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Datasheet for the decision of 20 February 2020

Case Number: T 2340/15 - 3.3.09

Application Number: 09740225.9

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IPC: A23L1/00, A23L1/10, A23L1/164, A23L2/52, A23P1/12, A23L1/105

Language of the proceedings: EN

Title of invention:
SOLUBLE OAT OR BARLEY FLOUR AND METHOD OF MAKING UTILIZING ENZYMES

Patent Proprietor:
The Quaker Oats Company

Opponent:
Société des Produits Nestlé S.A.

Headword:
Soluble oat flour/QUAKER OATS

Relevant legal provisions:
EPC Art. 54, 56, 83, 100(a)

Keyword:
Novelty - main request (no)
Auxiliary request - allowable (yes)

Decisions cited:

Catchword:

Europäisches Patentamt
European Patent Office
Office européen des brevets

Beschwerdekammern

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Case Number: T 2340/15 - 3.3.09

D E C I S I O N
of Technical Board of Appeal 3.3.09
of 20 February 2020

Appellant: (Opponent)	Société des Produits Nestlé S.A. Entre-deux-Villes 1800 Vevey (CH)
Representative:	Rupp, Christian Mitscherlich PartmbB Patent- und Rechtsanwälte Sonnenstraße 33 80331 München (DE)
Respondent: (Patent Proprietor)	The Quaker Oats Company 555 West Monroe Street Chicago, IL 60661 (US)
Representative:	Jenkins, Peter David Page White & Farrer Bedford House John Street London WC1N 2BF (GB)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 24 November 2015 concerning maintenance of the European Patent No. 2205101 in amended form.**

Composition of the Board:

Chairman	A. Haderlein
Members:	M. Ansorge
	D. Rogers

Summary of Facts and Submissions

I. This decision concerns the appeal filed by the opponent against the interlocutory decision of the opposition division, which held that the opposed patent in amended form (claims as granted with an amended description page 3) complied with the EPC.

II. With its notice of opposition, the opponent had requested revocation of the patent in its entirety on the grounds for opposition under Article 100(a) EPC (lack of novelty and lack of inventive step), Article 100(b) EPC and Article 100(c) EPC.

III. The documents submitted during the opposition proceedings included:

D1: US 4,996,063
D2: WO 92/10106 A1
D3: EP 0 634 106 A1
D10: Thava Vasanthan, Judy Yeung, Ratnajothi Hoover, "Dextrinization of Starch in Barley Flours with Thermostable alpha-Amylase by Extrusion Cooking", Starch/Stärke 53 (2001), pages 616 to 622

D01: Declaration of Yongsoo Chung
D02: Declaration of Robert Chatel, including exhibit 5 (a datasheet of Validase® BAA 1000L, a liquid bacterial alpha-amylase for starch hydrolysis).

IV. Claim 1 as granted reads as follows:

"A method of producing a soluble oat or barley flour comprising:

combining in a preconditioner a whole oat or barley flour starting mixture and a suitable enzyme solution to form an enzyme starting mixture having a moisture level of 25 to 40%, wherein a suitable enzyme solution includes α-amylase,

heating the enzyme starting mixture to between 48.8°C (120°F) and 93.3°C (200°F) for an effective amount of time to begin to hydrolyze the starch molecules in the oat or barley flour;

adding the mixture to an extruder, and extruding the mixture for a time sufficient to continue hydrolyzing the starch and to gelatinize and cook the mixture to form the soluble oat or barley flour, wherein the mixture resides in the extruder for 1-1.5 minutes and the extrusion occurs at a barrel temperature between 60°-121.1°C (140°F-250°F)"

Claim 6 as granted reads as follows:

"A method for preparing a beverage or a food product containing a soluble oat or barley flour comprising producing a soluble oat or barley flour according to the method of any of the preceding claims and adding the soluble oat or barley flour to a beverage or a food product."

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Claim 8 as granted reads as follows:

"A food product or beverage obtainable according to the method of claim 6 or 7."

Claim 10 as granted reads as follows:

"A soluble oat or barley flour obtainable according to any of the claims 1-5."

Claims 2 to 5, 7 and 9 as granted are dependent claims.

