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**Datasheet for the decision
of 22 October 2013**

Case Number: T 1939/11 - 3.3.09

Application Number: 05758958.2

Publication Number: 1758470

IPC: A23L1/30, A23L1/10, A61K31/716,
A61P1/00

Language of the proceedings: EN

Title of invention:
PREBIOTIC PREPARATION

Patent Proprietor:
Cargill, Incorporated

Opponent:
DF3 SAS(FR) / COSUCRA GROUPE WARCOING(BE)

Headword:

Relevant legal provisions:
EPC Art. 123(2), 100(c), 56

Keyword:
Appellant status (insolvency proceedings)
Admissibility of claim requests and documents (yes)
Amendments - added subject-matter (main request, yes)
Inventive step (no, first and second auxiliary request)

Decisions cited:
T 0696/02

Catchword:



**Beschwerdekammern
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Case Number: T 1939/11 - 3.3.09

D E C I S I O N
of Technical Board of Appeal 3.3.09
of 22 October 2013

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Decision under appeal: **Interlocutory decision of the Opposition
Division of the European Patent Office posted on
28 June 2011 concerning maintenance of the
European Patent No. 1758470 in amended form.**

Composition of the Board:

Chairman: W. Sieber
Members: M. O. Müller
R. Menapace

Summary of Facts and Submissions

- I. This decision concerns the appeal by the joint opponents against the interlocutory decision of the opposition division that European patent No. 1 758 470 as amended met the requirements of the EPC.
- II. The joint opponents DF3 SAS and Cosucra Groupe Warcoing had requested revocation of the patent in its entirety on the grounds that the claimed subject-matter was neither novel nor inventive (Article 100(a) EPC), that the patent did not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art (Article 100(b) EPC) and that the patent contained subject-matter which extended beyond the content of the application as filed (Article 100(c) EPC).

The documents submitted during the opposition proceedings included:

D2: EP 1 137 424 B1;

D3: WO 02/051264 A2;

A2: JP 06-217761; and

A4: V. van Craeyveld et al., "Structurally Different Wheat-Derived Arabinoxyloligosaccharides Have Different Prebiotic and Fermentation Properties in Rats", J. Nutr. 138, 2008, pages 2348 to 2355.

- III. The opposition division's decision was announced orally on 3 May 2011 and issued in writing on 28 June 2011. In its decision, the opposition division held that the main request (filed on 1 April 2011) met the

requirements of the EPC. Claims 1 and 5 of this request, which are the only claims relevant to the present decision, read as follows:

"1. A food or beverage product modulating the human intestinal flora comprising between 0.25 and 5 g of arabinoxylans per serving of said food or beverage product wherein said arabinoxylans have an average degree of polymerisation (DP) of 5 to 7."

"5. The beverage or food product according to any of claims 1 to 4, wherein said food product comprises living bacteria of the genus *Bifidobacterium* or *Lactobacillus*."

The opposition division's position can be summarised as follows:

The claims of the main request were based on the application as filed. In particular, the ranges of 5-50 and 7-20 disclosed for the average degree of polymerisation (hereinafter "DP") in the application as filed provided a basis for the range of 5-7 in the claims.

The invention underlying the opposed patent was also considered to be sufficiently disclosed.

It was also novel over *inter alia* D3, since this document did not disclose the claimed average DP in an unambiguous manner.

The claimed subject-matter was also regarded as inventive. In view of the closest prior-art document D3, the objective technical problem was the selection of a specific arabino-oligosaccharide which made it

possible to decrease protein fermentation in the colon, did not have a sweet taste and was easy and cheap to produce. None of the cited prior-art documents taught the selection of an arabinoxylan having the claimed average DP of 5 to 7 in order to solve this technical problem.

