BESCHWERDEKAMMERN DES EUROPÄISCHEN PATENTAMTS

BOARDS OF APPEAL OF THE EUROPEAN PATENT OFFICE

CHAMBRES DE RECOURS DE L'OFFICE EUROPEEN DES BREVETS

Internal distribution code:
(A) [ ] Publication in OJ
(B) [ ] To Chairmen and Members
(C) [X] To Chairmen
(D) [ ] No distribution

Datasheet for the decision of 9 October 2006

Case Number: T 0030/02 - 3.3.08

Application Number: 92908166.9

Publication Number: 0579672

IPC: C12N 9/42

Language of the proceedings: EN

Title of invention:
Xylanase, corresponding recombinant DNA sequence, xylanase containing agent, and use of the agent

Patentee:
Novozymes A/S

Opponent:
Koninklijke DSM N.V.

Headword:
Xylanase/NOVOZYMES

Relevant legal provisions:
EPC Art. 54, 56, 123(2), 133, 134

Keyword:
"Objection to the change of representation by the appellant (overruled)"
"Added matter (no)"
"Novelty (yes)"
"Inventive step (yes)"

Decisions cited:
G 0002/88, G 0001/92, G 0004/97, G 0002/98, T 0012/81, T 0396/89, T 0923/92, T 0793/93

Catchword:
-

Europäisches Patentamt | European Patent Office | Office européen des brevets

Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0030/02 - 3.3.08

D E C I S I O N
of the Technical Board of Appeal 3.3.08
of 9 October 2006

Appellant: (Opponent)
Koninklijke DSM N.V.
P.O. Box 9
NL-6160 MA Geleen (NL)

Representative:
Bieberbach, Andreas
BASF Aktiengesellschaft
D-67056 Ludwigshafen (DE)

Respondent: (Patent Proprietor)
Novozymes A/S
Krogshoejvej 36
DK-2880 Bagsvaerd (DK)

Representative:
Thomas, Philip John Duval
Eric Potter Clarkson LLP
Park View House
58 The Ropewalk
Nottingham NG1 5DD (GB)

Decision under appeal: **Decision of the Opposition Division of the European Patent Office posted 5 November 2001 rejecting the opposition filed against European patent No. 0579672 pursuant to Article 102(2) EPC.**

Composition of the Board:

Chairman: L. Galligani
Members: M. R. Vega Laso
M. B. Günzel

Summary of Facts and Submissions

I. The appeal lies from the decision of the opposition division posted on 5 November 2001, concerning the European patent No. 0 579 672 (European application No. 92 908 166.9, filed on 27 March 1992 and published as WO 92/17573) with the title "Xylanase, corresponding recombinant DNA sequence, xylanase containing agent, and use of the agent".

II. The patent as granted contained 22 claims. Independent claims 1, 13 and 14 read:

"1. A recombinant DNA sequence encoding a xylanase which is capable of hybridizing to the following partial DNA sequence

```
1               5                   10                  15
ATG GTC TCG CTC AAG TCT GTC CTC GCG GCC GCC ACG GCT GTG AGC

                20                  25                  30
TCT GCC ATT GCT GCC CCT TTT GAC TTC GTT CCT CGG GAC AAC TCG

                35                  40                  45
ACG GCC CTT CAG GCT CGC CAG GTG ACC CCC AAC GCC GAG GGC TGG

                50                  55                  60
CAC AAC GGC TAC TTC TAC TCG TGG TGG TCC GAC GGC GGA GGC CAG

                65                  70                  75
GTT CAG TAC ACC AAC CTC GAG GGC AGC CGC TAC CAG GTC AGA TGG

                80                  85                  90
NNN AAC ACC GGC AAC TTC GTC GGT GGT AAG GGT TGG AAC CCG GGA

                95                  100                 105
ACC GGC CCC ACG ATC AAC TAC GGC GGC TAC TTC AAC CCC CAG GGC

                110                 115                 120
AAC GGC TAC CTG GCC GTC TAC GGC TGG ACC NNN AAC CCG CTC GTC

                125                 130                 135
GAG TAC TAT GTC ATC GAG TCG TAC GGC ACG TAC AAT CCC GGC AGC

                140                 145                 150
CAG GCT CAG TAC AAG GGC ACA TTC TAT ACC GAC GGC GAT CAG TAT

                155                 160                 165
GAC ATC TTT GTG AGC ACC CGT NNN AAC CAG CCC AGC ATC ACG GCA

                170
CCC GGA CGT CCA GCT AGT ACT      (SEQ ID No. 7)
```

under relatively stringent conditions (1.0 X SSC, 0.1% SDS, 65°C).

13. A method for production of a xylanase which method comprises cultivating the transformed host cell according to any of claims 9-12 and recovering the resulting xylanase from the resulting culture broth.

