gum (Stabiliser), Red Beet Powder (Colouring), Flavouring, Lactase Enzymes, Potassium Citrate, Green Tea Extract (Camellia Sinensis), Sucralose (Sweetener), Nicotinamide, Biotin, Potassium Iodate, Pteroylmonoglutamic Acid, *Sources of Lactose and Milk Protein	yes	Medium chain triglycerides (MCT) contribute to total fat content. Milk fat stems from dairy products which might be depleted in butyric acid content.
		Muscle Fuel Anabolic Strawberry 2Kg	33	1.5	52	8	4-Stage Carb Release Formula (Long and Medium Chain Glucose Polymers, Dextrose Monohydrate, Fructose), 6-Stage Anabolic Protein Matrix [Whey Protein Concentrate and Isolate Blend, Ultra Purified (Water Filtrated) High Isoflavone Soy Protein Isolate, Calcium Caseinate, Micellar Casein, Milk Protein Isolate], Creatine Monohydrate, Di-Creatine Malate, L-Glycine, Rice Starch, Stabiliser: Cellulose Gum, Taurine, Flavourants, Magnesium Oxide, Calcium Phosphate, Non-Nutritive Sweetener: Sucralose, MCT (Medium Chain Triglyceride) Oil, Avena Sativa, Zymatech™ Lactazyme Blend (mainly Lactase), L-Glutamine, Glutamine Peptides, Glutamine AKG, HMB, Leucine, Valine, Isoleucine, Beta-Alanine, EPA (Eicosapentaenoic Acid) Powder, Ascorbic Acid, Alpha-Tocoferol Acetate, Nicotinamide, Calcium Pantothenate, Pyridoxine-5-Phosphate, Riboflavin, Thiamine Mononitrate, Biotin, Retinol, Folic Acid, Cholecalcipherol, Colourant: E124, Red Beet Powder (only in Strawberry Variant), Cyanocobalamin	no	Fat content is declared to 1.5%. Hence potential depletion of butyric acid will not lead to misclassification.

CN code	Product	Example	Total protein	Total fat	Starch/ Glucose	Sugar	Ingredients	Expected impact of butyric acid depletion	Evaluation
			g/100g	g/100g	g/100g	g/100g			
2106 1080	SECTION IV: PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES > MISCELLANEOUS EDIBLE PREPARATIONS > Food preparations not elsewhere specified or included > **Protein concentrates and textured protein substances > Other**	Vanilla flavoured whey and milk proteib based sports drinking powder 2Kg	61.6	2.7	24.8	10.3	PhD Protein Blend (57%) (Whey Protein Concentrate*, Milk Protein Concentrate (providing 80% Micellar Casein), Whey Protein Isolate*, Hydrolysed Whey Protein Isolate*, Hydrolysed Wheat Protein (providing Peptide bonded L-Glutamine)), PhD Carbohydrate Blend (28%) (Ground Oats (10%), Maltodextrin, Dextrose Monohydrate), Creatine Monohydrate, Taurine, CreaPep™ (Partially Hydrolysed Whey Protein*, Micellar Casein*, Soya Lecithin), PepForm® Leucine Peptides (Leucine Peptides, L-Leucine), L-Leucine, L-Isoleucine, L-Valine, Flavourings, Vitamin C, Magnesium Oxide, Zinc Oxide, Vitamin B6, Thickeners (Xanthan Gum, Guar Gum), BioPerine® (Black Pepper Extract), Sweetener (Sucralose), Emulsifier (Soya Lecithin), *from Milk, May also contain: Egg, Nuts, Peanuts	yes	Milk fat stems to a large extend from dairy products which might be depleted in butyric acid content.
		Strawberry flavoured whey and milk proteib based sports drinking powder 960G	50	7.3	38.3	36.7	Dextrose (38%), BioMax (29%) (a blend of Whey Proteins (from Milk) including Whey Protein Isolate (Milk) & Hydrolysed Whey Protein (Milk), Emulsifiers: Soya & Sunflower Lecithins), Creatine Monohydrate, L-Glutamine, Soya Oil Powder, Acidity Regulators (Tricalcium Phosphate, Sodium Bicarbonate, Potassium Bicarbonate), Calcium Beta-Hydroxy Beta-Methylbutyrate (Calcium HMB), Medium Chain Triglyceride (MCT) Powder, Thickener (Guar Gum), Flavouring, Zinc Gluconate, Sweetener (Sucralose), Black Pepper Extract, Chromium (III) Chloride, Colour (Ponceau 4R)	no	It can be expected that the milk fat content is below 1.5%. Fat contained in the product originates primarily from soya oil and MCT. Hence potential depletion of butyric acid will not lead to missclassification.
		Diet Strawberry Sundae 700G	31.8	10.6	48	19.8	Maltodextrin, Whole Milk Powder (25%), Milk Proteins (Emulsifier: Soya Lecithin), Soya Protein Isolate, Soya Oil, Safflower Oil (Rich in Conjugated Linoleic Acid), Mineral Mix (Dipotassium Phosphate, Magnesium Oxide, Zinc Gluconate, Iron Pyrophosphate, Sodium Selenite, Manganese Gluconate, Copper Gluconate, Potassium Iodide), Thickener: Guar Gum, Flavouring, Vitamin Mix (C, E, Niacin, A, Pantothenic Acid, B12, D, B6, B1, B2, Folic Acid, Biotin), Sweetener: Sucralose, Green Tea Extract (0.04%), Colouring: Beetroot Red	no	About 70 % of the fat content of the product is milk fat from whole milk powder, for which depletion of butyric acid is not expected. Hence significant impact is not expected.

