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D E C I S I O N
of 24 May 2002

Case Number: W 0011/01 - 3.3.4

Application Number: PCT/EP 99/02176

Publication Number: WO-A-99/50423

IPC: C12N 15/61

Language of the proceedings: EN

Title of invention:

Salicylic acid pathway genes and their use for the induction
of resistance in plants

Applicant:

MOGEN INTERNATIONAL N.V. et al.

Headword:

Salicylic acid/MOGEN

Relevant legal provisions:

PCT Art. 34(3)(a)

PCT R. 13.1-13.3, 68.2, 68.3(c), 68.3(e)

Keyword:

"Lack of unity a posteriori (yes)"

Decisions cited:

G 1/89

Catchword:

-



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Boards of Appeal

Chambres de recours

Case Number: W 0011/01 - 3.3.4
International Application No. PCT/EP 99/02176

D E C I S I O N
of the Technical Board of Appeal 3.3.4
of 24 May 2002

Applicant: SYNGENTA MOGEN INTERNATIONAL B.V. et al.
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Subject of the Decision: Protest according to Rule 68.3(c) of the Patent
Cooperation Treaty made by the applicants
against the invitation of the European Patent
Office (International Preliminary Examining
Authority) to restrict the claims or pay
additional fees dated 17 February 2000.

Composition of the Board:

Chairman: U. Kinkeldey
Members: L. Galligani
B. Günzel

Summary of Facts and Submissions

I. International patent application PCT/EP 99/02176 (published as WO-A-99/50423) was filed on 25 March 1999 with thirty-one claims of which claims 1 to 3, 6 and 16 read as follows:

"1. Method to induce pathogen resistance in plants, characterized in that plants are transformed with an expression cassette harboring a gene coding for an isochorismate synthase."

"2. Method according to claim 1, characterized in that the gene coding for isochorismate synthase is selected from a group consisting of *entC*, *orfA*, *pchA* and *ICS*."

"3. Method according to claim 2, characterized in that the gene coding for isochorismate synthase is the *ICS* gene from *Catharantus roseus*."

"6. Method according to any of the claims 1-5, characterized in that plants are additionally transformed with an expression cassette harboring a gene coding for an isochorismate pyruvate lyase."

"16. A pathogen-inducible promoter, characterized in that it comprises the 5' regulatory region which is naturally found to regulate the expression of the *ICS* gene in *Catharantus roseus*."

Claims 4 and 5 concerned embodiments of claim 2 or 3. Claims 7 to 9 concerned embodiments of claim 6. Claims 10 and 11 were directed to a protein having isochorismate synthase activity from *Catharantus roseus*; claims 12 to 15 to a nucleotide sequence encoding it; claim 23 to a vector comprising the latter and claim 24 to an *Agrobacterium* strain comprising the

said vector. Claims 17 to 19 concerned embodiments of the promoter according to claim 16, and claims 20 to 22 its use. Claims 25 to 30 were directed to plant cells capable of overexpression of isochorismate synthase; claim 31 to plants comprising said plant cells.

II. On 17 February 2000 the European Patent Office (EPO), acting as an International Preliminary Examining Authority (IPEA), invited the applicants to pay within a time limit of one month **five** additional examination fees pursuant to Article 34(3)(a) and Rule 68.2 PCT because the application was not considered to comply with the requirements of unity of invention (Rule 13.1 - 13.3 PCT). The following reasons were given for this finding:

- (a) The different inventions of the claims all addressed the problem of providing a gene coding for an isochorismate synthase;
- (b) Such a problem and its solution were already known in the prior art, eg from:

- (1) Verbene M.C. et al., Pharm. World Sci., Vol. 17, no. 6, 1995, page N12;

- (2) Lodhi A. H. et al., Plant Cell Reports, Vol. 16, no. 1-2, 1996, pages 54 to 57.

