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Case Number: T 0719/11 - 3.3.09

Application Number: 03772593.4

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Language of the proceedings: EN

Title of invention:
METHOD OF IMPROVING THE HYDRATION OF PASTA AND PREPARATION OF PASTA PRODUCTS

Patent Proprietor:
DuPont Nutrition Biosciences ApS

Opponent:
NOVOZYMES A/S

Headword:

Relevant legal provisions:
EPC Art. 54(1), 56

Keyword:
Novelty - (no)
Inventive step - (no)

Decisions cited:
G 0002/88

Catchword:

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Case Number: T 0719/11 - 3.3.09

D E C I S I O N
of Technical Board of Appeal 3.3.09
of 5 December 2013

Appellant: (Patent Proprietor)	DuPont Nutrition Biosciences ApS Langebrogade 1 Postboks 17 1001 Copenhagen K. (DK)
Representative:	Williams, Aylsa D Young & Co LLP 120 Holborn London EC1N 2DY (GB)
Appellant: (Opponent)	NOVOZYMES A/S Krogshoejvej 36 2880 Bagsvaerd (DK)
Representative:	Potter Clarkson LLP The Belgrave Centre Talbot Street Nottingham NG1 5GG (GB)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 3 February 2011 concerning maintenance of the European Patent No. 1613176 in amended form.**

Composition of the Board:

Chairman: W. Sieber
Members: W. Ehrenreich
F. Blumer

Summary of Facts and Submissions

I. Mention of the grant of European patent No. 1 613 176 in respect of European patent application No. 03 772 593.4, filed on 4 November 2003 as international application PCT/IB2003/005514 in the name of Danisco A/S (now Dupont Nutrition Biosciences ApS), was announced on 7 March 2007 in Bulletin 2007/10.

The patent was granted with 35 claims, claim 1 reading as follows:

"1. A method of improving the hydration of pasta or pasta products, comprising adding to the pasta or to pasta dough ingredients or to pasta dough an effective amount of an oxidoreductase which is at least capable of oxidising a carbohydrate."

Claims 2 to 18 were dependent claims.

Claim 19 read as follows:

"19. The use of an effective amount of an oxidoreductase which is at least capable of oxidising a carbohydrate in pasta or pasta dough, whereby said oxidoreductase provides the technical effect of improving the hydration of the pasta or of a pasta product made from said pasta or said pasta dough."

Claims 20 to 35 were directly or indirectly dependent on claim 19.

II. On 29 November 2007 Novozymes A/S filed an opposition against the patent. The opposition was based on the grounds that the claimed subject-matter was neither novel nor inventive (Article 100(a) EPC) and that the

invention was insufficiently disclosed (Article 100(b) EPC). The opponent relied *inter alia* on the following documents:

D1 WO-A 99/31990;
D2 WO-A 96/39851;
D3 JP 6296467 (abstract);
D4 US-A 3 520 702;
D11 CA-A 2009628.

III. By its interlocutory decision announced orally on 16 December 2009 and issued in writing on 3 February 2011, the opposition division maintained the patent in amended form on the basis of the claims according to auxiliary request 4 filed during the oral proceedings. Independent claims 1 and 14 of this request read as follows:

"1. A method of improving the rate or quality of the hydration of pasta or pasta products, wherein improving the quality of hydration is improving the evenness of hydration, comprising adding to the pasta or to pasta dough ingredients or to pasta dough an effective amount of an oxidoreductase which is at least capable of oxidising a carbohydrate."

"14. The use of an effective amount of an oxidoreductase which is at least capable of oxidising a carbohydrate in pasta or pasta dough, whereby said oxidoreductase provides the technical effect of improving the rate or quality of the hydration of the pasta or of a pasta product made from said pasta or said pasta dough, wherein improving the quality of hydration is improving the evenness of hydration ."

The opposition division found that the invention to which the claims of auxiliary request 4 related meet the requirement of the EPC.