14. A xylanase encoded by the DNA sequence according to any of claims 1-6."

Dependent claims 2 to 6 were directed to various embodiments of the recombinant DNA sequence of claim 1. Claims 7 and 8 concerned vectors comprising the claimed DNA recombinant sequences, and claims 9 to 12 transformed hosts containing such vectors. Claims 15 to 18 were directed to agents containing a xylanase according to claim 14 or produced by a method according to claim 13, claim 18 being specifically directed to a baking agent. Claims 19 to 22 concerned various uses of the claimed agents.

III. The patent was opposed on the grounds of Article 100(a) and 100(c) EPC, in particular lack of novelty (Article 54 EPC), lack of inventive step (Article 56 EPC) and added matter (Article 123(2) EPC). Third party observations under Article 115 EPC were also received on 19 July 2001 drawing attention to documents D15 and D16 (cf. Section XVIII *infra*).

IV. In the decision under appeal, the opposition division found that the objections raised by the opponent under Article 123(2) EPC against claims 1 and 13 were not

well-founded, and that, with regard to the cited prior art, the subject-matter of claims 1 and 14 was novel. Furthermore, the claimed subject-matter was considered to involve an inventive step within the meaning of Article 56 EPC. Since in the view of the opposition division none of the alleged grounds of opposition prejudiced the maintenance of the patent, the opposition was rejected under Article 102(2) EPC.

V. The appellant (opponent) filed a notice of appeal and paid the corresponding fee. In the statement setting out the grounds of appeal, arguments were put forward in respect of the issues treated in the decision under appeal.

VI. The respondent (proprietor) filed a response to the grounds of appeal including new evidence concerning the novelty of claim 14.

VII. Oral proceedings pursuant to Article 116 EPC were requested by both parties in the event that the board did not intend to grant their respective requests.

VIII. On 15 October 2003, the appellant requested the transfer of the opposition to BASF AG, alleging that the business in the interests of which the opposition had been filed, was transferred to BASF AG as per the same date. As evidence for the transfer, BASF AG filed legalized copies of extracts of two agreements and requested its registration as opponent.

IX. The respondent submitted observations on the requested transfer of opposition.

X. In a communication dated 28 May 2004, the board drew attention to deficiencies in the evidence filed for the transfer of the opposition, and indicated that, until suitable evidence was received, the appeal proceedings would be continued with the original opponent and appellant as a party.

XI. On 9 August 2004, further evidence for the transfer was filed by the appellant. The respondent submitted observations.

XII. In a communication dated 26 November 2004, the parties were informed that the additional evidence submitted by the appellant was not considered to be a suitable proof of the alleged transfer of business assets. The board indicated that, unless the request for transfer of the opposition and, consequently, of the position as appellant in the appeal proceedings was withdrawn, further delay in the appeal proceedings was to be expected in view of the referral to the Enlarged Board of Appeal pending at the time under Ref. No. G 2/04, the result of which could be relevant to the decision concerning the transfer in the present case.

XIII. On 17 January 2006, BASF AG withdrew its request for registration as opponent.

XIV. The parties were summoned to oral proceedings. In a communication pursuant to Article 11(1) of the Rules of Procedure of the Boards of Appeal sent with the summons, the board indicated the questions which appeared no longer to be contentious and drew attention to the issues to be discussed at the oral proceedings, in particular the objection to claim 13 under

Article 123(2) EPC, the novelty of the subject-matter of claims 1 and 14 with regard to documents D16 and D11, respectively, and the issue of inventive step.

XV. In a letter dated 28 February 2006, the appellant informed the board of a change of representation and filed an authorisation for new representatives. The respondent submitted observations objecting to the change of representation.

XVI. Both parties filed observations in preparation for the oral proceedings. The respondent filed an auxiliary request and proposed various amendments to the claims as basis for further auxiliary requests.

XVII. Oral proceedings were held on 11 May 2006. During the proceedings two new auxiliary claim requests were filed to replace the auxiliary claim request on file. After discussion of the contentious issues with the parties and deliberation by the board, the chairman declared the debate on the main request closed and informed the parties that the proceedings were to be continued in writing.