IV. On 26 August 2011, the joint opponents (hereinafter: "the appellants") filed an appeal and, on the same day, paid the prescribed fee. The statement setting out the grounds of appeal was filed on 28 October 2011 together with

D53: Doctoral thesis of H. Gruppen, "Structural characteristics of wheat flour arabinoxylans", 1992, 158 pages;

D54: C. M. Courtin et al., "Relative Activity of Endoxylanases Towards Water-extractable and Water-unextractable Arabinoxylan"; Journal of Cereal Science 33, 2001, pages 301 to 312;

D55: M. S. Izydorczyk et al., "Cereal arabinoxylans: advances in structure and physicochemical properties", Carbohydrate Polymers 28, 1995, pages 33 to 48;

D56: J. I. Sanchez et al., "Arabinoxylan-oligosaccharides (AXOS) affect the protein/carbohydrate fermentation balance and microbial population dynamics of the Simulator of Human Intestinal Microbial Ecosystem", Microbial Biotechnology 2(1), 2009, pages 101 to 113;

D57:Experimental report "Reproduction of the procedures described in A2 (Example I [0019]) and D2 (Example III)";

D58:JP 04-053801;

D59:Experimental report "ANNEX 1 - Effect of average DP of arabinoxylan preparations on the intestinal development of bifidobacteria, short chain fatty acid production and protein fermentation";

D60:Experimental report "ANNEX 2 - Effect of AXOS administration on bifidobacteria and urinary cresol excretion in healthy humans";

D61:Experimental report "ANNEX 3: Effect of administering arabinoxylan-oligosaccharides (AXOS) to healthy children";

D62:Declaration "ANNEXE 1 Impossibilité de réaliser la revendication 6 du document Main Request du 21/12/2009";

D63:Collection of information on various products, concerning their compositions and serving amounts;

D64:"Topics in enzyme and fermentation biotechnology 8", A. Wiseman (ed.), Wiseman/Ellis Horwood Limited, 1984, pages 9 to 30;

D65:JP 04-309501; and

D66:EP 0 470 870 A1.

V. With its two letters of 15 March 2012, the proprietor (hereinafter: "the respondent") filed its reply, which contained:

A6: Doctoral thesis of V. van Craeyveld "Production and functional characterisation of arabinoxylan-oligosaccharides from wheat (*Triticum aestivum* L.) bran and psyllium (*Plantago ovata* Forsk) seed husk", 2009, 210 pages;

A7: Product information sheet "Cellulase "Onozuka" RS", Serva Electrophoresis GmbH;

A8: A.-M. A. Loosveld et al., "Contents and Structural Features of Water-Extractable Arabinogalactan in Wheat Flour Fractions", J. Agric. Food Chem. 45, 1997, pages 1998 to 2002;

A9: G. Cleemput et al., "Heterogeneity in the structures of water-soluble arabinoxylans in European wheat flours of variable bread-making quality", Cereal Chem. 70(3), 1993, pages 324 to 329; and

A10: Product information sheet "Arabinoxylan (Wheat Flour; Insoluble)", Megazyme International Ireland.

Apart from the above documents, the letters contained three auxiliary requests. The respondent requested that the appeal be dismissed or that the patent be maintained on the basis of any of the three auxiliary requests, or, as a fourth auxiliary request, on the basis of the granted claims. Lastly, it was requested that the case be remitted back to the opposition division if the appeal was not dismissed.

- VI. On 13 February 2013, the board issued its preliminary opinion. The board observed *inter alia* that the presence of living bacteria as required by claim 5 of the main request appeared to be disclosed in the application as filed only for certain specific food products, rather than food products in general, and that therefore claim 5 appeared not to be based on the application as filed. As regards inventive step, the board considered *inter alia* D3 to represent the closest prior art. The claimed subject-matter constituted a selection of arabinoxylans with a specific average DP from the disclosure of this document. It had to be discussed during the oral proceedings which problem was solved by this selection and whether, in view of this problem, the selection of the claimed average DP range was obvious.
- VII. A reply was filed by the appellants with their letter of 1 August 2013 together with
- D67:JP 05 304950 (abstract and English translation);
- D68:"Copie tribunal de commerce d'Amiens", Jugement du vingt-huit octobre deux mille onze, N° de PC: 2011RJ329;
- as well as a CV of Mr Joseph Fockedey, an expert in food carbohydrates. It was requested that he be allowed to address the board on technical matters during the scheduled oral proceedings.
- VIII. The respondent filed its reply with letter dated 6 August 2013 together with a new first and second auxiliary request replacing the previous auxiliary requests.

