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**Datasheet for the decision  
of 7 June 2021**

**Case Number:** T 1698/16 - 3.3.08

**Application Number:** 08783433.9

**Publication Number:** 2188381

**IPC:** C12P19/02, C12P19/14, C12N9/42

**Language of the proceedings:** EN

**Title of invention:**  
ENZYMATIC HYDROLYSIS OF LIGNOCELLULOSIC FEEDSTOCKS USING  
ACCESSORY ENZYMES

**Patent Proprietor:**  
Iogen Energy Corporation

**Opponent:**  
Danisco US Inc.

**Headword:**  
Accessory enzymes/IOGEN

**Relevant legal provisions:**  
EPC Art. 54, 56, 83, 84, 87, 100(a), 100(b), 100(c), 123(2),  
123(3)

**Keyword:**

Main request (patent as granted) - sufficiency of disclosure -  
(yes)

Novelty - (yes)

Inventive step - (no) - problem not solved over the whole  
scope of the claims

Auxiliary request 9 - requirements of the EPC fulfilled -  
(yes)

**Decisions cited:**

T 0409/91, T 2290/12, T 0646/13, T 0524/17

**Catchword:**



**Beschwerdekammern**

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**Chambres de recours**

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Case Number: T 1698/16 - 3.3.08

**D E C I S I O N**  
**of Technical Board of Appeal 3.3.08**  
**of 7 June 2021**

**Appellant:** Iogen Energy Corporation  
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**Decision under appeal:** **Decision of the Opposition Division of the  
European Patent Office posted on 19 May 2016  
revoking European patent No. 2188381 pursuant to  
Article 101(3) (b) EPC.**

**Composition of the Board:**

**Chairman** B. Stolz  
**Members:** M. R. Vega Laso  
R. Winkelhofer

## Summary of Facts and Submissions

I. European patent No. 2 188 381 with the title "Enzymatic hydrolysis of lignocellulosic feedstocks using accessory enzymes" was granted from the European application No. 08783433.9 which was filed under the Patent Cooperation Treaty (PCT) claiming the priority of the US provisional application No. 60/969,046. The application was published as WO 2009/026722. In the present decision, references to the "application as filed" are to the WO publication.

II. Claim 1 of the patent as granted reads as follows:

"1. A cellulase enzyme mixture for hydrolyzing a pretreated lignocellulosic feedstock to soluble sugars, the cellulase enzyme mixture comprising an EG4 accessory enzyme present at a fractional concentration ( $f_{EG4}$ ) of 0.25 to 0.83 (w/w), a Swollenin accessory enzyme present at a fractional concentration ( $f_{Swol1}$ ) of 0.15 to 0.66 (w/w), and a Cip1 accessory enzyme present at a fractional concentration ( $f_{Cip1}$ ) of 0 to 0.33 (w/w), wherein each fractional concentration is measured relative to all of the EG4, Swollenin and Cip1 accessory enzymes present in the cellulase enzyme mixture"

Dependent claims 2 to 12 relate to embodiments of the cellulase enzyme mixture of claim 1. Independent claim 13 is directed to a process for converting a pretreated lignocellulosic feedstock to soluble sugars. Independent claims 14 and 15 relate to methods for producing the claimed cellulase enzyme mixtures.

- III. The patent was opposed on the grounds for opposition of Article 100(a) in conjunction with Articles 54 and 56; 100(b) and 100(c) EPC.
- IV. By a decision dated 19 May 2016, the patent was revoked. The opposition division found that the ground for opposition of Article 100(b) EPC prejudiced the maintenance of the patent as granted and that, for the same reasons given for the main request, the invention as claimed according to each of the auxiliary requests 1 to 6 then on file did not meet the requirements of Article 83 EPC.
- V. The reasons given by the opposition division for the finding on Article 100(b) EPC can be summarized as follows: there were no doubts that a person skilled in the art would be able to produce the claimed cellulase enzyme mixture using a purified and clearly defined starting material. However, the skilled person could not determine without undue burden whether or not a given cellulase enzyme mixture was within the scope of the claims (see section 25 of the decision). Since an improved activity could be seen as an inherent feature of the claimed mixture and the assay to analyse the improved activity was not reliably reproducible, it was not possible to establish the scope of the claims without undue burden (see sections 26 to 28 of the decision). Thus, the claimed invention was not disclosed in the patent as granted in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art.
- VI. The patent proprietor (appellant) filed an appeal and submitted a statement setting out the grounds of appeal

including new evidence and nine sets of claims as main request and auxiliary requests 1 to 8.