XVIII. The following documents are referred to in the present decision:

D2: F.R. Holden and J.D. Walton, Physiological and Molecular Plant Pathology, Vol. 40, 1992, pages 39 to 47;

D3: V. Kitpreechavanich et al., J. Ferment. Technol. Vol. 62, No. 5, 1984, pages 415 to 420;

D4: L. Anand et al., Archives of Biochemistry and Biophysics, Vol. 276, No. 2, 1 February 1990, pages 546 to 553;

D5: U. Tatu et al., Journal of Protein Chemistry, Vol. 9, No. 5, 1990, pages 641 to 646;

D11: R. Monti et al., Can. J. Microbiol., Vol. 37, 1991, pages 675 to 681;

D12: NCBI Genbank, Accession Number AF155594, "Humicola grisea var. thermoidea beta-1,4-xylanase precursor (xyn2) gene, complete cds", submitted 1 June 1999;

D15: PCT/DK91/00379, filed on 4 December 1991;

D16: WO 93/11249, claiming priority *inter alia* from D15;

D18: Declaration of Prof Dr J.A. Jorge, dated 20 March 2002, including a copy of a database entry (ATCC Number 201802 "*Hormographiella* sp., deposited as *Humicola grisea* var. *thermoidea* Cooney and Emerson");

D19: Declaration of Dr Daison Olzany Silva including, *inter alia*, a copy of a database entry (ATCC Number 60849 "*Humicola* sp.");

D20: Copy of email correspondence between Dr Azevedo and Novozymes.

XIX. The submissions made by the appellant, as far as they are relevant to this decision, may be summarised as follows:

Representation of the appellant

The representatives appointed by the appellant were not acting as employees of BASF AG, but as professional representatives under Article 134 EPC.

Article 123(2) EPC - Claim 13

The feature "recovery" in claim 13 was used in a general context, without specifying further method steps and/or the host strain used. In contrast, in the application as filed recovery was mentioned in the context of recovering the *Humicola insolens* xylanase produced in *Aspergillus oryzae*, and only by reference to specific method steps. Thus, the step of "recovering the resulting xylanase from the resulting culture broth" in claim 13 was an impermissible generalization which offended against Article 123(2) EPC.

Novelty

Claim 1

Document D16 disclosed the same invention as the earlier application D15 and, thus, enjoyed its priority. The fact that the sequence of XYL 1 disclosed in D16 included two additional nucleotides as compared with the same sequence XYL 1 disclosed in D15, did not make it a different molecule. A DNA molecule of which a partial nucleotide sequence had been determined did not materially change if the sequence of additional nucleotides was determined. Both Figure 9 in D15 and SEQ ID NO 13 in D16 related to a partial DNA sequence

that was obtained by sequence analysis of the same DNA insert. Since the nucleotide sequence was an inherent feature of an isolated DNA fragment, the fact that two nucleotides had been additionally analysed in this particular DNA fragment changed neither the chemical composition nor the sequence of the cloned DNA fragment.

Document D16 related to a method for expression cloning in yeast and to xylanase and cellulase genes obtained by that method. The features of the method of expression cloning were described in D16 on page 2, lines 11 to 26 and recited in claim 1. On page 2, lines 10 to 24 and in claim 1 of the priority document D15 the same features were described and claimed. As seen by the opposition division, the methods disclosed in document D16 enjoyed the priority of D15 and the clones obtained in D16 were the same as in D15. In particular, the xylanase clones XYL 1, XYL 2 and XYL 3 as disclosed in D16 (page 21, lines 31 to 37) were also disclosed in D15 (page 16, lines 29 to 35). These xylanase clones were characterized by their partial DNA sequence (Figures 9, 10 and 11 in D15, and SEQ ID NOs 13, 14 and 15 in D16). Contrary to the view of the opposition division, deposition of the clones disclosed in D15 was not required for the skilled person to obtain a DNA fragment containing the XYL 1 gene, because the DNA sequence shown in Figure 9 of D15 combined with the availability of the source organism provided an enabling disclosure.

Thus, document D16 enjoyed the claimed priority and it was citable prior art under Article 54(3) EPC. The recombinant DNA molecule disclosed therein encoded a xylanase and hybridized under the stated conditions to

the SEQ ID NO. 7 referred to in claim 1 and therefore anticipated the subject-matter of this claim.

Claim 14

Having regard to the nucleotide and amino acid sequences disclosed in the post-published document D12, it appeared that the xylanase from *Humicola grisea* var *thermoidea* was highly homologous to the xylanase isolated from *Humicola insolens*. Due to this high homology, the purified xylanase protein from *H. grisea* var *thermoidea* described in document D11 fell within the scope of claim 14. Contrary to the opposition division's view, there were only minor differences between the xylanase sequences from different strains, and these differences would not have any effect on their hybridisation behaviour.

Inventive step

In view of the arguments presented under novelty, D11 was also citable against the inventive step of claims 1 to 5. Claims directed to a gene sequence were not inventive if the purified protein encoded by said gene was part of the state of the art. The additional features in the dependent claims were all features either commonly known to the skilled person or disclosed in the cited documents. The combination of these additional features with subject-matter that was not novel and/or not inventive resulted in claims that lacked inventive step.