Claim 1 of the first and second auxiliary requests reads as follows:

- "1. A food or beverage product modulating the human intestinal flora comprising between 0.25 and 5 g of arabinoxylans per serving of said food or beverage product wherein said arabinoxylans have an average degree of polymerisation (DP) of 7, wherein said average degree of polymerisation (DP) is determined by gas-liquid chromatography by calculating said average DP as the sum of the total xylose and arabinose content divided by the reducing end xylose content." (first auxiliary request)

 - "1. The use of an arabinoxylan preparation comprising arabinoxylan molecules with an average degree of polymerisation (DP) of 7 as a food additive in the production of a food or beverage, which comprises between 0.25 and 5 g of such arabinoxylans per serving of said food or beverage, wherein said average degree of polymerisation (DP) is determined by gas-liquid chromatography by calculating said average DP as the sum of the total xylose and arabinose content divided by the reducing end xylose content." (second auxiliary request)
- IX. A further reply was filed by the appellants with their letter of 11 September 2013, and by the respondent with its letter of 9 October 2013.
- X. On 22 October 2013, oral proceedings were held before the board. At the beginning of the oral proceedings, the respondent withdrew its request for remittal and clarified that the previous fourth auxiliary request

was withdrawn as well. In addition to its remaining requests on file, the respondent requested that documents D53 to D68 not be admitted into the proceedings and that a decision on the status of one of the joint appellants be taken, namely DF3 SAS. The appellants maintained their written requests and additionally requested that the first and second auxiliary requests not be admitted into the proceedings.

XI. So far as relevant to the present decision, the appellants' arguments can be summarised as follows:

a) Status of joint appellant DF3 SAS

As evidenced by D68, the insolvency proceedings were still ongoing. Therefore the party status of DF3 SAS was still the same, namely that of an appellant.

b) Allowability of the main request

Claim 5 of the main request was not based on the application as filed. This claim required the presence of living bacteria for all types of products, while the application as filed, in particular page 8, lines 29 to 30 and 35 to 36 and claim 30, was limited in this regard to specific types of product.

The appellants raised a further objection under Article 123(2) EPC or, alternatively, Article 123(3) EPC against claim 11 and under Article 100(b) EPC against claims 1 and 6 of the main request.

- c) Admissibility of the first and second auxiliary requests

The first and second auxiliary requests were not convergent and therefore should not be admitted into the proceedings.

- d) Admissibility of D53 to D68

D53 to D67 constituted a further substantiation of attacks already made during the first-instance proceedings. D68 was a reaction to the submissions of the proprietor on the status of DF3 SAS. Therefore D53 to D68 should be admitted into the proceedings.

- e) Allowability of the first auxiliary request

D3 constituted the closest prior art. This document did not disclose the claimed average DP of 7. However, there was no specific effect linked to this average DP. Example 4 of the patent was not relevant in this respect since the control feed used in this example contained the enzyme xylanase. Upon admixture of this control feed with AXOS-7-0.34, the AXOS-7-0.34 started to degrade such that the average DP decreased. So what was fed to the chicken in this example in fact was an arabinoxylan with an average DP below 7, which was different from the claimed value. Furthermore, the feeds shown in figure 9 did not differ only in terms of the average DP but additionally by the ratio of arabinose to xylose and thus were not comparable. In this context the appellants' expert Mr Fockedey mentioned that the Xylooligo-95P shown

in this figure was xylose that was substituted by arabinose to a very minor extent and hence had a very low arabinose/xylose ratio. In the same way, a comparison of the AXOS-7-0.34 feed of figure 9 with the AXOS-15-0.27 feed of figure 10 was not meaningful, since in the first case the control feed present in the AXOS-7-0.34 feed contained xylanase while in the second case it did not. Finally, it could not be deduced from figure 9 that the AXOS-7-0.34 feed resulted in slow fermentation. What this figure actually showed was rather a slower adaptation of the bacteria to the AXOS-7-0.34 feed. The objective technical problem was thus the provision of an alternative and the solution was an arbitrary selection from D3.

As regards the serving amount required by claim 1, this did not limit the claim since it represented a use feature which did not restrict the claimed product. Furthermore, even if it did restrict the claim, it could not establish an inventive step since it did not provide any effect. In this respect, it was important that example 4 of the patent did not even disclose any serving amount. The claimed serving amount hence represented an arbitrary selection.