VII. The opponent (respondent) replied to the statement of grounds of appeal and filed additional evidence.

VIII. On 13 October 2017, the appellant filed observations, further evidence, and an additional set of claims as auxiliary request 9.

IX. Amended claim 1 of the auxiliary request 9 reads as follows:

"1. A cellulase enzyme mixture for hydrolyzing a pretreated lignocellulosic feedstock to soluble sugars, the cellulase enzyme mixture comprising an EG4 accessory enzyme present at a fractional concentration ( $f_{EG4}$ ) of 0.25 to 0.83 (w/w), a Swollenin accessory enzyme present at a fractional concentration ( $f_{Swo1}$ ) of 0.15 to 0.66 (w/w), and a Cip1 accessory enzyme present at a fractional concentration ( $f_{Cip1}$ ) of 0 to 0.33 (w/w), wherein each fractional concentration is measured relative to all of the EG4, Swollenin and Cip1 accessory enzymes present in the cellulase enzyme mixture, wherein the cellulase enzyme mixture comprises CBH1, CBH2, EG1 and EG2 primary cellulase enzymes, wherein the primary cellulase enzymes have a combined content within the cellulase enzyme mixture of 70 to 95 weight percent, and wherein the EG4, Swollenin and Cip1 enzymes have a combined content within the cellulase enzyme mixture of 5 to 30 weight percent, each weight percent measured relative to the primary cellulase enzymes and the EG4, Swollenin and Cip1 enzymes present in the cellulase enzyme mixture, and

wherein the coding sequences for the primary cellulase enzymes and the EG4, Swollenin and Cip1 enzymes are from a *Trichoderma* ssp and wherein the EG4 is functionally linked to a carbohydrate binding module (CBM) with a high affinity for crystalline cellulose."

Dependent claims 2 to 7 relate to embodiments of the cellulase enzyme mixture of claim 1. Independent claim 8 is identical to claim 13 of the patent as granted. Except for the reference to claims 1 to 7 (instead of claims 1 to 12), independent claims 9 and 10 of auxiliary request 9 are identical to claims 14 and 15 of the patent as granted.

- X. Pursuant to their request, the parties were summoned to oral proceedings before the board.
- XI. In a communication sent in preparation for the oral proceedings, the board drew attention to matters which seemed to be of special significance and expressed a provisional opinion on some of the issues at stake. In particular, the board indicated that it did not agree with the reasons given by the opposition division for the adverse findings on sufficiency of the disclosure.
- XII. The respondent informed the board that it was not intended to attend the scheduled oral proceedings, and requested a decision based on the written submissions so far.
- XIII. Oral proceedings were held by videoconference on 7 June 2021 in the absence of the respondent. During the oral proceedings, the appellant withdrew the auxiliary requests 1 to 8.

XIV. The following documents are referred to in this decision:

- (1): US provisional application No. 60/969,046;
- (6): J. Schmidt *et al.*, 2001, Bioresource Technology, Vol. 76, pages 207 to 212;
- (7): US 2008/0057541 A1, published on 6 March 2008;
- (28): Declaration of Dr David Selinger, dated 2 September 2017; and
- (31): WO 2012/149344 A1, published on 1 November 2012.

XV. The submissions made by the appellant, insofar as relevant to the present decision, were essentially as follows:

*Main request (claims as granted)*

*Article 100(b) EPC - sufficiency of disclosure*

The patent disclosed the invention in a manner sufficiently clear and complete. The skilled person could readily determine whether a given enzyme mixture fell within the claims. The microorganisms likely to be used as a source of the accessory enzymes in a commercial setting were well characterized and presented no difficulties to the skilled person in terms of identification or quantification. Moreover, a variety of quantification techniques described in the literature, e.g., immunological detection by Western blotting or ELISA (as in Example 3 of the patent), one- and/or two-dimensional protein gel electrophoresis and mass spectrometry, or liquid chromatography-mass



spectrometry, were available to the skilled person for determining the composition of a cellulase enzyme mixture.