XX. The submissions of the respondent may be summarized as follows:

Representation of the appellant

By changing representation to BASF employees, the appellant and BASF AG were clearly seeking to achieve the desired effect of the transfer of the opposition and thereby get around the refusal of the transfer by the board. It was clear that the appellant's involvement in the proceedings had come to an end, and that it was only acting as a "man of straw" for the real opponent and appellant, namely BASF AG. The appointment of the new representatives amounted to an abuse of procedure.

Article 123(2) EPC - Claim 13

It was clear from page 12, lines 10 to 13 of the application as filed that Examples 1 and 2 served to illustrate the production and purification (recovery) of xylanase. Hence, a skilled person would not understand from the application as filed that only purification/recovery according to the specific examples was intended to fall within the scope of the invention.

Novelty

Claim 1

D15 was not citable under Article 54(3) EPC and D16 was only citable in respect of subject-matter entitled to the priority from D15. The facts in the present case

were very different from those underlying the decision G 1/92 (OJ EPO 1993, 277), because the chemical composition in question (clone XYL 1) was not publicly available.

The general teaching of document D16 concerning the cloning and screening method as described in Example 1 enjoyed the claimed priority. However, the disclosure of this method was not prejudicial to the novelty of claim 1 because its outcome was unpredictable.

Claim 14

The appellant had completely failed to discharge the onus on it to provide evidence to support its assertions. The evidence relied on by the appellant was incomplete, unclear and riddled with inconsistencies. It was clear from documents D18, D19 and D20 that no link whatsoever existed between D11 and D12. Accordingly, the lack of novelty argument had to fail.

Inventive step

The appellants arguments on inventive step were totally dependent on the argument that D11 and D12 were linked because they related to the same organism. Since D18, D19 and D20 showed that no link existed, the objection of lack of inventive step had to fail for the same reasons.

XXI. With regard to the main request and the first auxiliary request of the respondent, the appellant requested that the decision under appeal be set aside and the patent be revoked. With regard to the respondent's second

auxiliary request, the appellant declared that it had no objections against the said request.

XXII. The respondent requested that the appeal be dismissed or, in the alternative, that the decision under appeal be set aside and the patent be maintained on the basis of either the first or the second auxiliary request filed during the oral proceedings before the board.

Reasons for the Decision

Objection to the change of representation by the appellant

1. The objections raised by the respondent concerning the appointment of new representatives of the appellant cannot be accepted. The representatives appointed by the appellant are professional representatives within the meaning of Article 134 EPC whose names appear on the list maintained by the European Patent Office and, therefore, according to Article 134(4) EPC they are entitled to act in all proceedings established by the European Patent Convention, in particular in appeal proceedings.

2. A party to proceedings before the boards of appeal is, in principle, free to choose its representatives among those who appear in the list of the European Patent Office, as no limitation of this choice can be derived from Articles 133 and 134 EPC or the Implementing Regulations to these Articles. The circumstances of the present case do not justify departing from this principle, even if, as the respondent contends, the opponent and appellant in this case were now acting as

a "man of straw" for the legal person in respect of which the transfer of the opposition had been requested in appeal proceedings. The board fails to see in the behaviour of the present appellant a circumvention of the law by abuse of due process (cf. decision G 4/97; OJ EPO 1999, 245). The possibility that the representatives of the appellant might act following the instructions of their employer rather than those of the appellant, has no bearing on the appeal proceedings, but is relevant only to the internal relationship between the appellant and its representatives.

3. For these reasons, the objection raised to the representatives appointed by the appellant is overruled.

Main request (claims as granted)

Article 123(2) EPC - Claim 13

4. The finding of the opposition division in respect of claim 1 has not been contested by the appellant and the board sees no grounds for differing from the view of the opposition division. Thus, the sole issue to be decided by the board in connection with Article 123(2) EPC is whether or not the introduction of the additional step of "*recovering the xylanase from the resulting culture broth*" in the method for production of a xylanase according to claim 13 has as a consequence that, as the appellant contends, the claimed subject-matter extends beyond the content of the application as filed.

5. For the following reasons, the appellant's view cannot be shared. The purpose of the invention as formulated

in the original application is "*to provide a xylanase which can be produced as a* ***preparation*** *with very small amounts of other enzyme activities, especially cellulase activities and other xylanase activities*" (see page 3, lines 5 to 7 of the application as filed; emphasis added by the board). It is also stated in the application that the xylanase preparation obtained, preferably in the form of a non-dusting granulate, a stabilized liquid or a protected enzyme (see page 8, lines 13 to 15 of the application as filed) is suitable for various uses, *inter alia*, as bleaching agent, baking agent or additive to animal feed. Thus, reading the application as a whole and in particular the formulated purpose of the invention, the person skilled in the art would readily understand that in order to obtain a preparation of the xylanase according to the invention the enzyme has to be **recovered** from the cell culture broth.