In addition to the above, the appellants raised further objections under Article 123(2) EPC, Rule 80 EPC and Article 83 EPC against the first auxiliary request.

f) Allowability of the second auxiliary request

D3 already disclosed the use of the nutritional composition disclosed in this document as a food

supplement on page 7, line 8. Consequently, the use feature of claim 1 of the second auxiliary request did not constitute an additional distinguishing feature with regard to D3. Therefore, for the same reasons as given for the first auxiliary request, the subject-matter of the second auxiliary request lacked an inventive step in view of D3.

XII. So far as relevant to the present decision, the respondent's arguments can be summarised as follows:

a) Status of joint appellant DF3 SAS

In view of the ongoing bankruptcy proceedings, the party status of DF3 SAS was not clear.

b) Allowability of the main request

Claim 5 was based on the application as filed. More specifically, it was disclosed on page 7, lines 13 to 15 as filed that the arabinoxylan preparations according to the invention had a strong bifidogenic effect. It was therefore implicit that these preparations contained living bifidobacteria. Furthermore, no unwarranted advantage or legal uncertainty was created by the inclusion in claim 5 of embodiments wherein living bacteria were present in food products in general. Therefore, even though these embodiments were not clearly and unambiguously disclosed in the application as filed, the requirements of Article 123(2) EPC were met.

- c) Admissibility of the first and second auxiliary requests

The amendments in the first and second auxiliary requests essentially consisted of the inclusion of the measurement method for the average DP in the independent claims and in the deletion of various other claims. These amendments did not add anything and could not surprise the appellants. Furthermore they represented a reaction to the board's preliminary opinion. Therefore the auxiliary requests should be admitted into the proceedings.

- d) Admissibility of D53 to D68

The main documents used against novelty and inventive step in the statement of grounds of appeal were those already submitted during the opposition proceedings rather than the ones newly filed in appeal. Furthermore, D56 was not prior art and D67, which was used together with D13 against novelty, was not relevant. Thus, D53 to D67 did not add anything new to the prior art already on file. Therefore, D53 to D68 should not be admitted into the proceedings (no reasons were given for D68).

- e) Allowability of the first auxiliary request

D3 represented the closest prior art. This document disclosed arabinoxylan as only one member of a list of oligosaccharides, and furthermore neither disclosed an average DP nor a serving amount as required by claim 1. The objective

technical problem solved in view of this document was the provision of improved bifidogenic properties, ie an increased amount of bifidobacteria and a slower fermentation. A comparison of the results obtained in example 4 of the patent for the AXOS-7-0.34 feed, which was according to claim 1, with those obtained for the further feeds in figures 9 and 10 showed that with the AXOS-7-0.34 feed a higher amount of bifidobacteria was obtained. More specifically, after 14 days, the amount of bifidobacteria obtained with the AXOS-7-0.34 feed was higher than that obtained with the AXOS-122-0.66 or the Xylooligo-95P feed in figure 9 or the AXOS-15-0.27 feed in figure 10. The latter was confirmed by the text of example 4 where it was stated that with AXOS-7-0.34, the number of bifidobacteria increased by a factor of about 10^5 , whereas with AXOS-15-0.27, it increased by a factor of 22. Finally, the results in figure 9 showed that the AXOS-7-0.34 feed led to slower fermentation. More specifically, the number of bifidobacteria obtained after a 7-day feeding with AXOS-7-0.34 was lowest in figure 9 while after a longer time, namely 14 days, it was the highest. This slower increase in the amount of bifidobacteria implied a slower fermentation.

f) Allowability of the second auxiliary request

Apart from the distinguishing features already present in claim 1 of the first auxiliary request, the use as nutritional additive constituted a further distinguishing feature of claim 1 of the second auxiliary request. Therefore an inventive step had to be acknowledged.

- XIII. The appellants requested that the decision under appeal be set aside and European patent No. 1 758 470 be revoked.
- XIV. The respondent requested that the appeal be dismissed (main request), or that the patent be maintained on the basis of the claims according to the first or second auxiliary request, both filed on 6 August 2013.

Reasons for the Decision

1. The appeal is admissible.
2. *Appellant status*

An appeal was filed by the joint opponents DF3 SAS and Cosucra Groupe Warcoing. The respondent requested that a decision on the party status of DF3 SAS be taken.

As is shown by D68, a copy of a judgement of the *Tribunal de Commerce d'Amiens*, insolvency proceedings (*procédure de Liquidation Judiciaire Normale*) were opened against DF3 SAS. According to D68, these proceedings have been pending until 25 October 2013, ie until after the oral proceedings before the present board and until after the decision announced therein.

