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D E C I S I O N
of 26 January 1999

Case Number: T 0872/97 - 3.3.5

Application Number: 92922783.3

Publication Number: 0538467

IPC: B01J 8/20

Language of the proceedings: EN

Title of invention:

Process and means for down stream processing

Applicant/Patentee:

Pharmacia Biotech Aktiebolag

Opponent:

-

Headword:

Beads/PHARMACIA

Relevant legal provisions:

EPC Art. 84

Keyword:

"Clarity of functional feature (no)"

Decisions cited:

G 0002/88, T 0068/85, T 0337/95, T 0011/89

Catchword:

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Boards of Appeal

Chambres de recours

Case Number: T 0872/97 - 3.3.5

D E C I S I O N
of the Technical Board of Appeal 3.3.5
of 26 January 1999

Appellant: Pharmacia Biotech Aktiebolag
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Representative: Woods, Geoffrey Corlett
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Decision under appeal: Decision of the Examining Division of the
European Patent Office posted 17 March 1997
refusing European patent application
No. 92 922 783.3 pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: R. K. Spangenberg
Members: G. Dischinger-Höppler
W. Moser

Summary of Facts and Submissions

- I. The Appellant lodged an appeal against the decision of the Examining Division refusing European patent application No. 92 922 783.3. The decision under appeal was based on a main request and two auxiliary requests.
- II. The reason given for the refusal was that the independent claims of all requests did not meet the requirement of Article 84 EPC. In particular, the Examining Division held that the functional term "the beads being fluidized ... under such conditions that back-mixing of the beads is prevented", which was contained in Claim 1 of all requests, was an essential feature and necessary for distinguishing the claimed subject-matter from the prior art. It was clear from the description and from the Appellant's statements that the term did not indicate a complete suppression of the back-mixing. Since, however, the degree of prevention of back-mixing was not specified, the scope of protection conferred by the claims was not precisely defined.
- III. In response to a communication of the Board, the Appellant filed amended claims according to a main and a first and second auxiliary request on 8 June 1998.

Claim 1 of the main request reads as follows:

"1. Use of beads for recovering a desired component from a sample solution, the beads:

- having affinity for the component,

- having a diameter of from 100 to 1000 μm ,
- comprising a polymer matrix into which glass or silica particles of from 1 to 100 μm in size are incorporated in an amount of from 5 to 50% based on the wet weight of the beads, and
- being fluidized in a column in an upward-flowing liquid stream comprising the sample solution under such conditions that back-mixing of the beads is prevented without the application of a magnetic field."

Claim 1 of the first auxiliary request refers to "a fluidized bed comprising beads for recovering a desired component from a sample solution", and

Claim 1 of the second auxiliary request refers to "a method for recovering a desired component from a sample solution, which method comprises (i) feeding the sample solution through a bottom port into a column containing beads...". In both claims the beads are defined as in Claim 1 of the main request.

These claims differ from the refused claims (main and auxiliary requests) only in that the diameter of the beads has been incorporated and the application of a magnetic field has been excluded.

The Appellant further submitted several declarations drawn up by Dr Howard A. Chase.

IV. Oral proceedings were held on 26 January 1999.

V. The Appellant's arguments, submitted in writing and orally, can be summarized as follows:

The term "under such conditions that back-mixing of the beads is prevented" was an essential feature which would be interpreted by someone skilled in the art to mean that the fluidised bed had negligible axial dispersion so that back-mixing did not, for practical purposes, affect the performance of the bed. He would interpret the term neither to mean complete prevention of back-mixing nor to include any possible degree of reduction of back-mixing. It further followed from the above-mentioned declarations that he would also be able to determine whether or not back-mixing had in fact been prevented in a particular case. Furthermore, for the correct interpretation of the said functional feature the relevant prior art and, in view of Article 69 EPC and its Protocol, the description had to be taken into account.

If specific conditions for fluidization were inserted in Claim 1, the scope of the invention would be unduly restricted because the conditions necessary to prevent back-mixing varied depending upon factors such as bead size, bead density and liquid flow. The language of the functional feature was sufficiently clear for a person skilled in the art to put the invention into practice without undue burden. The functional feature was, thus, permissible in accordance with decision T 68/85.

The following documents were in particular referred to by the Appellant:

D7: US-A-4 976 865;

D8: Draeger & Chase, Trans. I. Chem. E., Part C,
45-52; March 1991;

D9: EP-A-0 140 572 and

D10: Chase & Draeger, J. Chromatog. 597, 129-145, 1992.

VI. The Appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the following documents:

- (a) Claims 1 to 10 filed on 8 June 1998 as a main request, or
- (b) Claims 1 to 10 filed on 8 June 1998 as a first auxiliary request, or
- (c) Claims 1 to 10 filed on 8 June 1998 as a second auxiliary request.