V. The opposition division decided, *inter alia*, that:

- the amended description page 3 (including an amendment to paragraph [0012]) met the requirements of Article 123(2) EPC;
- the invention was sufficiently disclosed;
- the subject-matter of product claims 8 and 10 was novel; and
- the claimed subject-matter involved an inventive step in view of D2 as the closest prior art.

VI. In its statement setting out the grounds of appeal, the opponent ("the appellant") requested that the decision be set aside and the patent be revoked in its entirety.

VII. With its reply to the statement setting out the grounds of appeal, the proprietor ("the respondent") requested that the appeal be dismissed (main request) or, alternatively, that the patent be maintained on the

basis of one of the first to fifth auxiliary requests filed with the reply.

In addition, the following document was filed with this reply:

D05: Supplementary declaration of Yongsoo Chung.

VIII. On 20 February 2020 oral proceedings took place before the board. During the course of the oral proceedings, the respondent withdrew the first and second auxiliary requests, while maintaining the numbering of the remaining auxiliary requests.

IX. The respondent's requests, in so far as relevant for the present decision, are as follows:

The claims of the **main request** are identical to the claims as granted (see point IV above).

Claims 1 to 8 of the **third auxiliary request** correspond to claims 1 to 7 and 9 of the main request. Compared with the main request, the product claims have been deleted.

X. The appellant's arguments, in so far as relevant for the present decision, are as follows:

- The invention is not disclosed in a manner sufficiently clear and complete for it to be carried out by a skilled person.

- The subject-matter of claims 8 and 10 of the main request lacks novelty in view of document D2.

- The subject-matter of claim 1 of the third auxiliary request does not involve an inventive step in view of D2 as the closest prior art in combination with either exhibit 5 of D02 or D10.

XI. The respondent's arguments, in so far as relevant for the present decision, are as follows:

- The invention is disclosed in a manner sufficiently clear and complete for it to be carried out by a skilled person.

- The subject-matter of claims 8 and 10 of the main request is novel in view of D2.

- The subject-matter of claim 1 of the third auxiliary request involves an inventive step in view of D2 as the closest prior art.

XII. The parties' requests are as follows:

- The appellant requested that the decision be set aside and the patent be revoked in its entirety.

- The respondent requested that the appeal be dismissed (main request) or that the patent be maintained upon the basis of one of the Third to Fifth Auxiliary Requests, all filed on 15 August 2016 with the reply to the statement setting out the grounds of appeal, and upon the basis of pages 3 to 6 of the amended description filed at the oral proceedings on 20 February 2020.

Reasons for the Decision

MAIN REQUEST

1. Novelty

1.1 The appellant attacked the novelty of the product-by-process claims (claims 8 and 10) in view of D2.

1.2 D2 describes a method for producing a water-soluble dietary fibre composition, comprising the steps of:

(a) treating an aqueous dispersion of a gelatinised, milled, barley substrate with an α-amylase under conditions which will hydrolyse the substrate and yield a soluble fraction and an insoluble fraction;
(b) separating said soluble fraction from said insoluble fraction; and
(c) recovering from said soluble fraction a water-soluble dietary fibre composition substantially free of water-insoluble fibre. D2 describes whole or debranned flours of barley and oats as being of particular interest as starting materials (see page 4, lines 19 to 21 of D2), and claim 3 of D2 discloses whole barley flour as the barley substrate. The product resulting from the method of D2 is a hydrolysed soluble dietary fibre product.

1.3 Since claim 10 of the main request, relating to a soluble oat or barley flour, represents the broadest claim, it is discussed first. Claim 10 is a product-by-process claim. Thus, in addition to the product features "soluble oat or barley flour", only those limitations which are the inevitable result of carrying

out the method of claim 1 over its entire breadth can be considered to define the product of claim 10.

1.4 In the respondent's view the soluble oat or barley flour according to claim 10 of the main request being obtainable according to the method of claim 1 (as well as the food product or beverage according to claim 8) is novel in view of D2 for three reasons.

Firstly, claim 10 relates to a flour, whereas the method of D2 merely produces a powdery oligomeric fraction of an oat or barley substrate which, in the respondent's view, is not a flour. Secondly, the product according to claim 10 retains whole grain properties whereas in D2 the whole grains are processed to such an extent that the product can no longer be considered to have retained any whole grain properties. Thirdly, the degree of polymerisation typical of starch is retained in the product of claim 10 whereas in D2 starch is hydrolysed to such an extent that it exhibits a degree of polymerisation typical of an oligomer. Thus, the starch composition of the product of claim 10 differs from that in D2.