An action taken against the property of an opponent, here *une procédure de Liquidation Judiciaire Normale* under French law against DF3 SAS, does not take away the opponent's party status (T 696/02, not published in OJ EPO, point 7.2 of the Reasons) and does not entail an interruption of the proceedings, Rule 142 EPC covering applicants or patent proprietors only.

Therefore DF3 SAS could validly claim the status of an appellant until the announcement of the present decision.

Main request

3. *Amendments - Articles 123(2) and 100(c) EPC*

3.1 Claim 5 refers to "[t]he beverage or food product according to any of claims 1 to 4, wherein said food product comprises living bacteria of the genus *Bifidobacterium* or *Lactobacillus*".

3.2 The presence of living bacteria of the genus *Bifidobacterium* or *Lactobacillus* is disclosed in the application as filed solely for dairy products, non-alcoholic beverages and functional soft drinks:

- page 8, lines 29 to 30: "Optionally said dairy product comprises living bacteria of the genus *Bifidobacterium* or *Lactobacillus*,..."
- page 8, lines 35 to 36: "In a particular embodiment said functional soft drinks comprise living bacteria of the genus *Bifidobacterium* or *Lactobacillus*, ..."
- claim 30: "The beverage or food product according to claims 27 to 29 wherein said food product comprises living bacteria of the genus *Bifidobacterium* or *Lactobacillus*", whereby claims 27 to 29 define the product as "a dairy product" (claim 27), "a non-alcoholic beverage" (claim 28) and "a functional soft drink" (claim 29).

The application as filed does not disclose the presence of living bifidobacteria or lactobacilli in food products, which are different from dairy products, non-alcoholic beverages and functional soft drinks. Such products are however covered by claim 5 of the main request, since this claim does not contain any limitation with regard to the type of food product. Consequently, this claim is not based on the application as filed.

3.3 The respondent argued that it was disclosed on page 7, lines 13 to 15 of the application as filed that the arabinoxylan preparations according to the invention had a strong bifidogenic effect. According to the respondent, it was therefore implicit that these preparations could contain living bifidobacteria. This argument is however not convincing. Neither from the cited passage on page 7 nor from any other part of the application as filed can it be derived that the bifidogenic effect, ie the presence of *inter alia* bifidobacteria in the gastro-intestinal tract, is due to the presence of these bacteria in the arabinoxylan preparations. On the contrary, it is the presence of the claimed arabinoxylan in the arabinoxylan preparations rather than the alleged presence of these bacteria that is responsible for the bifidogenic effect (see for instance example 4 as filed).

3.4 The respondent furthermore argued that no unwarranted advantage or legal uncertainty was created by extending claim 5 to embodiments wherein living bacteria were present in food products in general (ie without any restriction to dairy products, non-alcoholic beverages and functional soft drinks).

However, it is neither the absence or presence of an unwarranted advantage nor the question whether any legal uncertainty is created that is relevant with regard to the requirements of Articles 100(c) and 123(2) EPC. On the contrary, the only relevant criterion is whether the embodiments in question are clearly and unambiguously derivable from the application as filed.

- 3.5 Claim 5 does thus not meet the requirements of Articles 100(c) and 123(2) EPC. The main request is hence not allowable.

Auxiliary requests

4. *Admissibility of the first and second auxiliary requests*

The first and second auxiliary requests were filed on 6 August 2013. The appellants requested that these requests not be admitted into the proceedings.

The first auxiliary request differs from the main request essentially in that the method to determine the average degree of polymerisation has been specified in the two independent claims 1 and 9 and in that several further claims have been deleted. The second auxiliary request differs from the first auxiliary request by the deletion of the product claims while keeping the use claims (for the wording of claim 1 of the two auxiliary requests, see point VIII above).

These amendments in the two auxiliary requests do not confront the appellants with any new subject-matter which they could not be expected to deal with before the oral proceedings. Furthermore, these amendments can

be considered as a reaction to the objections raised by the board in its preliminary opinion. Finally, contrary to the appellants' assertion, the first auxiliary request does not diverge from the main request since its only independent claims 1 and 9 are more restricted than the corresponding independent claims 1 and 12 of the main request. In the same way, the second auxiliary request does not diverge from the first auxiliary request, since the claims of the second auxiliary request were already present in the first auxiliary request.