6. Hence, the board considers it implicit in the purpose of the invention that the preparation of the desired xylanase must involve recovering the enzyme from the culture broth. The requirement of Article 123(2) EPC is thus met.

Novelty

Claim 1

7. The primary question to be decided in relation to the novelty of claim 1 is whether or not the opposition division was correct in finding that document D16, as far as its disclosure content is relevant to the assessment of novelty, does not enjoy the priority of

the earlier application PCT/DK91/00379 (referred to in the present proceedings as document D15) and that, consequently, to that extent D16 is not comprised in the state of the art under Article 54(3)(4) EPC.

8. Claim 1 is directed to a recombinant DNA sequence encoding a xylanase, which sequence is capable of hybridizing under given conditions to a defined partial DNA sequence of 516 nucleotides in length which is referred to in the claim as SEQ ID No. 7.

9. Document D16, which has been cited as affecting the novelty of claim 1, teaches a method for the isolation of genes coding for proteins with enzymatic activity, which method comprises (a) the transformation of yeast host cells with a DNA library from an organism suspected of producing one or more proteins of interest, (b) the cultivation of the transformed cells under conditions suitable to produce a protein of interest by expression of a gene contained in a DNA fragment introduced into the yeast cell, and (c) the screening for positive clones by determining the activity of the protein of interest. This general teaching is exemplified by a cloning method in which a cDNA library from *Humicola insolens* DSM 1800 is used for transforming yeast cells (cf. Example 1 of the patent). As described in this Example, screening of the transformants for cellulase or xylanase activity led to the isolation of numerous clones, the DNA sequence of which was partially determined. Based on the DNA sequence, the clones are assigned to six cellulase genes and three xylanase genes (XYL 1, XYL 2 and XYL 3). On page 21, lines 31 to 33, fifteen clones assigned to the XYL 1 gene are identified by their respective

number and the molecular weight of the encoded protein (22 kD) is given. Furthermore, reference is made to SEQ ID NO:13 in the Sequence Listing, which is a partial DNA sequence of 572 nucleotides in length with two guanine residues at its 3' end.

The relevant disclosure of document D16

10. In the view of the opposition division (cf. point 8.3.5 of the decision under appeal), the relevant disclosure of D16 in the context of assessing the novelty of claim 1 was the **specific disclosure** of a recombinant DNA sequence encoding a xylanase which is characterized by the partial nucleotide sequence of SEQ ID NO:13 of the Sequence Listing. As this sequence differed from the SEQ ID No. 7 specified in claim 1 only in that it included two additional guanine residues at its 3' end, under the particular conditions specified in claim 1 a DNA molecule comprising the sequence defined in SEQ ID NO:13 could be expected to hybridize to a DNA molecule comprising the sequence of SEQ ID No. 7. Hence, it was concluded that SEQ ID NO:13 fell under the scope of claim 1. This finding has not been questioned by the parties on appeal, and the board sees no reason to differ from the conclusion reached by the examining division.

11. It is, however, subject of dispute between the parties whether in respect of the specific SEQ ID NO:13, the priority of the earlier application D15 has been validly claimed. Only if this question is answered in the affirmative, is the relevant disclosure of document D16 to be considered as state of the art under Article 54(3)(4) EPC and prejudicial to the novelty of

the subject-matter of claim 1 (cf. Articles 87 and 89 EPC).

12. The general teaching of the priority document D15 is essentially identical to the teaching of document D16. In fact, D15 discloses the same cloning and screening method starting from the same material (a cDNA library from *Humicola insolens* DSM 1800) and comprising the same steps as described in document D16, and the same XYL 1 clones are obtained (cf. page 16, lines 29 to 31 of D15, and page 21, lines 31 to 33 of D16). Yet, document D15 does not contain a sequence listing and, consequently, SEQ ID NO: 13 disclosed in D16 is not found in the earlier application. A partial DNA sequence which is identical to the sequence disclosed in SEQ ID NO:13 of D16 except for that it lacks the two guanine residues at the 3' end is, however, found in Figure 9 of D15.

13. Thus, the decisive question in the framework of assessing the right to priority in respect of the specific disclosure of SEQ ID NO:13 in document D16, is whether or not a person skilled in the art may recognize this DNA sequence and the sequence disclosed in Figure 9 of D15 as representing the "same subject-matter" and, thus, the "same invention" within the meaning of Article 87 EPC (cf. G 2/98, OJ EPO 2001, 413)

14. In the decision under appeal, the opposition division held that the presence of two additional guanine residues in SEQ ID NO:13 resulted in a different molecule that was not directly and unambiguously derivable from the earlier application D15. Consequently, in respect of the specific disclosure of

D16 (ie SEQ ID NO:13) the priority of the earlier application was not validly claimed.