In the decision under appeal, the improved activity of the claimed enzyme mixtures had been regarded as an inherent feature of claim 1. The opposition division had erroneously found that the alleged contradiction between the data in the patent and the priority document revealed a problem with reliability and reproducibility of the assay for determining activity. However, whilst there were some differences in activity for individual enzyme mixtures between the two data sets, those differences were attributable to the inherent challenges in conducting enzyme assays on pretreated lignocellulosic biomass in small reaction volumes. Nevertheless, the microplate hydrolysis assays used in the examples of the patent were reliable, reproducible and endorsed in the technical literature. There was absolutely no reason to doubt that the assays described in the patent would allow the skilled person to determine whether or not a given enzyme mixture had improved activity.

*Article 100(a) in conjunction with Article 54 EPC - novelty*

In the decision under appeal, the opposition division had decided that the claims of the patent as granted were not entitled to the priority date of the US provisional application. The decision was incorrect and also lacked any relevance to the consideration of novelty or inventive step, because no prior art published between the priority date and the filing date of the patent had been cited.

*Article 100(a) in conjunction with Article 56 EPC -  
inventive step*

Starting from a commercial cellulase enzyme mixture like the "Benchmark Blend" used in the patent or Celluclast 1.5L, the problem to be solved was to provide a more effective means of breaking down lignocellulosic material into sugars. The solution was a cellulase enzyme mixture which comprised specific ranges of  $f_{EG4}$ ,  $f_{Swo1}$  and  $f_{Cip1}$ , as defined in the claims. There was no inconsistency between the data provided in the patent and the data in the priority application. The skilled person had no motivation to select accessory enzymes, over primary cellulases, for attention in devising a modified composition. Even if the skilled person could have tried to modify the fractional concentration of accessory enzymes, he/she had no expectation of arriving at the significantly improved activity achieved by the enzyme mixtures of the invention. Hence, the claimed enzyme mixtures involved an inventive step.

*Auxiliary request 9*

*Admittance into the proceedings*

The amendments introduced into the claims responded directly to the new submissions regarding *Trichoderma reesei* EG7, made by the respondent for the first time in the reply to the statement of grounds of appeal. Hence, the amended claims should be admitted.

*Articles 123(2) (3) and 84 EPC*

The subject-matter of the amended claims did not extend beyond the content of the application as filed. By

defining that the EG4 was functionally linked to a carbohydrate binding module (CBM) with a high affinity for crystalline cellulose, minor enzymes allegedly falling within the definition of "EG4", in particular EG7 were excluded.

The recitation of *Trichoderma* ssp. as the source for the accessory enzymes did not encompass heterologous expression of (non-fungal, non-*Trichoderma*) genes in *Trichoderma* ssp. It was clear from the wording "*the coding sequences for*" in amended claim 1 that only enzymes resulting from the expression of *Trichoderma* genetic material were meant. Hence, the clarity requirement of Article 84 EPC was fulfilled.

*Article 83 EPC - sufficiency of disclosure*

The invention as claimed was sufficiently disclosed in the application as filed. Claim 1 had been restricted to cellulase enzyme mixtures in which the source of accessory enzymes was *Trichoderma* ssp. Since *Trichoderma* was exceptionally well characterized and the genome sequence of many *Trichoderma* ssp. were available to the public, the already straightforward task of characterising a given enzyme mixture was made even simpler and any possible burden to the skilled person reduced. Moreover, the skilled person could readily determine whether a given enzyme mixture had improved activity, as disclosed in Examples 4 and 6 of the application as filed.

*Article 56 EPC - inventive step*

The subject-matter of the amended claim 1 involved an inventive step because cellulase enzyme mixtures having

the features specified in the claim were not obvious to a person skilled in the art.

XVI. The submissions made by the respondent in writing, insofar as relevant to the present decision, were as follows:

*Main request (claims as granted)*

*Article 100(b) EPC - sufficiency of disclosure*

Determining whether a given cellulase enzyme mixture fell within the scope of the claims of the patent as granted required the calculation of the fractional ratios of each of the accessory enzymes EG4, Swollenin and Cip1. This in turn required identification **and** detection of all the proteins in the mixture that fell under the extremely broad definitions provided in the patent. As stated in document (28), a person skilled in the art at the relevant date could not perform this analysis across the scope of the claims of the patent as granted. The claims were not limited in any way with respect to the enzyme source, and encompassed mixtures of enzymes from a great number of organisms for which genome sequence information was not available at the relevant date, making the task of even identifying all the relevant proteins impossible in practice.