The board therefore decided to admit the first and second auxiliary requests into the proceedings.

5. *Admissibility of D53 to D68*

D53 to D66 were filed by the appellants with the statement of grounds of appeal. D67 and D68 were both filed by the appellants with their letter of 1 August 2013. The respondent requested that D53 to D68 not be admitted into the proceedings.

As acknowledged by the respondent, the main documents used against novelty and inventive step in the statement of grounds of appeal had all been filed already during the opposition proceedings. Accordingly, D53 to D67 are merely a further substantiation of attacks already made in opposition proceedings.

As regards D56, the respondent argued that this document did not constitute prior art. This argument is however irrelevant since D56 was not used as prior art but as evidence with regard to the presence or absence of certain effects obtained by the claimed composition.

The respondent submitted no arguments as to why D68 should not be admitted into the proceedings. The filing of this document is in fact a direct reaction to the respondent's remark that DF3 SAS "is presently bankrupt and in the hands of the Receiver" (letter of 15 March 2012).

Furthermore, the respondent did not claim that the time between the submission of any of D53 to D68 and the oral proceedings was too short to deal with these documents.

The board therefore decided to admit D53 to D68 into the proceedings.

6. *First auxiliary request - inventive step*

6.1 The invention underlying the opposed patent relates to food products containing supplements that improve gastro-intestinal health (page 2, lines 5 to 7). The invention in particular concerns food products containing arabinoxylans having a strong bifidogenic effect (page 5, lines 24 to 27).

6.2 As acknowledged by both parties, D3 constitutes the closest prior art. Like the opposed patent, this document relates to nutritional compositions with health-promoting action, in particular a bifidogenic effect (page 1, lines 3 to 5).

D3 discloses in claim 1 nutritional compositions in individual single or multiple dosage form comprising non-digestible oligosaccharides which contain at least one terminal arabinose unit. The oligosaccharides have a degree of polymerisation (hereinafter "DP") of 2 to 20 (page 1, lines 9 to 11). Apart from the terminal

arabinose unit, the oligosaccharides contain saccharide residues that can be chosen from all available saccharide residues, such as lactose, arabinose, mannose or xylose, most preferably arabinose or galactose (page 1, lines 32 to 36). As an example of such an oligomer, arabinoxylans ("arabinoxyloligosaccharide") are disclosed (page 4, line 35 and example 7).

D3 does not disclose the claimed combination of (i) arabinoxylans and (ii) an average DP of 7.

6.3 According to the respondent, the problem underlying the patent in the light of D3 is the provision of a food or beverage product with improved bifidogenic properties. As explained by the respondent during the oral proceedings, improved bifidogenic properties imply an increased amount of lactobacilli and bifidobacteria in the gastro-intestinal tract and a slower fermentation of non-digestible oligosaccharides by these bacteria. An increase in the amount of these bacteria is associated with improved overall health, reduced gut infections, increased levels of intestinal short chain fatty acids, better absorption of minerals, and suppression of colon cancer initiation (page 2, lines 28 to 30 of the patent). A slower fermentation of the non-digestible oligosaccharides implies that part of them are not fermented until they reach the distal part of the colon, where their fermentation aids the prevention of colon cancer (page 5, lines 27 to 30 of the patent).

6.4 As a solution to this problem, the patent proposes the food or beverage product of claim 1, which is characterised in that it comprises arabinoxylans having an average DP of 7.

6.5 It needs to be examined whether the above problem has been credibly solved. In this respect, the respondent referred to example 4 and corresponding figures 9 and 10 of the patent.

6.5.1 Example 4 contains a first and second series of experiments. In the first series of experiments, chicken were fed

- a control feed,
- the control feed with 0.25% of AXOS-7-0.34, which is an arabinoxylan with an average DP of 7 and an arabinose/xylose ratio of 0.34,
- the control feed with 0.25% of AXOS-122-0.66, which is an arabinoxylan with an average DP of 122 and an arabinose/xylose ratio of 0.66, and
- the control feed with 0.25% of a Xylooligo-95P (page 14, lines 42 to 53).

After decapitation, the animals were dissected and the number of bifidobacteria in the caecum was determined. The results are shown in figure 9.