Concerning novelty, the opposition division reasoned that the introduction of the purpose of improving specifically the rate or evenness of hydration in claims 1 and 14 constituted an essential functional technical feature and thereby limited the respective claims. This feature was not disclosed in any one of D1 to D4.

Furthermore, the subject-matter of claims 1 and 14 was not rendered obvious from a combination of D4 with D11. Furthermore, D2 did not establish any link between the use of oxidoreductase and an improved rate or evenness of hydration in cooked pasta.

IV. On 28 March 2011 the opponent filed a notice of appeal against the decision of the opposition division and paid the prescribed fee on the same day. In the grounds of appeal which were received on 1 June 2011, the objections of lack of novelty, lack of inventive step and insufficiency of disclosure in respect of the subject-matter of the claims according to the main request and auxiliary requests 1 to 4 before the opposition division were maintained. It was requested that the decision be set aside and the patent be revoked.

V. On 1 April 2011 the patent proprietor filed a notice of appeal against the decision of the opposition division and paid the appeal fee on 4 April 2011. The grounds of appeal were received on 1 June 2011. The proprietor requested that the decision be set aside and the patent be maintained as granted (main request), or

alternatively that the patent be maintained on the basis of one of auxiliary requests 1 to 10 enclosed with the grounds of appeal. Auxiliary requests 1 to 4 correspond to the auxiliary requests before the opposition division.

VI. As the proprietor and the opponent have both the status of an appellant in these proceedings, for simplicity the board will continue to refer to them as the proprietor and the opponent.

VII. In its letter dated 21 September 2011 the opponent extended its objections of lack of novelty and lack of inventive step to the subject-matter of the proprietor's auxiliary requests 5 to 10. An objection of insufficiency of disclosure was raised against the subject-matter of the main request and auxiliary requests 1, 5, 6, and 10.

On 5 August 2013 the board issued a communication, in which it expressed its doubts that the subject-matter of all requests was novel over the disclosures in D1 to D4. In the board's preliminary view the feature in the claims of all requests relating to the improvement of hydration, or to the rate, evenness or quality of hydration was a description by other words of quality criteria for pasta or pasta products which were already disclosed in D1 to D4. Therefore the question arose whether the above features in the claims were novel functional technical features which could establish novelty over D1 to D4 in accordance with the principles set out in G 2/88 (OJ EPO 1990, 93), Headnote 3.

VIII. By its letter dated 11 September 2013 the proprietor informed the board that it would not be attending the

oral proceedings. All requests and submissions filed in its grounds of appeal were, however, maintained.

IX. On 5 December 2013 oral proceedings were held before the board, and were attended solely by the opponent. The main issue of discussion was novelty. Concerning the subject-matter of auxiliary request 10, the question arose whether the limitation of the optimal cooking time in claim 1 should be considered under the provisions of Article 56 EPC.

The arguments of the parties provided in writing (both parties) and orally (opponent) in respect of novelty and inventive step, as far as they are relevant to this decision, are summarised in the following.

X. Arguments of the proprietor

a) Novelty - main request, auxiliary requests 1 to 3

The proprietor acknowledges the opposition division's view that texture and mouthfeel are not necessarily a result of improved hydration. However, its argument that the disclosure in D4 of using glucose oxidase, for the purpose of strengthening the protein network in order to give good elasticity and non-stickiness, discloses the feature of hydration of pasta, as claimed in the patent, is not correct. The fundamental mechanism underlying the patent is improved water uptake, i.e. hydration, of pasta. This mechanism is nowhere disclosed in D4. Even if a skilled person would understand from D4 that protein crosslinking by an oxidoreductase gives rise to improved properties of the pasta, there is no direct and unambiguous teaching in D4 of improving water

uptake. Regardless of whether D4 is considered to disclose improving texture/mouthfeel of the pasta, it does not disclose improving hydration. The subject-matter of the main request is therefore novel. The same considerations apply in principle to the claims of auxiliary request 1.