The fractional ratios defined in the claims were *weight* ratios, yet the asserted advantage was improved *activity*. However, each protein falling within the broad patent definition of - for example - EG4 had a different level of activity per gram protein. Accordingly, there were serious doubts that the asserted improvement in activity would be observed for

all of the weight ratios encompassed by the granted claims.

Even for the tightly defined enzyme mixtures exemplified in the patent, repetition of the activity assay between the priority application and the patent produced datasets that were *prima facie* inconsistent. Statistical analysis did not support the appellant's assertion that the datasets were consistent and, even if they were, there were serious doubts that the resultant picture was consistent with the scope of the granted claims (which were based only on the patent dataset). Hence, the opposition division's finding that the invention was not sufficiently disclosed in the patent was correct.

*Article 100(a) in conjunction with Article 56 EPC - inventive step*

Whilst the opposition division had considered the contradiction between the activities reported for identical accessory mixtures in the opposed patent and the priority application under Article 83 EPC, the contradiction also had significant implications for Article 56 EPC.

*Auxiliary request 9*

The respondent did not submit any arguments on this request.

- XVII. The appellant requested that the decision under appeal be set aside and the opposition be rejected (main request), or that patent be maintained on the basis of auxiliary request 9 filed on 13 October 2017.

XVIII. The respondent requested in writing that the appeal be dismissed.

## **Reasons for the Decision**

### *Evidence filed in appeal proceedings*

1. The respondent requested that the documents filed by the appellant together with the statement of grounds of appeal not be admitted into the appeal proceedings, on the grounds that this evidence could have been filed in opposition proceedings, and that the amount of technical information submitted by the appellant ran contrary to the principle that the appeal should be based on the facts at first instance. Nevertheless, also the respondent filed numerous documents and requested their admittance.
2. In appeal proceedings, everything presented by the parties together with the statement of grounds of appeal or the written reply has to be taken into account by the board if and to the extent it relates to the case under appeal and meets the requirements in Article 12(2) RPBA 2020. However, the board has the discretionary power to hold inadmissible facts, evidence or requests which could have been presented in the first instance proceedings (see Article 12(4) RPBA 2007 which applies to the present case by virtue of Article 25(2) RPBA 2020).
3. The evidence filed by the appellant together with the statement of grounds of appeal addresses the opposition division's adverse findings on the objection under Articles 100(b) and 83 EPC in the decision under appeal (see section V. above). These findings deviated from

the provisional opinion expressed by the opposition division in the communication attached to the summons to oral proceedings, in which the opposition division held that the objection of lack of sufficient disclosure raised by the opponent (the present respondent) was in fact "*... an Article 84 EPC objection, which is not a ground of opposition*", and that, since no verifiable facts had been provided for substantiating the objection, the requirement of sufficient disclosure was - provisionally - regarded as fulfilled.

4. The board holds that, while the patent proprietor (the present appellant) could, in principle, have submitted additional evidence in opposition proceedings, in the light of the opposition division's views on the objections under Article 83 EPC, there was no compelling reason to do so. As the opposition division finally decided adversely on Article 83 EPC, the statement of grounds of appeal represented the first opportunity for the appellant to file evidence in response to the findings in the decision under appeal. In view of the circumstances above, the evidence submitted by the appellant together with the statement of grounds of appeal was admitted and considered in the appeal proceedings.
5. Since it would not be equitable to admit the documents filed by the appellant whilst denying the respondent the opportunity to respond by submitting new evidence, also the documents filed together with the respondent's reply were admitted and considered in the appeal proceedings.

*Main request (patent as granted)*

*Article 100(c) EPC*

6. The opposition division's finding that the subject-matter of the claims of the patent as granted does not extend beyond the content of the application as filed (see section 17 of the decision under appeal) was not contested in appeal proceedings.