In the second series of experiments, chicken were fed *inter alia* a control feed with 0.25% of AXOS-15-0.27, which is an arabinoxylan having an average DP of 15 and an arabinose/xylose ratio of 0.27, and the number of bifidobacteria in the caecum was determined in the same way as in the first series of experiments. The result for AXOS-15-0.27 is shown in figure 10 (third bar from the left).

6.5.2 According to the respondent, a comparison of the results obtained for the AXOS-7-0.34 feed (allegedly according to claim 1) with those obtained for the

further feeds in figures 9 and 10 showed that the AXOS-7-0.34 feed resulted in a higher number of bifidobacteria. In particular, after 14 days, the number of bifidobacteria obtained with the AXOS-7-0.34 feed (ie a mixture of the control feed of the first series of experiments and AXOS-7-0.34) was higher than

- (a) that obtained with the AXOS-122-0.66 feed (ie a mixture of the control feed of the first series of experiments and AXOS-122-0.66),
- (b) that obtained with Xylooligo-95P feed (ie a mixture of the control feed of the first series of experiments and Xylooligo-95P), and
- (c) that obtained with the AXOS-15-0.27 feed (ie a mixture of the control feed of the second series of experiments and AXOS-15-0.27).

With regard to the last point (c), the respondent additionally referred to the text of example 4 where it is stated that with AXOS-7-0.34, the number of bifidobacteria increased by a factor of about 10^5 (page 15, lines 16 to 17) whereas with AXOS-15-0.27 it increased only by a factor of 22 (page 15, line 44).

- 6.5.3 The board is not convinced that the experiments relied upon by the respondent do indeed show an improved bifidogenic effect caused by the AXOS-7-0.34 feed.

Firstly, the control feed in the first series of experiments contained xylanase (page 14, lines 56 to 57). Xylanase is an enzyme that cuts xylose-xylose bonds in the arabinoxylans and thereby leads to a decrease of their average DP. Since, in the AXOS-7-0.34 feed, the AXOS-7-0.34 is present in admixture with the xylanase-containing control feed, the average DP of the

AXOS-7-0.34 can be assumed to decrease to a value below 7. Consequently, the AXOS-7-0.34 feed is not according to claim 1 of the first auxiliary request. Therefore, any effect allegedly obtained with the AXOS-7-0.34 feed is irrelevant for the question of which effects are obtained and which problem is solved by the subject-matter of claim 1.

Secondly, the AXOS-7-0.34 feed, which allegedly has an average DP according to claim 1 (but which in fact it has not, as set out above), does not only differ from the further feeds AXOS-122-0.66 and Xylooligo-95P in terms of the average DP but also in terms of the arabinose/xylose ratio. More specifically, the arabinoxylan in the AXOS-122-0.66 feed had a much higher arabinose/xylose ratio than the arabinoxylan in the AXOS-7-0.34 feed (0.66 versus 0.34) while the arabinoxylan in the Xylooligo-95P feed can be assumed to have had a lower arabinose/xylose ratio than the arabinoxylan in the AXOS-7-0.34 feed. The latter was confirmed by the appellants' expert Mr Fockedey during the oral proceedings and is in line with the statement on page 7, lines 41 and 42 of the patent that Xylooligo-95P predominantly consists of xylobiose, xylotriose and xylotetraose and hence has a very low arabinose/xylose ratio. Consequently, the comparison of the AXOS-7-0.34 feed with the AXOS-122-0.66 and Xylooligo-95P feeds cannot prove that it is the alleged average DP of 7 of the AXOS-7-0.34 feed which is responsible for the increased number of bifidobacteria.

The comparison of the AXOS-7-0.34 feed with the AXOS-15-0.27 feed is likewise not acceptable. The latter feed contains the arabinoxylan AXOS-15-0.27 in admixture with the control feed of the second series of experiments. Unlike the control feed contained in the

AXOS-7-0.34 feed (which is the control feed of the first series of experiments), the control feed in the AXOS-15-0.27 feed did not contain any xylanase. Hence, unlike the AXOS-7-0.34 feed, where the arabinoxylan chains can be assumed to have been degraded by the xylanase of the control feed, no such degradation of arabinoxylan chains has occurred in the AXOS-15-0.34 feed. The two feeds are thus not comparable. Therefore, the results obtained for the two feeds (including the statement in the patent that the AXOS-7-0.34 feed increased the number of bifidobacteria by a factor of about 10^5 whereas the AXOS-15-0.27 feed did so by a factor of only 22) cannot prove any effect that is due to the difference in the average DP of the two feeds.