Concerning the claims of auxiliary requests 2 and 3, the principle of "inherency" was applied by the opposition division in relation to the claim features "rate of hydration", "evenness of hydration" and "quality of hydration". This view is not the correct approach to the consideration of novelty, as explicitly stated in G 2/88, point 10.1 of the Reasons.

b) Novelty - auxiliary requests 4 to 10

Arguments relating specifically to the claims of auxiliary request 4 (which was allowed by the opposition division) and auxiliary requests 5 to 10 were not provided by the appellant/proprietor.

XI. Arguments of the opponent

a) Novelty - main request, auxiliary requests 1 to 3

Concerning the proprietor's view that improved texture and mouthfeel are not necessarily a result of improved hydration, it should be noted that the practical purpose of hydrating pasta is always to provide a texture and mouthfeel suitable to allow it to be eaten. The improvement of the gluten network by the action of an oxidoreductase on the protein as disclosed in D4, column 2, lines 9 to 12, is the mechanism that is also disclosed in the

patent specification at paragraph [0083]. Thus, the proprietor seeks to confuse hydration with the mechanism by which it is obtained. Its conclusion that the mechanism of improved water uptake (i.e. hydration) underlying the patent is different from the mechanism in D4 is therefore incorrect.

The subject-matter of the main request and auxiliary requests 1 to 3 also lacks novelty over D1 to D3, which all disclose the use of an oxidoreductase in pasta dough:

D1 discloses that the addition of the oxidoreductase results in a strengthening of the gluten structure, which can provide a dough with improved texture (page 8, lines 13 to 17). D2 discloses the use of the oxidoreductase in improving the cooking quality and texture of noodles (page 13, line 18 to page 14, line 2) and in addition describes that the noodles should "cook as quickly as possible" (page 13, lines 30 to 31). It is therefore impossible to see how any alleged increase in the rate of cooking could be hidden in the disclosure of D2. In addition, D3 describes how a wheat flour product such as pasta can have improved texture when produced using glucose oxidase.

b) Novelty - auxiliary requests 4 to 10

For the reasons mentioned above the subject-matter of auxiliary request 4 is not novel over D1 to D4 either.

Claims 1 and 2 of auxiliary request 5 disclose that the firmness of the pasta is improved. Since

firmness of pasta is closely related to texture/ mouthfeel (patent specification, page 8, lines 7/8) the subject-matter of these claims also lacks novelty over D1 to D4.

Claim 1 of auxiliary request 6 specifies that the rate of hydration is improved. Such an effect is not hidden but is made available to the public by the disclosure in D1 to D4.

Claim 1 of auxiliary request 7 discloses improving the firmness of the pasta. For the reasons given for auxiliary request 5 the subject-matter of claim 1 lacks novelty over D1 to D4.

The feature in claim 1 of auxiliary request 8 indicating how the firmness of the pasta is improved does not alter the scope of claim 1 of auxiliary request 7 because the firmness is still improved to an unspecified extent.

Claim 1 of auxiliary request 9 adds to claim 1 of auxiliary request 7 that the pasta is dried pasta. Dried pasta is disclosed in D2 (page 14, line 30). Thus, there is a lack of novelty over D2.

According to claim 1 of auxiliary request 10, the rate of hydration is improved and the optimal cooking time is reduced by at least 5%. These features are disclosed by the use of oxidoreductase described in D1 to D4. In particular, D2 discloses that the noodles should cook as quickly as possible (page 13, last paragraph).

c) Inventive step - auxiliary request 10

Even if it is acknowledged that the reduction of the cooking time by at least 5% is a feature which is not explicitly disclosed in the prior art, the choice of this range is arbitrary and therefore obvious in view of the disclosure in D2 that the noodles should cook as quickly as possible.

XII. The proprietor requested in writing that the decision under appeal be set aside and the patent be maintained as granted, or alternatively on the basis of one of the auxiliary requests 1 to 10 filed with the grounds of appeal.

XIII. The opponent requested that the decision under appeal be set aside and the patent be revoked.

Reasons for the Decision

1. The appeals are admissible.

2. Novelty - General considerations

2.1 The patent in suit, in its broadest sense, is concerned with the improvement of the hydration of pasta and pasta products. This improvement is achieved by the action of the enzyme oxidoreductase on pasta, pasta dough ingredients or pasta dough. This technical measure is expressly derivable from the disclosure in paragraphs [0019] to [0024] of the patent specification and is part of all independent method and use claims of the proprietor's requests.