In the following, it will be assessed whether these three alleged differences ("flour", "whole grain properties" and "starch composition") can be acknowledged as difference(s) in view of D2.

1.5 "Flour"

In the respondent's view D2 merely discloses a powdery oligomeric fraction which does not qualify as a flour as defined in claim 10. It pointed out that a flour is typically obtained by milling grains, which is completely different compared with the product of D2.

In this context, there was common ground among the parties that whole grains in general are composed of endosperm, germ and bran.

In the board's view, the method of claim 1 of the main request indeed uses a whole oat or barley flour as the starting material, which can be considered a flour within the commonly accepted meaning set out above. However, this whole flour undergoes significant further processing in claim 1. To be more precise, it is first hydrolysed in a preconditioner and hydrolysed further in an extruder. As a consequence, the resulting soluble oat or barley flour according to claim 10 (the final product resulting from the method of claim 1) can no longer be considered a flour within the commonly accepted meaning, but rather is considered to be hydrolysed flour or further-processed flour as in D2.

In view of the above, the mere terminology "soluble oat or barley flour" (emphasis added) in claims 1 and 10 cannot be acknowledged as a difference in view of the soluble dietary fibre product of D2. Thus, the board cannot agree with the respondent in this respect.

1.6 "Whole grain properties"

The respondent argued that when the method of claim 1 is carried out, the final product retains "whole grain properties" and that this is not the case in D2. As evidence to support this assertion, the respondent referred to declarations D01, D02 and D05 (including experimental data) which, in the respondent's view, demonstrate that the whole oat or barley flour is only modified to a minor extent in the method of claim 1, thus retaining its whole grain properties or whole grain status.

For the following reasons, the board cannot accept this conclusion.

First of all, it should be noted that there is no accepted and precise definition of "whole grain properties", so it is ambiguous what this means exactly, regardless of the fact that these properties are at least not explicitly referred to in the claims.

Since no amount of time is specified for the preconditioning step of claim 1, it could be carried out for a rather long period of time, which inevitably leads to a loss of "whole grain properties", in particular in relation to the hydrolysis of starch as an essential component. In this context, the respondent submitted that the term "an effective amount of time to begin to hydrolyze the starch molecules in the oat or barley flour" in claim 1 implied that this step was only carried out for a short period of time. In the absence of any time requirement or degree of starch hydrolysis at the end of the preconditioning step, the board finds this assertion unconvincing.

Moreover, the enzyme concentration is not defined in claim 1 of the main request. There is no doubt that the α-amylase concentration (α-amylase being the enzyme) significantly influences the properties of the final product, particularly the degree of starch hydrolysis. As a matter of course, enzymes at higher concentrations will hydrolyse starch more rapidly than at lower concentrations.

In addition, the type of extruder and the shear conditions in the extruder are not limited in claim 1. It can be taken from paragraph [0023] of the patent

that any suitable extruder may be used, with the screw speed being not limited. As can also be taken from paragraph [0021] of the patent, high shear can dextrinise the starch, reducing its molecular weight. In the absence of any definition of the shear conditions in the extruder in claim 1, claim 1 also encompasses those high-shear conditions. The patent itself confirms that those high-shear extrusion conditions lead to a significant reduction in the starch's molecular weight. Thus, the respondent's view that the product resulting from the method of claim 1 necessarily leads to a degree of polymerisation typical of starch cannot be accepted due to the lack of any definition in claim 1 of the extruder type and the shear conditions.

The experimental data (D01, D02 and D05) were only carried out for a very specific concentration of 0.075 wt% α-amylase as the enzyme. As outlined above, the amount of enzyme is not defined in claim 1 and it is apparent that a higher enzyme concentration significantly influences the properties of the resulting product, in particular leading to more rapid hydrolysis of starch. In the experimental data no time is given for the preconditioning step. It is apparent that the amount of time taken for said step also significantly influences the final properties of the product. Thus, D01, D02 and D05 are not capable of showing that "whole grain properties" are maintained for any reasonable enzyme concentration and any reasonably conceivable process conditions, in particular in the preconditioning step, covered by claim 1.