15. The board concurs with the view of the opposition division. It is generally acknowledged in the case law of the boards of appeal that the nucleotide sequence of a nucleic acid represents an essential feature linked to the character and nature of the nucleic acid as such, and, where the nucleotide sequence is a coding sequence, also of the encoded protein (cf. T 923/92; OJ EPO 1996, 564). The skilled person is aware of the fact that even a minimal modification of the nucleotide sequence may result in a different nucleic acid not only from the structural but also from the functional point of view, and that a modification affecting a single nucleotide may result in the substitution of an amino acid in the encoded protein or in a shift of the reading frame (if one nucleotide is deleted or inserted), the outcome of which may be a truncated form of the protein or even a protein with a partial amino acid sequence which differs from the original sequence. Furthermore, since the primary sequence of the protein is, in most cases, determinant for its function, even small structural modifications of the nucleotide sequence can result in dramatic functional changes in the encoded protein.

16. In the present case, the skilled person may reasonably expect that the presence of two additional guanine residues in SEQ ID NO:13 of document D16 results in both a DNA molecule and an encoded xylanase which are different from those disclosed in Figure 9 of D15. Even though two nucleotide residues only cannot encode an additional amino acid, it would be apparent to the

skilled person, with the background of his/her common general knowledge and knowing that SEQ ID NO:13 is a partial sequence, that the two guanine residues at the 3' end of SEQ ID NO:13 are part of a codon which, irrespective of the nucleotide at the third position, encodes a glycine residue. A glycine residue at this position of the xylanase protein cannot be derived from the disclosure in document D15. Hence, with regard to the chemical composition not only the nucleotide sequences disclosed in D15 and D16, but also the derived amino acid sequences of the xylanase proteins differ from each other.

17. On appeal, the appellant argued that, since both SEQ ID NO:13 and the DNA sequence of Figure 9 of D15 were only partial sequences, the two guanine residues present in SEQ ID NO:13, but missing in the DNA sequence of Figure 9 were irrelevant in the context of assessing whether or not these sequences were the same. Furthermore, in the appellant's view the two DNA sequences had necessarily to correspond to the same DNA molecule because they were obtained by sequence analysis of the same cloned DNA insert. The analysis of two additional nucleotides would not change the chemical composition of the cloned DNA insert.

18. These arguments are not convincing. Even if it is true that the two DNA sequences in question are partial sequences, a DNA sequence comprising the sequence of Figure 9 of D15 and a sequence comprising the SEQ ID ID:13, which includes two additional guanine residues, are, *prima facie*, different DNA sequences. There is no explicit indication in D16 nor can it be implied from this document that the two additional guanine residues

in SEQ ID ID:13 result from further sequence analysis, or that they are not part of the xylanase-encoding sequence. In the absence of such (explicit or implicit) information, a person skilled in the art, when comparing the nucleotide sequences disclosed in D15 and D16 to assess whether or not they represent the same invention, would have no reason to disregard the two guanine residues in SEQ ID NO:13 as being irrelevant.

19. Moreover, there is no evidence on file supporting the appellant's argument that the specific sequences disclosed in D15 and D16 are derived from the same cloned DNA insert. As is apparent from document D15 (see sequence in Figure 9 where the respective 5' end of individual XYL 1 clones is indicated in hand-writing), the DNA inserts contained in different XYL 1 clones obtained when carrying out the method of Example 1 share part of their sequence, but differ not only in their 5' end, but - as is clear from their different lengths - also in their 3' end. Whereas in the DNA sequence of Figure 9 of D15 the 5' end of several clones cited on page 16, lines 29 to 31 is indicated - which allows to assign a specific sequence to each of these clones -, no information is provided in document D16 that allows the skilled person to determine whether the sequence defined in SEQ ID NO:13 has been obtained from any of the XYL 1 clones cited in the document and, possibly, from which one. In the board's view, in the absence of such information a person skilled in the art could not determine with reasonable certainty whether or not the sequence of Figure 9 of D15 and of SEQ ID NO:13 of D16 are derived from the same DNA insert.

20. Thus, the board concludes that, on the basis of the evidence on file, the specific DNA sequences disclosed in D16 (SEQ ID NO:13) and D15 (cf. Figure 9) cannot be considered to represent the "same subject-matter" and, thus, the "same invention" within the meaning of Article 87 EPC. Consequently, a priority right in respect of SEQ ID NO:13 cannot be acknowledged on the basis of the sequence disclosed in Figure 9 of D15.