The board notes that the addition of oxidoreductase to pasta or pasta dough for the purpose of improving the quality of pasta or pasta products is also expressly disclosed in the prior art documents D1 to D4. This was not contested by the proprietor. The use of the enzyme oxidoreductase for the purpose of improving the properties of pasta or pasta products was therefore already known in the prior art.

2.2 In decision G 2/88 the Enlarged Board of Appeal decided *inter alia* that a claim to the use of a known compound for a particular non-medical purpose, which is based on a technical effect, should be interpreted as including that technical effect as a functional technical feature. Such a claim is accordingly not open to objection under Article 54(1) EPC provided that such technical feature has not previously been made available to the public (Headnote 3).

2.3 All sets of claims of the proprietor's requests (main request, auxiliary requests 1 to 10) include an independent use claim which begins with the following wording:

"The use of an effective amount of an oxidoreductase which is at least capable of oxidising a carbohydrate in pasta or pasta dough. ...".

In each of these use claims one or more technical effects are mentioned, which are achieved by the use of oxidoreductase. For the assessment of novelty of the subject-matter of these claims the question has therefore to be considered whether the variously described technical effects have been made available to the public by one or more of the documents D1 to D4. If

this question is to be answered in the affirmative, the above principle of G 2/88 cannot be applied.

2.4 The technical effect(s) provided by the use of the oxidoreductase are defined in the respective independent use claims as follows:

Main request:
"..., whereby said oxidoreductase provides the technical effect of improving the hydration of the pasta or of a pasta product made from said pasta or said pasta dough" (claim 19);

Auxiliary request 1:
Claim 1 is identical to claim 19 of the main request;

Auxiliary request 2:
"..., whereby said oxidoreductase provides the technical effect of improving the hydration of the pasta or of a pasta product made from said pasta or said pasta dough, wherein (a) the rate of hydration is improved, or (b) the quality of hydration is improved, wherein the evenness of the hydration is improved" (claim 15);

Auxiliary request 3:
"..., whereby said oxidoreductase provides the technical effect of improving the rate or quality of the hydration of the pasta or of a pasta product made from said pasta or said pasta dough, wherein improving the quality of hydration is improving the evenness of hydration" (claim 15);

Auxiliary request 4:
"..., whereby said oxidoreductase provides the technical effect of improving the rate or quality of

the hydration of the pasta or of a pasta product made from said pasta or said pasta or said pasta dough, wherein improving the quality of hydration is improving the evenness of hydration (claim 14);

Auxiliary request 5:
"..., whereby said oxidoreductase provides the technical effect of improving the hydration of the pasta or of a pasta product made from said pasta or said pasta dough, wherein (a) the rate of hydration is improved, or (b) the firmness of the pasta or pasta product is improved compared with pasta or pasta product without oxidoreductase (claim 15);

Auxiliary request 6:
"..., whereby said oxidoreductase provides the technical effect of improving the hydration of the pasta or of a pasta product made from said pasta or said pasta dough, wherein the rate of hydration is improved (claim 1);

Auxiliary request 7:
"..., whereby said oxidoreductase provides the technical effect of improving the hydration of the pasta or of a pasta product made from said pasta or said pasta dough, wherein the firmness of the pasta or pasta product is improved compared with pasta or pasta product without oxidoreductase (claim 1);

Auxiliary request 8:
"..., whereby said oxidoreductase provides the technical effect of improving the hydration of the pasta or of a pasta product made from said pasta or said pasta dough, wherein the firmness of the pasta or pasta product is improved compared with pasta or pasta product without oxidoreductase, and wherein the

firmness of the pasta or pasta product is determined using AACC method 66-50 (claim 1);

Auxiliary request 9:
"..., whereby said oxidoreductase provides the technical effect of improving the hydration of the pasta or of a pasta product made from said pasta or said pasta dough, wherein the firmness of the pasta or pasta product is improved compared with pasta or pasta product without oxidoreductase, and wherein the pasta or pasta product is a dried pasta or pasta product (claim 1);

Auxiliary request 10:
"..., whereby said oxidoreductase provides the technical effect of improving the hydration of the pasta or of a pasta product made from said pasta or said pasta dough, wherein the pasta or pasta product is a dried pasta or pasta product, wherein the rate of hydration is improved and wherein the optimal cooking time is reduced by at least 5% (claim 1).