6.5.4 The respondent also argued that the results in figure 9 showed that the AXOS-7-0.34 feed led to slower fermentation. More specifically, according to the respondent, the number of bifidobacteria obtained after a 7-day feeding with AXOS-7-0.34 was lowest in figure 9 (compared to the other feeds in the figure) while after a longer time, namely 14 days, it was the highest. According to the respondent, this slower increase in the number of bifidobacteria implied a slower fermentation.

However, this argument must fail since a slower fermentation is not reflected by a slower increase in the number of bacteria but a slower increase in the amount of fermented arabinoxylans during the passage through the gastro-intestinal tract. This is however not what is shown in figure 9. On the contrary, all that figure 9 shows is a slower increase in the number of bifidobacteria over time and this simply implies a slower adaptation of the bifidobacteria to the AXOS-7-0.34 feed.

Irrespective of this, as set out above (point 6.5.3), the AXOS-7-0.34 feed is not according to claim 1. Therefore, even if this feed did indeed lead to slower fermentation, the same effect could not be assumed to be produced by the subject-matter of claim 1.

- 6.5.5 In view of the above, it cannot be deduced from example 4 that the claimed presence of arabinoxylans with an average DP of 7 solves the problem of improved bifidogenic properties.
- 6.5.6 The respondent has provided further experimental evidence in the form of D59 and the corresponding scientific publication A4. However, in the experiments described in these documents, no arabinoxylans with an average DP of 7 have been used. Consequently, these experiments cannot prove any effect for the average DP as required by claim 1 either.
- 6.6 The problem referred to by the respondent of obtaining improved bifidogenic properties consequently has not been credibly solved by the subject-matter of claim 1. The objective technical problem must therefore be formulated in a less ambitious manner as the provision of a further food or beverage product with a bifidogenic effect.
- 6.7 It remains to be examined whether the solution to this problem is obvious in view of D3.
 - 6.7.1 D3 already discloses that for a bifidogenic effect, oligomers which are branched and have a DP of up to 20 are most suited (page 6, lines 17 to 18). A DP of up to 20 implies an average DP below 20. In the absence of any effect, the selection of the claimed average DP

of 7 out of this range of below 20 is arbitrary. The same holds true for the type of oligosaccharide chosen in claim 1 (arabinoxylan), which is an arbitrary choice amongst the oligosaccharides disclosed in D3. The arbitrary selection of arabinoxylans with a certain DP belongs however to the routine tasks of the skilled person, and therefore cannot contribute to inventive step.

6.7.2 It was a matter of dispute between the parties whether the serving amount required by claim 1 is a further distinguishing feature with regard to D3. Since the respondent has not claimed that any effect is caused by the serving amount and no such effect can be deduced from example 4 of the patent (the serving amount is not disclosed in this example), this feature, even if distinguishing, cannot contribute to inventive step either. More specifically, in the absence of any effect, the selection of a certain serving amount is an arbitrary selection within the routine abilities of the skilled person.

6.8 The subject-matter of claim 1 of the first auxiliary request thus lacks an inventive step in view of D3. The first auxiliary request therefore is not allowable.

7. *Second auxiliary request - inventive step*

Claim 1 of the second auxiliary request contains all the features of claim 1 of the first auxiliary request except that it is now worded as a use claim, namely the use of an arabinoxylan preparation as a food additive in the production of a food or beverage (see point VIII above).

Since D3 already discloses the use of the nutritional composition of this document as a food supplement (page 7, line 8), this change in the claim category does not lead to any additional distinguishing feature. Therefore, the subject-matter of claim 1 of the second auxiliary request lacks an inventive step for the same reasons as given above with regard to the first auxiliary request. Consequently, the second auxiliary request too is not allowable.

8. Since the main and auxiliary requests are not allowable in view of Articles 123(2), 100(c) and 56 EPC, there is no need to deal with the further issues discussed by the parties, including sufficiency of disclosure.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The patent is revoked.

The Registrar:

The Chairman:



M. Cañueto Carbajo

W. Sieber

Decision electronically authenticated