21. In a second line of argument, the appellant asserted that the specific DNA sequence disclosed in D16 (ie SEQ ID NO:13) was directly and unambiguously derivable either from the disclosure of XYL 1 clones in document D15 and/or as inevitable result of carrying out the cloning and screening method described in Example 1 of the same document (cf. T 12/81, OJ EPO 1982, 296; G 2/88, OJ EPO 1990, 93). In the appellant's view, the two additional guanine residues present in SEQ ID NO:13 were an inherent feature of the nucleotide sequence of the XYL 1 clones described in document D15.

22. This view cannot be shared. There is no evidence on file showing that the DNA sequence of any of the inserts contained in the XYL 1 clones described in document D15 or any xylanase-encoding DNA sequence obtainable following the general teaching of this document, in particular the teaching of Example 1, necessarily includes the two guanine residues present at the 3' end of SEQ ID NO:13. The missing evidence cannot be replaced by the allegation that document D16 discloses the same XYL 1 clones as document D15, because, in the present case, a direct link connecting SEQ ID NO:13 with any specific XYL 1 clone among those

mentioned in D16 (and D15) cannot be found either in this document or elsewhere.

23. The appellant's argument that the sequence defined in SEQ ID NO: 13 is an inherent feature of the XYL 1 clones disclosed in D15 cannot be accepted. According to opinion G 1/92 (OJ EPO 1993, 277) of the Enlarged Board of Appeal, on which the appellant based its argument, the question whether or not a chemical composition "inherent" to a product has been disclosed arises only if the product has been made available to the public and can be analysed and reproduced by the skilled person. In the present case, none of the XYL 1 clones had been made available to the public in a way allowing the sequence to be analysed.

24. It is therefore concluded that the SEQ ID NO:13 cannot be derived directly and unambiguously either from the sequence of Figure 9 or from the general teaching, in particular from the teaching of Example 1 of the earlier application D15. Hence, as far as SEQ ID NO:13 is concerned, document D16 does not enjoy the priority of D15 and, consequently, it is not comprised in the state of the art under Article 54(3) EPC.

The general teaching of D16 as the relevant disclosure

25. At oral proceedings before the board, the question was discussed as to whether or not the general teaching of document D16, ie a method for isolating a recombinant DNA encoding a xylanase as described in Example 1, prejudices the novelty of the subject-matter of claim 1. Both parties agreed in that, in respect of its general teaching, D16 enjoys the priority of the earlier

application D15. Furthermore, it was not disputed that the general teaching of D16 (and D15) would enable the skilled person to isolate a recombinant DNA sequence which encodes a xylanase and is capable of hybridizing to the sequence defined in claim 1 (SEQ ID No. 7).

26. Thus, the question that remains to be decided is whether carrying out the cloning and screening method disclosed in D16 using a cDNA library from *Humicola insolens* DSM 1800 as starting material does **inevitably** lead to a recombinant DNA falling under the scope of claim 1. "Inevitably" means that one result, and one result only, could be obtained applying the teaching of Example 1 (cf. T 396/89 of 8 August 1991; point 4.3).

27. As is apparent from page 21, lines 29 to 37 of document D16, screening of transformants for xylanase activity led to the isolation of 36 clones corresponding to three different xylanase genes, namely XYL 1, XYL 2 and XYL 3. Among the 15 clones assigned to the XYL 1 gene, at least 12 clones contained a sequence capable of hybridizing to the sequence defined in claim 1 (cf. Figure 9 of D15). However, the partial DNA sequences obtained from the XYL 2 and XYL 3 clones (cf. SEQ ID NOs:14 and 15 in D16 and Figure 10 in D15) do not show any similarity to the SEQ ID No. 7 and, therefore, cannot be expected to hybridize to this sequence.

28. Thus, not even half of the xylanase clones isolated by the method of Example 1 correspond to the XYL 1 gene and contain a recombinant DNA that is capable of hybridizing to SEQ ID No. 7 and, therefore, fall under the scope of claim 1. The appellant's argument that the inevitable result of carrying out the method disclosed

in D16 would be a recombinant DNA falling under the scope of claim 1 must therefore fail. Consequently, the general teaching of document D16 does not prejudice the novelty of the subject-matter of claim 1.

29. Summarizing the above, the board concludes that having regard to the disclosure of document D16, either its general teaching or the specific disclosure of SEQ ID NO:13, the subject-matter of claim 1 is novel within the meaning of Article 54(3)(4) EPC.

Claim 14

30. Claim 14 is directed to a xylanase encoded by a recombinant DNA sequence as claimed in the patent.

31. In opposition proceedings, various documents (D2, D3 to D5 and D11) were cited in relation to the novelty of the subject-matter of claim 14. However, neither the opposition division's finding that document D2 was not available to the public at the filing date of the patent in suit (cf. point 8.3.2 of the decision under appeal), nor the reasons given in the decision under appeal to reject the objection of lack of novelty with regard to documents D3 to D5 of the prior art (cf. point 8.3.3) have been questioned by the appellant, and the board does not see any reason to disagree with the pertinent findings of the opposition division.