2.5 As is apparent from the claim wording set out above, the broadest aspect of the invention is "improving the hydration". This term is defined in paragraph [0073] of the patent specification as follows:

"The term 'improving the hydration' ... means one or more of the following:

- improving the rate of hydration (i.e. increasing the speed with which the pasta and/or pasta product absorbs water into the pasta) and/or
- improving the quality of the hydration (i.e. the evenness of the hydration and/or the texture/

mouthfeel of the final product, for example, including al dente firmness)".

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Further explanations how to assess the "rate of hydration", the "quality of hydration" and the "evenness of hydration" are given in paragraphs [0074] and [0076], respectively.

The second sentence in paragraph [0074] reads: "... the 'rate of hydration' can be assessed by comparing the optimal cooking time of pasta or pasta products comprising the oxidoreductase ... compared with that of pasta or pasta products without the enzyme".

In paragraph [0076] the following is stated: "Suitably, the 'quality of hydration' can be measured by evaluating the bite of the pasta once cooked. A cooked pasta should have a slight bite, which is not mushy and not overly tough. This is often referred to as an al dente bite. In addition or alternatively, the 'quality of hydration' can be measured by measuring the evenness of hydration".

2.6 Thus, as is apparent from paragraphs [0073], [0074] and [0076] of the patent specification, the following relationships between the terms "improving the hydration", "improving the rate of hydration", "improving the quality of hydration" and certain quality properties of the pasta or pasta product occur:

(a) the broadest term "improving the hydration" includes all quality criteria mentioned under "rate of hydration" and "quality of hydration" and is thus linked to optimised cooking time, texture/ mouthfeel, al dente bite and al dente firmness;

(b) the term "rate of hydration" is linked to optimal cooking time;

(c) the term "quality of hydration" is linked to al dente bite, texture/mouthfeel, al dente firmness and evenness of hydration.

2.7 It follows from the above that documents of the prior art disclosing one or more of the quality criteria for the pasta/pasta products mentioned above under (a) to (c), as a result of the action of oxidoreductase on pasta or pasta dough, also make one or more of the technical effects relating to the terms "improved hydration", "improved rate of hydration" and "improved quality or evenness of hydration" available to the public.

2.8 In this context, the board cannot accept the argument of the proprietor that the fundamental mechanism underlying the patent is improved water uptake, i.e. hydration of pasta, which was not disclosed in the prior art. It is clearly indicated in paragraph [0083] of the patent specification that the presence of oxidoreductase affects proteins, in particular gluten, in the pasta and thus results in an improved gluten network. Therefore, it is this alteration of the protein network and the capillary structure of the pasta which constitutes the mechanism underlying the teaching of the patent, and the improved hydration is the technical effect resulting from this mechanism. This relation between the alteration of the protein network and the resulting technical effect also becomes clear from the disclosure in D4. The respective passage in column 1, lines 68 to 72 in D4 reads: "The state of the protein network after cooking can also affect the elasticity of the pasta. The main problem which has to

be solved to obtain elastic and non-sticky pasta thus consists in increasing the resistance of the protein network to cooking".