Document (1) disclosed a method for inducing pathogen resistance in plants by transforming them with an expression cassette harboring the *entC* gene from *E.coli* which encoded isochorismate synthase. Document (2) disclosed the cloning of the same gene and its expression in transgenic plant root cultures;

- (c) Thus, the linking concept was neither novel nor

inventive and could not provide unity of invention for the six groups of inventions into which the claims were divided, namely:

- (i) Claims 1, 2, 4, 5, 23 to 26 and 31 (in part), being directed to a gene which comprised the nucleotide sequence of the open reading frame of SEQ ID NO: 13 (*entC*) encoding isochorismate synthase of SED ID NO: 14 from *E.coli*;
- (ii) Claims 1, 2, 4, 5, 23 to 26 and 31 (in part): being directed to a gene which comprised the nucleotide sequence of the open reading frame of SEQ ID NO: 15 (*orfA*) encoding isochorismate synthase of SED ID NO: 14 (sic!) from *P. fluorescens*;
- (iii) Claims 1, 2, 23 to 26 and 31 (in part): being directed to the *pcha* gene coding isochorismate synthase from *P. aeruginosa*;
- (iv) Claims 1, 2, 4, 5, 14, 15, 23 to 26 and 31 (in part), and claims 3 and 10 to 13: being directed to a gene which comprised the nucleotide sequence of the open reading frame of SEQ ID NO: 19 (*ics*) encoding isochorismate synthase of SEQ ID NO: 18 from *Catharantus roseus*;
- (v) Claims 6 to 9 and 28 to 30, which addressed the reformulated problem of providing a method to induce pathogen resistance which improved on the resistance obtained with plants harboring a gene coding for isochorismate synthase;
- (vi) Claims 14 to 22 and claims 23 and 24

(in part): which addressed the reformulated problem of providing a new pathogen-inducible promoter.

III. On 13 March 2000, the applicants paid under protest **five** additional examination fees in respect of the additional inventions (Rule 68.3(c) PCT). They expressed the opinion that the application comprised at the most two inventions. In support of this contention, they submitted that:

- The main claim was directed to a method to induce pathogen resistance in plants by transforming them with a gene coding for an isochorismate synthase (ICS). Claims 2 to 9 provided several options for such genes and, optionally, transformation with an isochorismate pyruvate lyase. One of the genes was that from *Catharantus roseus* of claims 10 to 14 and 23 to 24 (partially). The promoter of the said gene and its use were the subject of claims 15 to 21 and 23 to 24 (partially);
- The linking concept for at least claims 1 to 14 was providing pathogen resistance through a gene coding for ICS, and could be derived neither from document (1) nor document (2);
- Document (1) was at best an invitation to experiment without any reasonable expectation that transformation with the gene *entC* alone would provide pathogen resistance, especially in view of the statement "(t)here is not much known about the biosynthesis of SA [*salicylic acid*] in plants". Document (2) mentioned only transformation and expression of the *entC* gene in plant cells, nothing being said about pathogen resistance;
- Although both documents demonstrated

transformation of plants, they affected neither novelty nor inventive step of the concept linking the claims.

The applicants, however, acknowledged that the claims directed to the promoter from the *C. roseus* ICS gene could be regarded as a separate invention and thus would warrant payment of an additional examination fee.

IV. On 25 August 2000, the IPEA issued a communication informing the applicants that, after a prior review of the justification for the invitation to pay additional fees, the requirement of payment thereof was upheld. The applicants were thus invited under Rule 68.3(e) PCT to pay the protest fee within one month. With reference to document (1), the IPEA stated that it was clear already from its title that the goal to be achieved was indeed the induction of pathogen resistance. The solution employed to achieve that goal comprised the same process steps as defined in claim 1, the actual level of pathogen resistance being irrelevant for the assessment of novelty as it was to be expected that the same measures lead to the same results.

V. The protest fee was paid by the applicants on 21 September 2000. In a letter with the same date, they submitted that a skilled person would have had doubts on the outcome of at least one of the approaches of document (1) as it could not be predicted whether capturing of chorismate by the ICS would be feasible without disturbing essential plant processes thereby leading to aberrant or even lethal phenotypes. Moreover, there was uncertainty over the availability of the chorismate for the (transgenic) enzyme. The applicants had observed that no detectable synthesis of SA was obtained by making *entA-entB-entC* transgenic plants, whereas - as shown in the application - SA production was obtained with the combination of *entC*

with either *orfD* or *pchB*. Document (1) only showed the intent to get the desired result on the basis of hypothetical assumptions. Thus, it could not serve as a basis to contest the unity of invention of claims 1 to 15 and 23 to 31 as filed.