*Article 100(b) EPC*

7. The board shares the opposition division's view that there are no serious doubts that a person skilled in the art was able to obtain the claimed cellulase enzyme mixtures relying on the disclosure in the examples of the patent, i.e. by combining purified EG4, Swollenin and Cip1 enzymes at fractional concentrations in the ranges specified in claim 1.
8. However, the board disagrees with the opposition division's view that the ability of the skilled person to establish whether or not a particular enzyme mixture falls within the scope of the claims is a requirement for sufficient disclosure within the meaning of Articles 100(b) and 83 EPC. Even though this view was held in some earlier decisions of the Boards of Appeal (e.g. decision T 409/91, OJ EPO 94, 653 to which the opposition division referred in its decision), it is the current prevailing view in the jurisprudence of the Boards that the definition of the "forbidden area" of a claim is associated with the scope of the claims, i.e. Article 84 EPC, and should not be considered as a matter related to Articles 83 and 100(b) EPC (see, e.g., decisions T 2290/12 of 13 October 2016, point 3.1 of the reasons; T 646/13 of 28 July 2017, point 4.3;



and T 524/17 of 11 October 2019, point 2.2.3). Whilst Article 84 EPC is not a ground for opposition, the scope of the claims may still be considered when assessing inventive step, in particular in connection with the question whether or not the purported technical problem is solved over the whole scope of the claims.

9. Nor does the board concur with the opposition division's view that the reliability of the assay is an issue to be considered for the assessment whether the patent as granted discloses the invention in a manner sufficiently clear and complete for a person skilled in the art to carry out the invention without undue burden. In the present case, this issue is rather associated with the question whether the purported technical effect underlying the invention, i.e. an improved hydrolytic activity, is credibly achieved over the whole scope of the claims, a question which is relevant to inventive step, rather than sufficiency of disclosure.

10. Thus, Article 100(b) EPC does not prejudice the maintenance of the patent as granted.

*Article 100(a) in conjunction with Article 54 EPC*

*Article 87 EPC - validity of the priority*

11. Since the patent was revoked on the ground for opposition of lack of sufficient disclosure, the opposition division did not decide whether the claimed subject-matter was novel. Nevertheless, the opposition division decided that no priority right could be validly claimed from US provisional application No. 60/969,046 (document (1) in these proceedings) for

the subject-matter of claims 1 and 2 because the fractional concentrations recited in these claims were not disclosed in the priority application.

12. The board shares the opposition division's view. Contrary to the appellant's allegation, paragraph [0048] of the priority application does not disclose the specific ranges of the fractional concentration for EG4 or Swollenin recited in claims 1 and 2. In this paragraph, eighteen different fractional concentrations for EG4 are disclosed, among them 0.25, the lower value of the range specified in claim 1. However, there is no explicit or implicit disclosure of the upper value of the range (0.83), let alone any pointer to the specific range. Similarly, among the eighteen fractional concentrations disclosed in the same paragraph for Swollenin, the lower value of the range specified in claim 1 for this enzyme is found. However, neither the upper value nor any range are disclosed.
13. Since the priority right is not valid, the relevant date for determining what is comprised in the state of the art is the filing date (Article 54(2) EPC). Hence, the content of document (7), which was published before the filing date of the present patent, forms part of the state of the art.
14. Document (7) describes a cellulase enzyme mixture comprising primary CBH1 and CBH2 cellobiohydrolases and EG1 and EG2 endoglucanases at the specific fractional concentrations recited in claims 17 to 23 (see pages 14 and 15 of document (7)). However, whilst it is stated in paragraph [0039] that the cellulase enzyme mixture may comprise additional cellulases as well as  $\beta$ -glucosidase enzyme components, document (7) does not

describe the accessory enzymes EG4, Swollenin and Cip1 recited in claim 1 of the patent as granted, let alone their fractional concentrations. Hence, the subject-matter of independent claim 1 and dependent claims 2 to 12 is novel over document (7).

15. No further documents of the state of the art are on file that would anticipate the invention. Consequently, the claimed subject-matter is novel.