Given that neither the time in the preconditioning step nor the enzyme concentration is limited, neither the

extruder type nor the shear conditions in the extruding step are further defined, and claim 1 does not require a final deactivation of the enzyme, it cannot be acknowledged that the product of claim 10 (i.e. resulting from the method of claim 1) necessarily retains "whole grain properties", bearing in mind that the latter term is also ambiguous.

Thus, it cannot be concluded that "whole grain properties" qualifies as a distinguishing feature in view of D2.

1.7 "Starch composition"

When assessing the issue of "starch composition" (i.e. the degree of polymerisation of starch or the degree of hydrolysis of starch), the conclusions reached under point 1.6 above apply analogously to the assessment of the "starch composition", since the respondent's argument in relation to retaining "whole grain properties" mainly relied on maintaining the properties of starch.

As outlined under point 1.6 above, the amount of time in the preconditioning step, the extruder type and the shear conditions in the extruding step in claim 1 significantly influence the degree of starch hydrolysis and the degree of polymerisation of starch. In addition, in the absence of a final deactivation of the enzyme in claim 1, the hydrolysis of starch may continue even after the extrusion step. Moreover, the α-amylase concentration (which is not limited in claim 1) significantly influences the degree of starch hydrolysis, i.e. the degree of polymerisation. It is apparent that a higher concentration of this enzyme leads to more rapid hydrolysis of starch and thus may

break down its molecular weight into oligomers or even sugars.

In view of the breadth of method claim 1, the product of claim 10 does not necessarily retain a degree of polymerisation typical of starch. Thus, a different "starch composition" as a potential difference in view of the product of D2 cannot be acknowledged.

1.8 The respondent further mentioned that the method of claim 1 may also result in remaining insoluble fibres coming from whole grains of oat or barley, whereas those insoluble fibres are separated in D2. In this context, the respondent did not argue that insoluble fibres are the inevitable result when carrying out the method of claim 1 over its entire breadth. In view of the breadth of the method of claim 1, the board is unable to see how such insoluble fibres are necessarily produced when the claimed method is carried out. In addition, construing claim 1 so as to relate to a method resulting in flour comprising insoluble fibres would go against the wording of claim 1, which refers to the production of "soluble oat or barley flour" (emphasis added by the board).

In view of the above, it is concluded that D2 discloses a soluble product falling within the scope of claim 10. Thus, the subject-matter of claim 10 of the main request is not novel in view of D2.

2. Since the respondent withdrew the first and second auxiliary requests, the next request to be discussed is the third auxiliary request, which only contains method claims.

THIRD AUXILIARY REQUEST

3. Sufficiency

3.1 The appellant challenged sufficiency of disclosure, contending particularly that there was no real example demonstrating the method of the invention, the amount and type of the enzyme was a critical issue and there was no indication in the patent about the feature "effective amount of time to begin to hydrolyze the starch molecules in the oat or barley flour" of claim 1. In the appellant's view claim 1 covers an undefined degree of hydrolysis of the starch molecules and the term "whole" in claim 1 is not defined. Thus, the appellant argued that the invention was not reproducible without undue burden.

3.2 Although the patent does not contain a working example implementing all the features of claim 1, example 1 of the patent mentions a specific flour mix formula for an extrusion process, including the amount of whole oat flour and α-amylase as well as the source of α-amylase (Valley Research - Validase® BAA 1000L), as the starting material. In addition, the method of claim 1 is defined sufficiently precisely, with whole oat or barley flour and an enzyme solution including α-amylase being stated as the starting materials to form an enzyme starting mixture having a moisture level of 25 to 40%. Method claim 1 further mentions temperature conditions in the preconditioning step and the extruding step. In addition, the description gives further explanations with respect to the starting materials and process conditions. Thus, a skilled person has no difficulty in selecting an appropriate enzyme starting mixture and following the method steps of claim 1.

The degree of starch hydrolysis is not limited in claim 1. However, this concerns the breadth of claim 1 and not sufficiency under Article 83 EPC. Moreover, the other arguments directed to the amount and type of enzyme, the effective amount of time to begin to hydrolyse starch and the term "whole" relate only to the breadth of the claimed subject-matter or questions of clarity.

An objection of lack of sufficient disclosure presupposes that there are serious doubts substantiated by verifiable facts. However, the appellant did not provide any such verifiable facts to support its assertions. Thus, the board agrees with the finding of the opposition division, including the basic reasoning that the invention is sufficiently disclosed (see points 5.1.4 to 5.2.4 of the decision).