CN code	Product	Example	Total protein	Total fat	Starch/ Glucose	Sugar	Ingredients	Expected impact of butyric acid depletion	Evaluation
			g/100g	g/100g	g/100g	g/100g			
2106 9098	SECTION IV: PREPARED FOODSTUFFS; BEVERAGES, SPIRITS AND VINEGAR; TOBACCO AND MANUFACTURED TOBACCO SUBSTITUTES > MISCELLANEOUS EDIBLE PREPARATIONS > Food preparations not elsewhere specified or included > Other > Other	A wide range of products is possible in this category - from food supplement pills to hollunder syrups						unknown	
		Cheese Curls Snacks 6X17g	3.5	32	56	3	Sunflower Oil, Potato Starch, Wheat Flour, Maize Flour, Cheese Flavour Seasoning, Potato Flour, Salt, Colour (Paprika Extract), Cheese Flavour Seasoning contains: Whey Powder, Wheat Flour, Salt, Sugar, Yeast Extract Powder, Cheese Powder, Onion Powder, Natural Flavourings, Buttermilk Powder, Colours (Paprika Extract, Curcumin), White Pepper, Lactic Acid	no	The protein content is too low to allow milk fat contents above 1.5 %. Hence potential depletion of butyric acid has no impact.
3302	**Mixtures of odoriferous substances and mixtures (including alcoholic solutions) with a basis of one or more of these substances, of a kind used as raw materials in industry; other preparations based on odoriferous substances, of a kind used for the manufacture of beverages**								
3302 1029	SECTION VI: PRODUCTS OF THE CHEMICAL OR ALLIED INDUSTRIES > ESSENTIAL OILS AND RESINOIDS; PERFUMERY, COSMETIC OR TOILET PREPARATIONS > Mixtures of odoriferous substances and mixtures (including alcoholic solutions) with a basis of one or more of these substances, of a kind used as raw materials in industry; other preparations based on odoriferous substances, of a kind used for the manufacture of beverages > **other**	A broad range of products possible. However likelyhood of milk fat content is extremely low.						unknown	Milk fat content of these products is not expected. Hence significant impact is not expected.

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