3. The disclosure of documents D1 to D4

D1 to D4 disclose the following improvements in the quality of pasta or pasta products, as a technical effect resulting from the action of the enzyme oxidoreductase:

3.1 D1: The stickiness is reduced, and the strength is improved, which is a result of a strengthening of the gluten structure (page 8, lines 13 to 17);

3.2 D2: The cooking time is reduced; the firmness after cooking is increased; no loss of solids to cooking water occurs; the pasta has good texture and mouthfeel (page 13, line 18 to page 14, line 2, and page 14, line 24 to page 15, line 2);

3.3 D3/D3a: The texture, elasticity and firmness are improved (claim 1, page 2, last paragraph, and page 3, last paragraph);

3.4 D4: A protein network which is highly resistant to cooking results, which leads to high elasticity and low stickiness (column 1, line 69 to column 2, line 8).

4. Novelty of the subject-matter of the independent use claims of the requests

4.1 Claim 19 of the main request and claim 1 of auxiliary request 1 require, in their broadest sense, that "the hydration" is improved. The respective quality criteria of optimal cooking time, texture/mouthfeel and al dente

firmness/bite mentioned in point 2.6 (a) above are disclosed in D2 and D3a.

4.2 According to claim 15 of auxiliary request 2, feature (a), the rate of hydration is improved. Feature (b) requires that the quality of hydration is improved wherein evenness of hydration is improved. Feature (a), which is linked to optimal cooking time, is disclosed in D2. Feature (b) is linked to al dente bite/firmness, texture/mouthfeel according to 2.6 (c), which are disclosed in D2 and D3a.

The same considerations can also be applied to the subject-matter of claim 15 of auxiliary request 3, claim 14 of auxiliary request 4, claim 15 of auxiliary request 5 and claim 1 of auxiliary request 6.

4.3 Claim 1 of auxiliary request 7 requires improved firmness compared with pasta/pasta products without oxidoreductase. Improved firmness is thus anticipated by at least D2 and D3a.

4.4 Claim 1 of auxiliary request 8 requires, in addition to the features of claim 1 of auxiliary request 7, that the firmness is determined by the AACC method 66-50. This method of determination is, however, not a technical feature which further characterises the pasta/pasta product. Therefore, the same consideration as for auxiliary request 7 applies.

4.5 In addition to the features of claim 1 of auxiliary request 7, claim 1 of auxiliary request 9 indicates that the pasta or pasta product is dried. It is, however, evident from the disclosure in the patent specification (in particular paragraph [0073]) that all the quality criteria of the pasta or pasta products

resulting from the improvement of the hydration relate to the final product, i.e. the product obtained after cooking the dried pasta or pasta product. The disclosure in D2 and D3a thus also anticipates the subject-matter of auxiliary request 9.

4.6 From the above the board concludes that the technical effects linked to the terms "improved hydration", "improved rate of hydration" and "improved quality or evenness of hydration" according to the use claims of the main request and auxiliary requests 1 to 9 are made available to the public, in particular by the disclosures in D2 and D3a. Thus the principle set out in Headnote 3 of G 2/88 cannot be applied. Novelty of the subject-matter of the use claims of the proprietor's main request and auxiliary requests 1 to 9 is thus not acknowledged.

4.7 According to claim 1 of auxiliary request 10 the rate of hydration is improved and the optimal cooking time is reduced by at least 5%. Although reduced cooking time is disclosed in D2, the range that the time of reduction is at least 5% is not expressly and unambiguously disclosed in this document. The subject-matter of claim 1 of auxiliary request 10 is therefore considered to be novel.

5. Inventive step - auxiliary request 10

Claim 1 requires that the optimal cooking time is reduced by at least 5%. The proprietor has not shown that the choice of this range for the reduction of the cooking time is linked to a specific technical effect. The range of "at least 5%" for the reduced cooking time is therefore an arbitrary choice, in particular in view of the disclosure on page 13, last paragraph of D2 that

"the noodles should cook as quickly as possible", which unambiguously points to a considerable reduction in the cooking time. The use according to claim 1 thus lacks an inventive step.

6. For the above reasons, none of the proprietor's requests is allowable, either because of lack of novelty (main request, auxiliary requests 1 to 9) or because of lack of an inventive step (auxiliary request 10). It is therefore not necessary to discuss other issues.

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:

R.Schumacher W. Sieber

Decision electronically authenticated