Reasons for the Decision

1. The appeal is admissible.
2. The amendments made to the claims of the main request as well as to the claims of the first and second auxiliary request are disclosed in the patent application as filed (see Claims 1, 4 to 9, page 4, lines 1 to 8 and 16 to 30, page 9, lines 9/10 and page 5, last paragraph to page 6, line 2). The requirements of Article 123(2) EPC are, therefore, met.

3. The remaining issue is whether the present claims meet the criteria of Article 84 EPC. The most relevant point is the issue of clarity as regards the functional feature "the beads being fluidized ... under such conditions that back-mixing of the beads is prevented", which is present in Claim 1 of all requests.

In accordance with the established Case Law of the Boards of Appeal of the European Patent Office, functional features defining a technical result must be sufficiently clear for the expert to reduce them to practice without undue burden, but are not permissible where the clarity of a claim is jeopardised (see e.g. T 68/85, OJ EPO 1987, 228, reasons no. 8.4.3).

4. The term "back-mixing of the beads" is defined in the description of the application in suit as follows:

"Minor irregularities in the flow field in a fluidized bed cause translational movements of the particles. Over a certain time, there is the same probability that a certain particle may be found at any position within the confined space of the fluidized bed. Here, this effect is referred to as back-mixing or a large degree of axial dispersion." (see description page 1, last paragraph).

This definition refers to a relative term, i.e. "a large degree of axial dispersion".

5. It is undisputed that, in practice, back-mixing of the beads cannot be completely abolished in the sense that the beads remain completely static in the fluidized bed (see point V above). It is therefore necessary to

establish whether in the present circumstances, in particular having regard to the description of the application in suit, the expression "that back-mixing of the beads is prevented" can be given a clear meaning.

6. The Board assumes, in the Appellant's favour, that a skilled person would, as indicated in the declarations of Dr H. A. Chase, be able to determine whether or not back-mixing had in fact been prevented in the sense of "practically prevented" in a particular case, i.e. for a predetermined solute which is to be adsorbed from a predetermined feed stream to a predetermined extent, and to find, by trial and error, suitable conditions therefor. However, the Board observes that it is not in dispute that the tolerable degree of back-mixing and the conditions under which back-mixing can be regarded as being "prevented" depend on the binding affinity of the beads for the solute and the concentration of the solute in the feed stream (see the description of the application in suit, page 3, lines 11 to 15). This means that the functional requirement may be regarded as being fulfilled by using certain beads under certain flow conditions in respect of one particular solute being present in a feed stream in a given concentration, and that the same beads under the same flow conditions would not meet that requirement in respect of another solute having e.g. less affinity to the beads and/or being present in a lower concentration. However, neither the desired component nor its affinity to the beads or its concentration in the solute are defined in the application in suit, so that the tolerable degree of back-mixing remains obscure.

7. The Board has doubts whether in this situation it would be sufficient that the description contains the missing necessary information, because, strictly speaking, Article 69 and its protocol, relied upon by the Appellant in this context, do not concern the clarity of claims. The Board considers that this article and its protocol rather require that a patent should only be granted with claims having a clear scope (see T 11/89 of December 1990, reasons no. 2.1). This question need not, however, be decided here, since the description does not contain the said missing information.

8. In respect of the degree of back-mixing of the beads, the description of the application in suit only states that "the axial dispersion is often expressed by the vessel dispersion number (for a definition see Levenspiel (1972)) which in a stabilized bed should be less than about 75×10^{-3} , and especially less than 20×10^{-3} " (see page 4, lines 11 to 15). In the Board's judgment, it follows from the wording that this statement is rather given as an example than as an alternative definition of a "stabilised" fluidized bed (see point 5.2 above). This finding is in accordance with the Appellant's submission that the claims would be unduly restricted by the insertion of the vessel dispersion number.

9. It follows that the description does not indicate any clearly defined limit or a tolerable degree of back-mixing, so that the expression "back-mixing of the beads is prevented" on its proper construction has to be regarded as being relative, and thus potentially ambiguous, not only with respect to the term "back-

mixing" but also with respect to the term "prevented".

10. The Board considers, in agreement with the Appellant, that the mere fact that a relative term is used in a claim as an essential feature (see point V above) for the definition of the subject-matter for which protection is sought does not in all circumstances render that claim unclear in the sense of Article 84 EPC. Rather, the clarity of such a claim depends on the context in which the relative term is used.