Reasons for the Decision

1. The protest in respect of the payment of further examination fees is admissible.
2. According to the PCT Regulations (cf. Rule 13.1 PCT), the international patent application shall relate to one invention only or to a group of inventions so linked as to form a single inventive concept. The determination whether a group of inventions is so linked as to form a single general inventive concept shall be made without regard to whether the inventions are claimed in separate claims or as alternatives within a single claim (cf. Rule 13.3 PCT).
3. An objection as to lack of unity can also be raised *a posteriori*, ie after having taken the prior art revealed by the search into closer consideration (cf PCT Preliminary Examination Guidelines PCT/GL/3 dated 1 March 1993, Chapter III, 7 and PCT GAZETTE, Special Issue, 25 June 1998 Section 206 and Annex B to the Administrative Instructions). Such consideration of the prior art represents only a **provisional** opinion on novelty and inventive step which is in no way binding upon the authorities subsequently responsible for the further examination of the application (cf decision G 1/89 of the Enlarged Board of Appeal, OJ EPO 1991, 155, see in particular point 8.1. of the Reasons).
4. In the present case, the applicants accept that claims

directed to a pathogen-inducible promoter comprising the 5' regulatory region of the ICS gene of *Catharantus roseus* constitutes a separate invention for which the payment of an additional fee is justified (cf Section III, last paragraph supra). These are indeed claims 16 to 22, **not** claims 14 to 22 and claims 23 to 24 (in part) as incorrectly stated in the IPEA invitation (cf group vi, Section II supra). However, they maintain that the unity of claims 1 to 15 and 23 to 31 is based on the inventive concept of inducing pathogen resistance in plants by transforming them with a gene encoding ICS, optionally together with a gene encoding isochorismate pyruvate lyase. In their view, the suggestion in document (1) was only hypothetical and the skilled person would have had doubts about it.

5. Document (1) suggests genetically modifying the biosynthesis of SA in plants in order to increase their resistance against infection *inter alia* by transforming them with the *E.coli entC* gene coding for ICS. This suggestion is identical with the proposal in claim 1 of a "method to induce pathogen resistance in plants, characterized in that plants are transformed with an expression cassette harboring a gene coding for an isochorismate synthase", said gene being, according to a possible selection proposed in claim 2, the *entC* gene. There is no difference between the suggestion made in the prior art and the broadly formulated proposal of claims 1 and 2. Moreover, the suggestion of the prior art was feasible for the skilled person in 1998 because - as also acknowledged by the applicants (cf Section III supra) - the ICS gene from *E.coli* had already been cloned into a vector and mobilised into an *Agrobacterium* strain which was used to transform plants. The arguments put forward by the applicants (see in particular Section V supra) do not demonstrate that the teaching of document (1) is not enabling, which would be a pre-condition for discarding it for

the purpose of novelty. They are merely aimed at demonstrating the presence of an inventive step based on an alleged lack of reasonable expectation of success. However, as shown above, the subject-matter of claims 1 and 2 lacks novelty vis-à-vis document (1) which provides an enabling teaching. Thus, no further discussion of matters related to inventive step is necessary.

6. As the unifying concept underlying the present claims lacks novelty, the claims are no longer linked together by "a special technical feature" in the sense of Rule 13.2 PCT. Under these circumstances, the claims relate to a plurality of inventions, each being in relation to a different solution for a different or alternative technical problem. In fact, the use of *entC*, or *orfA* or *pchA* or *ICS* as candidate ICS (cf claim 2 where these four different alternatives are proposed) in the known method for inducing pathogen resistance in plants all constitute separate particular alternative ways of performing it which are no longer linked together under a general inventive concept (groups of inventions i) to iv); cf Section II, supra). The use of an ICS gene together with a gene encoding an isochorismate pyruvate lyase constitutes a further particular alternative way of carrying out the method (group v; cf Section II, supra). As acknowledged by the applicants, the pathogen-inducible promoter comprising the 5' regulatory region of the ICS gene of *Catharantus roseus* and its use (claims 15 to 22) constitutes a solution to the problem of expressing in plants an heterologous protein, in particular an antipathogenic protein, which has no link with the other groups of inventions (group (vi)).

7. For the foregoing reasons, the board finds that the invitation made under Article 34(3)(a) and Rule 68.2 PCT to pay the additional fees was justified.

Order

For these reasons it is decided that:

The protest according to Rule 68.3(c) PCT is dismissed.

The Registrar

The Chairperson:

P. Cremona

U.M. Kinkeldey