32. With respect to document D11, the opposition division held that, having regard to the fact that this document did not identify the specific strain of *Humicola grisea* var *thermoidea* from which the described xylanase was purified, and also to the fact that the xylanases

described in documents D11 and D12 originated from different laboratories, it could not be concluded with reasonable certainty that the purified xylanase disclosed in D11 was identical to the xylanase for which the amino acid sequence was given in the post-published document D12, especially in view of the fact that, as disclosed in document D4, different strains of the same organism can produce xylanases that differ in their structural and physicochemical properties (cf. point 8.3.4 of the decision).

33. In its statement of grounds of appeal, the appellant contested the decision under appeal arguing that it did not provide any detail regarding the nature of the differences between xylanases of different strains, which differences were, in its view, only minor and amounted to approximately 5% of the total sequence. No evidence whatsoever was submitted by the appellant in this respect.

34. In contrast, documents D18, D19 and D20 were filed by the respondent as evidence that the fungi from which the xylanases described in D11 and D12 were isolated, were not only different strains, but belonged to different genera. Document D18 is a declaration of Dr Jorge, a co-author of document D11, stating that the fungus used in D11 is in fact not a *Humicola grisea* var *thermoidea* strain as indicated in the document, but it has been identified by the ATCC as *Hormographiella sp*. Documents D19 (declaration of Dr Silva) and D20 (information from Dr Azevedo) confirm that the amino acid sequence disclosed in D12 was obtained from *Humicola grisea* var *thermoidea* (ATCC deposit No. 60849).

35. This evidence, which has not been contested by the appellant, contradicts the appellant's argument that the amino acid sequence and the DNA sequence described in D12 would correspond to the purified protein described in D11. Since the burden of proof incumbent upon the appellant (cf. T 793/93 of 27 September 1995) has not been discharged, the objection of lack of novelty against claim 14 must fail.

36. Thus, having regard to the evidence and arguments on file, the subject-matter of claims 1 and 14 is considered to be novel within the meaning of Article 54 EPC.

Inventive step

37. Document D11 is considered as the closest prior art for the purpose of assessing inventive step. This document discloses the purification and characterization of the biochemical properties of one of at least two extracellular xylanases produced by *Humicola grisea* var *thermoidea*. However, no information concerning the amino acid sequence of the protein, nor the nucleotide sequence of the gene encoding the same is provided in the document.

38. In view of D11, the technical problem to be solved is to provide a further fungal xylanase as well as a method and means for the production of the xylanase protein, including a recombinant DNA sequence encoding the same, and various applications of the enzyme.

39. One aspect of this problem is solved by the subject-matter of the claim 1, which is directed to a

recombinant DNA sequence capable of hybridizing under given conditions to the partial DNA sequence defined as SEQ ID No. 7. This partial DNA sequence is derived from the fungus *Humicola insolens*.

40. Neither D11 nor any of the further prior art documents on file give the skilled person an indication towards the isolation of a recombinant DNA sequence as claimed from *Humicola insolens*. As stated above (cf. points 34 and 35), there is no evidence on file supporting the allegation that the xylanase disclosed in D11 and the xylanase of the patent are closely related and are also encoded by similar DNA sequences. Thus, the appellant's line of argument on inventive step is not convincing.

41. Hence, the board considers that, having regard to the state of the art as reflected by the documents on file, the provision of a recombinant DNA sequence and a xylanase protein as claimed is not obvious to a person skilled in the art. Consequently, the subject-matter of claims 1 and 14 involves an inventive step (Article 56 EPC). The same applies *mutatis mutandis* to the subject-matter of all claims depending on or referring to claims 1 and 14, ie the different embodiments of the recombinant DNA sequence (claims 2 to 6), vectors (claims 7 and 8), transformed hosts (claims 9 to 12), a method for production of a xylanase using a transformed host as claimed (claim 13), agents containing the claimed xylanase protein (claims 15 to 18) and uses of the same (claims 19 to 21). Thus, an inventive step is recognised also for these claims, the inventive merit of which relies on an inventive step being acknowledged for the recombinant DNA sequence and the xylanase protein of claims 1 and 14.

42. It follows from the above that claims 1 to 22 as granted fulfil the requirements of the EPC, in particular those of Articles 123(2), 54 and 56 EPC, and that the findings in the decision under appeal are correct. Thus, the appellant's request to set aside the decision of the opposition division cannot be granted.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

G. Röhn L. Galligani