*Article 100(a) in conjunction with Article 56 EPC - inventive step*

16. In the decision under appeal, also inventive step was not assessed. In opposition proceedings, the opponent (the respondent in appeal) argued that document (6), which describes a cellulase enzyme preparation named "Celluclast 1.5L", represented the closest state of the art. However, in the communication in preparation of the oral proceedings the opposition division expressed the provisional view that the most promising starting point for the assessment of inventive step was the "Benchmark Blend" used in the examples of the patent as granted for comparison with the cellulase enzyme mixtures of the invention. The enzyme mixture of claim 1 differs from each of the Celluclast and "Benchmark Blend" enzyme mixtures in that it comprises less Cip1 or no Cip1 at all.

17. According to the patent, the problem to be solved by the invention is the provision of an improved enzyme mixture for the enzymatic hydrolysis of a lignocellulosic feedstock.

18. In connection with the objection under Article 100(b) EPC, the respondent disputed that this

problem is solved over the whole scope of the claims, and based the objection on, *inter alia*, the breadth of the definitions of EG4, Swollenin and Cip1 in paragraphs [0039] to [0041] of the patent and, as a consequence of the definition of the claimed mixtures based on the fractional concentration of each accessory enzyme in "w/w", the possibility that mixtures having the same fractional ratios of accessory enzymes may have significantly different activity levels which are not necessarily improved in comparison with the prior art.

19. Claim 1 is not restricted to cellulase enzyme mixtures comprising accessory enzymes from a particular source. According to the definition provided in paragraph [0039] of the patent, the EG4 accessory enzyme can be any protein, polypeptide or fragment thereof having as little as 40% amino acid sequence identity to a highly conserved sequence of 20 amino acids (amino acids 144 to 163) of the EG4 enzyme of *Trichoderma reesei* with the GenPept accession No. CAA71999. The same degree of sequence identity to a particular Cip1 enzyme from *Trichoderma reesei*, but over a substantially longer amino acid sequence (amino acids 1 to 212) is required for Cip1 (see paragraph [0041] of the patent). While in Tables 1 and 3 of the patent proteins from various microorganisms that have at least 40% amino acid sequence identity to, respectively, EG4 and Cip1 are listed, there is no evidence on file, either in the patent itself or in any post-published document that an enzyme mixture comprising any of these proteins in combination with the other two accessory enzymes at the fractional concentrations specified in claim 1 provides an improved enzyme mixture for the enzymatic hydrolysis of a lignocellulosic feedstock. Each of the enzyme mixtures tested in the examples of the patent comprise

the same three specific accessory proteins from *Trichoderma reseei*.

20. The respondent pointed to the fact that, while the alleged technical effect underlying the invention is an improved cellulase activity of the enzyme mixtures, in claim 1 fractional concentrations of the accessory enzymes are expressed as weight ratios. However, as shown by document (31) two different enzymes falling under the definition of EG4 provided in the patent may have different specific activities (i.e. cellulase activity per weight of protein). This means that the fractional concentration ranges specified in claim 1 in which the specific accessory enzymes used in the examples of the patent achieve an improvement, do not necessarily apply to each and any combination of enzymes falling under the broad definitions provided in the patent. The appellant's argument that, within a given set of experiments, a skilled person would use the same enzyme preparations, is not persuasive in this context.
  
21. More importantly, as the appellant also stated, accessory enzymes often work by enhancing the activity of primary cellulases, rather than by exhibiting significant independent cellulase activity of their own. However, claim 1 does not specify any particular ratio between primary and accessory enzymes. In the board's view, it is not plausible that cellulase enzyme mixtures as defined in claim 1 would show an improved cellulase activity at any possible ratio between primary and accessory enzymes.
  
22. For these reasons the problem of providing cellulase enzyme mixtures with improved hydrolytic activity is not plausibly solved over the whole scope of the

claims. Hence, the problem needs to be formulated less ambitiously as the provision of alternative cellulase enzyme mixtures.

23. Starting from Celluclast 1.5L or the "Benchmark Blend", a skilled person in the field of cellulose conversion to soluble sugars could modify the composition of cellulase enzyme mixture by omitting enzymes without significant cellulase activity, reducing the amount of a particular enzyme added to the mixture, or changing the ratio between the different enzymes. In the absence of any advantageous effect on cellulase activity, the selection of the particular combination of accessory enzymes EG4, Swollenin and Cip1 in the fractional concentrations ranges specified in claim 1 among equally obvious alternative variations, is arbitrary and does not involve any inventive skills.
24. Since the subject-matter of claim 1 lacks an inventive step, the ground for opposition of Article 100(a) EPC prejudices the maintenance of the patent as granted.