10.1 In the description of the application in suit it is stated that by using bead particles covering a given size and/or density interval the particles are kept from moving around in the confined space of the bed such that, for a certain particle the probability to find it in a certain position is high only in a limited volume being a minute fraction of the total bed volume, or, in other words, that the particles are kept resident locally and back-mixing is prevented (see the paragraph bridging pages 3 and 4). The fluidized beds achieved when using the actual particles are referred to as stabilized or unmixed expanded beds, which are characterized by having **negligible** axial dispersion (see page 4, first complete paragraph). However, no size and/or density interval for the particles is defined, since - as agreed by the Appellant - the ranges for the diameter of the beads and for the size of the silica particles incorporated therein, as defined in Claim 1 of the application in suit, do not necessarily mean that the beads and/or silica particles cover a size interval.

10.2 Concerning the conditions under which back-mixing is to

be "prevented", it is stated in the description of the application in suit that the former comprise the density, viscosity and the velocity of the fluidium and the diameter and density of the solid entities, which affect the balancing of frictional versus gravitational forces (page 2, lines 11 to 13). No numerical ranges of the above parameters are indicated. As to the way in which these parameters should be combined, it is stated that the pressure drop D in a given fluidized bed must for each combination of flow velocity, viscosity, particle size etc. exceed a given value (page 6, lines 30 to 34). No numerical value of the pressure drop D is, however, indicated either.

- 10.3 The only other relevant information concerning the interpretation of the functional feature under consideration is to be found in example 8 of the application in suit, which is the only one relating to the recovery of a desired component from a sample solution in accordance with the present claims. Being no more than an example, i.e. one particular embodiment of the claimed subject-matter, this part of the description does not provide any useful information concerning the scope of the protection sought by the present claims.
11. The Appellant has not shown that the said relative expression is commonly used in the art. It is agreed that in documents (7) to (9), relied upon by the Appellant, methods are disclosed for minimizing back-mixing. It is further agreed that the authors of these documents have certainly understood the basis for said reduction of the degree of back-mixing (see declaration of Dr H.A. Chase submitted with the Appellant's letter

dated 21 July 1997, items 4.2 and 4.3). These methods are, however, in each case fully described insofar as they are either defined by constructional elements as in document (7) (division of the column into sections) or by measurable parameters as in documents (8) (beads having a particular size distribution) or by both as in document (9) (use of beads having magnetic properties and application of a magnetic field; see also the above declaration). These methods are, moreover, totally different from each other, so that documents (7) to (9) do not provide a general concept as to how the functional feature in question is to be construed. D10, which summarises the technical information contained in D7 to D9, does not contain any further relevant information.

12. In the Board's judgment, Article 84 EPC, and in particular its clarity requirement, serves the purpose of ensuring that the public is not left in any doubt as to which subject-matter is covered by a particular patent claim and which is not (see G 2/88, OJ EPO 1990, 93; Corr OJ EPO 1990, 469, reasons no. 2.4 and 2.5). The Board considers that a claim is not clear in the sense of Article 84 EPC if it does not allow this distinction (see T 337/95, OJ EPO 1996, 628, reasons no. 2.2. to 2.5).

The only features of the present claims which are clearly defined by ranges of measurable parameters are that the beads must have a size within certain limits and must comprise a polymer matrix into which glass or silica particles of from 1 to 100 μm in size are incorporated in an amount of from 5 to 50% based on the wet weight of the beads. These features are not

sufficient for defining the subject-matter for which protection is sought, nor do they imply clear meanings of the other features of the claims under consideration. This is not in dispute. In view of the factual situation set out in points 10 and 11 above, in particular in view of the absence of any clear definition of the desired component and the solute from which it is to be recovered, or of the degree of affinity of the beads to the desired component, the Board therefore holds that it is completely left to the public to guess which particular beads in combination with which conditions of use are covered by the claims and which are not, so that the clarity requirement of Article 84 EPC is not met by the claims under consideration (see also T 11/89 cited above).

13. The present situation is totally different to that underlying decision T 68/85 (OJ EPO 1987, 228), relied upon by the Appellant. In that case, the scope of protection sought was defined inter alia by the functional feature "in an amount producing a synergistic herbicidal effect" which feature related to any measurable degree of synergy, and, being clear in this respect, clearly defined the amounts of two specific components of the claimed mixture. In this case, therefore, the determination of the scope of protection did not depend on the meaning of a relative term, e.g. "a large degree" of synergy.

As set out above, the present claims seek to define the scope of protection conferred by a functional feature containing a relative term which does not have a clear meaning in the context of these claims.

Therefore, the reasons given in the said decision are not relevant for deciding the present case.

14. For these reasons, the Appellant's main and auxiliary requests must fail.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman

S. Hue

R. Spangenberg