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(74) Common Representative: **NOVOZYMES A/S**; Patents,  
Krogshoejvej 36, DK-2880 Bagsvaerd (DK).

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(71) Applicant (for all designated States except US):  
**NOVOZYMES A/S** [DK/DK]; Krogshoejvej 36,  
DK-2880 Bagsvaerd (DK).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **RASMUSSEN, Lars** [DK/DK]; Fasanvaenget 297, DK-2980 Kokkedal (DK). **XU, Qing** [CN/CN]; Room 205, Building 823, Zhong Guancun, Beijing 100080 (CN). **PEDERSEN, Niels Kildegaard** [DK/DK]; Soevvej 1 B, DK-3480 Fredensborg (DK). **ZHOU, Zhiwei** [CN/CN]; Room 1201, Building 15, Fulaiyin, 70 Shazikou Road, Chongwen District, Beijing 100075 (CN).

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Published:

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[Continued on next page]

(54) Title: AN ENZYMATIC TREATMENT OF SKIN AND HIDE DEGREASING

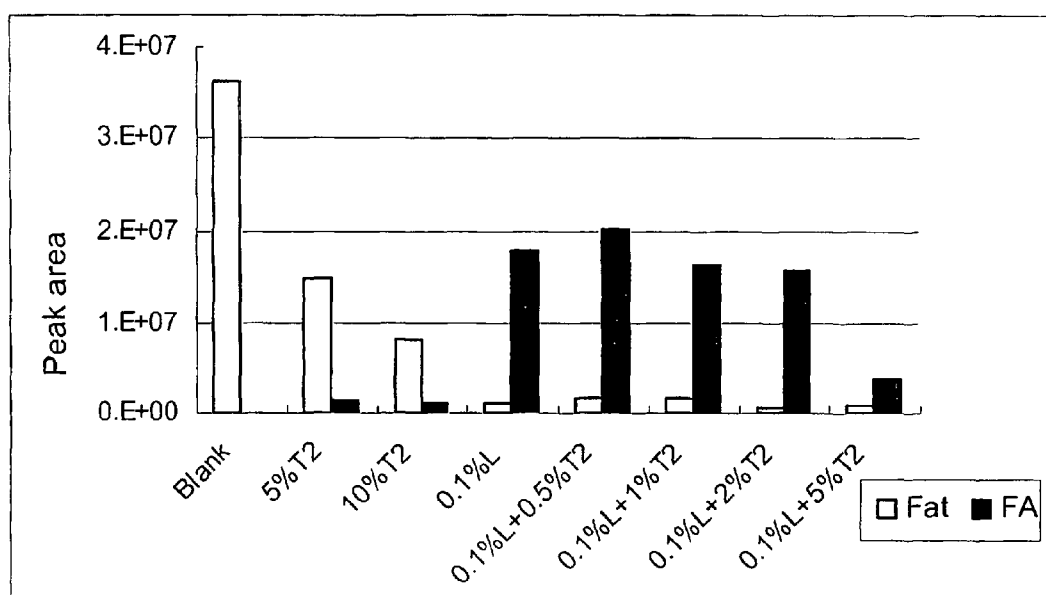


Fig 6

(57) Abstract: The present invention relates to a method of degreasing skins and hides with certain variants of *Humicola lanuginosa* lipase. More specifically, the invention relates to a process for enzymatic degreasing of skins and hides with lipase in the absence of surfactant at pH 6-13.

WO 2008/122640 A3



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## INTERNATIONAL SEARCH REPORT

International application No

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A. CLASSIFICATION OF SUBJECT MATTER  
 INV. C11D3/386 C14C1/08

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
 C11D C14C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, Sequence Search, WPI Data, MEDLINE, BIOSIS

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 02/055679 A (NOVOZYMES AS [DK]; MINNING STEFAN [DK]; VIND JESPER [DK]; GLAD SANNE O) 18 July 2002 (2002-07-18) cited in the application page 6, line 10 - line 17	1-24
X	WO 02/066622 A (NOVOZYMES AS [DK]; TSUTSUMI NORIKO [JP]; VIND JESPER [DK]; PATKAR SHAM) 29 August 2002 (2002-08-29) page 7, line 16 page 7, line 29 - page 8, line 21	1-24
X	WO 00/60063 A (NOVONORDISK AS [DK]; VIND JESPER [DK]; SVENDSEN ALLAN [DK]; PATKAR SHA) 12 October 2000 (2000-10-12) cited in the application claims 6,11,14	1-24
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☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

## \* Special categories of cited documents:

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- \*E\* earlier document but published on or after the international filing date
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- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

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\*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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\*G\* document member of the same patent family

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European Patent Office, P.B. 5818 Patentlaan 2  
 NL - 2280 HV Rijswijk  
 Tel. (+31-70) 340-2040  
 Fax: (+31-70) 340-3016

Authorized officer

Griesinger, Irina

# INTERNATIONAL SEARCH REPORT

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## C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 505 920 A (ROEHM GMBH [DE]) 30 September 1992 (1992-09-30) cited in the application abstract	1-24
X	WO 94/25577 A (NOVONORDISK AS [DK]; SVENDSEN ALLAN [DK]; PATKAR SHAMKANT ANANT [DK];) 10 November 1994 (1994-11-10) claims 4-6,21	1-24

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/EP2008/054241

### Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

### Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.
3. ☒ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:  
1-24 (all claims partially)
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

#### Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☒ No protest accompanied the payment of additional search fees.

**FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210**

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

**Invention 1: Claims 1-24 (all claims partially)**

relate to a process for enzymatic degreasing of skins or hides, which process comprises treatment of the skin or hide with a lipase from *Humicola lanuginosa* (SEQ ID NO: 1), which has been modified at one or more amino acid positions, wherein at least amino acid position 1 of SEQ ID NO: 1 (first variant mentioned in claim 1) has been modified and to leather degreasing compositions comprising said lipase variant.

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**Inventions 2-30: Claims 1-24 (all claims partially)**

relate to a process for enzymatic degreasing of skins or hides, which process comprises treatment of the skin or hide with a lipase from *Humicola lanuginosa* (SEQ ID NO: 1), which has been modified at one or more amino acid positions, wherein at least one of the amino acid positions 24, 33, 60, 62, 83, 84, 87, 91, 94, 96, 99, 101, 102, 189, 209, 225, 228, 231, 233, 244, 249, 251, 255, 263, 264, 265, 266, 267, and 269 of SEQ ID NO: 1 has been modified (each invention corresponds to one modified amino acid position listed in claim 1) and to leather degreasing compositions comprising said lipase variant respectively.

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**Invention 31: Claims 1-24 (all claims partially)**

relate to a process for enzymatic degreasing of skins or hides, which process comprises treatment of the skin or hide with a lipase from *Humicola lanuginosa* (SEQ ID NO: 1), wherein one to three amino acids have been added at the C-terminus and optionally, amino acid substitutions have been added and to leather degreasing compositions comprising said lipase variants.

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

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