*Auxiliary request 9*

*Admittance into the appeal proceedings*

25. The set of claims of auxiliary request 9 was filed by the appellant in response to new submissions regarding *Trichoderma reesei* EG7 made by the respondent in the reply to the statement of grounds of appeal. The respondent did not raise any procedural or substantive issues concerning this request and, in particular, did not oppose the admittance of the request into the proceedings. Since the request is *prima facie* allowable, this request was admitted and considered in the proceedings.

*Rule 80 EPC*

26. The amendments introduced into the claims are occasioned by the ground for opposition of Article 100(a) in conjunction with Article 56 EPC.

*Article 123(2) (3) EPC - added matter and scope of protection*

27. Amended claim 1 is derived from claim 26 of the application as filed in combination with claim 28 (primary enzymes) and claim 29 (ratio of primary enzymes to accessory enzymes). *Trichoderma* ssp. as a source of the coding sequences for the primary and accessory enzymes is disclosed in paragraphs [0024] and [0071] of the application as filed. The characterization of EG4 as functionally linked to a carbohydrate binding module (CBM) with a high affinity for crystalline cellulose is disclosed in the last sentence of paragraph [0038] of the application as filed. Hence, the subject-matter of amended claim 1 does not extend beyond the content of the application as filed (Article 123(2) EPC).
28. Claims 2 to 10 are identical to, respectively, claims 2, 5 to 8, and 12 to 15 of the patent as granted for which an objection under Article 100(c) EPC was not raised.
29. In amended claim 1, the features of claims 1, 3 and 4 of the patent as granted are combined with two features taken from the description. The introduction of these additional features into claim 1 does not result in an extension of the scope of protection conferred by the patent. Hence, Article 123(3) EPC is not contravened.

*Article 84 EPC - clarity*

30. The respondent did not raise any objection to the amended claims under Article 84 EPC, and the board sees no reason to raise any of its own motion.

*Article 83 EPC - sufficiency of disclosure*

31. The findings on the main request in paragraphs 6 to 8 above apply *mutatis mutandis* also to this auxiliary request. The requirement of sufficiency of disclosure is fulfilled.

*Articles 87 and 54 EPC - validity of the priority and novelty*

32. For the same reasons given in connection with claim 1 of the patent as granted (see paragraphs 11 to 14 above), the priority of the earlier US application cannot be validly claimed for the subject-matter of amended claim 1. Nevertheless, novelty is to be acknowledged because none of the documents of the state of the art on file anticipate the claimed subject-matter.

*Article 56 EPC - inventive step*

33. Starting from the "Benchmark Blend" as the closest state of the art (see paragraph 16 above), the problem to be solved by the invention as claimed is the provision of an improved enzyme mixture for the enzymatic hydrolysis of a lignocellulosic feedstock.
34. In view of the features introduced into claim 1 limiting its scope, and in the light of the evidence provided in the examples of the application as filed,



in particular Examples 4 to 6, this problem is solved by the claimed subject-matter.

35. The board shares the opposition division's provisional view expressed in the summons to the oral proceedings (see section 22 of the communication dated 24 July 2015) that none of the documents of the state of the art on file teaches or suggests that a reduction of the fractional concentration of Cip1 or even the omission of this accessory enzyme results in an improvement of the cellulase activity of the cellulase enzyme mixture. This result is somehow surprising because the production of Cip1 is induced by cellulose, which suggests that this protein may play a role in the breakdown of cellulose. Hence, a skilled person seeking to obtain an improved cellulase enzyme mixture would not have reasonably expected that this could be achieved by reducing the fractional concentration of Cip1 or omitting this accessory enzyme.
36. Since for the reasons given above the claimed cellulase enzyme mixtures are not obvious to a person skilled in the art, an inventive step is acknowledged.

## 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 on the basis of claims 1 to 10 of auxiliary request 9 as filed on 13 October 2017, and a description to be adapted.

The Registrar:

The Chairman:



L. Malécot-Grob

B. Stolz

Decision electronically authenticated