In view of the above, the requirement of sufficiency of disclosure set forth in Article 83 EPC is met.

4. Inventive step

4.1 In the written appeal proceedings, the appellant used D1, D2 and D3 as closest prior-art documents. In the oral proceedings before the board, it only relied upon D2 as the closest prior art and raised inventive step objections against claim 1 of the third auxiliary request in view of D2 as the closest prior art alone or in combination with either exhibit 5 of document D02 or D10.

In the following, D2 is taken as the closest prior art. However, since D1 and D3 uncontestedly contain similar teachings to D2, the reasons set out below apply

mutatis mutandis to the assessment of inventive step when starting from D1 or D3 as the closest prior art.

4.2 The appellant acknowledges that the subject-matter of claim 1 differs from D2 in that D2 does not disclose:

- the moisture level of 25 to 40% of the enzyme starting mixture (instead, D2 describes 60% or more); and

- a "second heating" carried out at 60-121.1°C (instead, D2 describes heating to 140°C in the steam injection pressure cooker).

4.3 In addition, the board notes that D2 does not disclose any extrusion process. As a consequence, D2 also fails to disclose the specific residence time of 1 to 1.5 minutes in the extruder.

4.4 Even assuming, in the appellant's favour, that no effect resulting from the distinguishing features was shown compared with D2 and thus that the objective technical problem to be solved was merely the provision of an alternative method for producing a soluble oat or barley flour, the method of claim 1 involves an inventive step in view of D2 as the closest prior art for the following reasons.

4.4.1 There is no teaching whatsoever in D2 to contemplate an extrusion step. In addition, D2 does not give any hint or suggestion to reduce the amount of water in the process. Thus, for this very reason, D2 fails to render the claimed method obvious.

4.4.2 The appellant used exhibit 5 of document D02 as a disclosure to be used in combination with document D2.

However, exhibit 5 of D02 does not mention any extrusion step either. For this reason, exhibit 5 of document D02 cannot give any hint towards contemplating an extrusion step. Thus, the attack in view of D2 in combination with exhibit 5 of D02 fails.

4.4.3 The appellant also used D10 as a document to be combined with D2 in order to provide a disclosure with respect to carrying out an extrusion step and the required water content.

In this context, it should be noted that D2 relates to a method which is carried out in an aqueous slurry having a rather low solid content of about 10 to 40 wt% whereas the extrusion cooking process of D10 is a different type of process requiring a significantly higher solid content. Thus, in the board's view a skilled person having knowledge of D2 would not take D10 into consideration. Even if the skilled person did consider D10, the document clearly fails to teach the combination of a preconditioning step to begin hydrolysing the starch with a downstream extrusion step in which starch hydrolysis is continued and the mixture is gelatinised and cooked. In addition, D10 is silent with respect to the residence time of 1 to 1.5 minutes in the extruder. In this context, the appellant alleged that this residence time was a standard residence time in an extruder. However, no evidence was submitted to support this assertion. Thus, the board concludes that D10 also fails to provide a hint towards the claimed method, in particular in view of the sequence of the two process steps required in claim 1 and the residence time in the extruder.

4.5 In view of the above, the claimed method is at least a non-obvious alternative in view of D2 as the closest prior art.

Thus, the subject-matter of claim 1 of the third auxiliary request involves an inventive step in view of D2 as the closest prior art, taken alone or in combination with either exhibit 5 of document D02 or D10. The same applies to dependent claims 2 to 5, method claim 6, which refers back to the method of claim 1, and claims 7 and 8, which are dependent on claim 6.

5. The respondent submitted description pages 3 to 6 (filed at the oral proceedings before the board) replacing all description pages of the patent. Neither the appellant nor the board had any objections regarding the adaptation of the description to the method claims according to the third auxiliary request. The requirement of Article 84 EPC is fulfilled.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the opposition division with the order to maintain the patent as amended in the following version:

Description:
Pages 3 to 6 received during the oral proceedings on 20 February 2020.

Claims:
No. 1 to 8 of the Third Auxiliary Request filed on 15 August 2016 with the reply to the statement setting out the grounds of appeal.

The Registrar: The Chair:

K. Exner A. Haderlein

Decision electronically authenticated