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**Datasheet for the decision
of 14 November 2018**

Case Number: T 2116/13 - 3.3.02

Application Number: 05708211.7

Publication Number: 1711058

IPC: A01N35/02

Language of the proceedings: EN

Title of invention:

METHODS OF KILLING NEMATODES COMPRISING THE APPLICATION OF A
TERPENE COMPONENT

Applicant:

EDEN RESEARCH PLC

Headword:

Relevant legal provisions:

EPC Art. 56

Keyword:

Inventive step - (yes)

Decisions cited:

Catchword:



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Case Number: T 2116/13 - 3.3.02

D E C I S I O N
of Technical Board of Appeal 3.3.02
of 14 November 2018

Appellant: EDEN RESEARCH PLC
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Decision under appeal: **Decision of the Examining Division of the
European Patent Office posted on 15 May 2013
refusing European patent application No.
05708211.7 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman M. O. Müller
Members: P. O'Sullivan
P. de Heij

Summary of Facts and Submissions

- I. This decision concerns the appeal filed by the applicant against the decision of the examining division to refuse European patent application 05708211.7.
- II. The following evidence inter alia was cited during examination proceedings:
- D1: US 4 049 828 A
- D2: DATABASE WPI, Section Ch, Week 198026, AN 1980-45625C; XP002335785, & JP 55 064736 A
- D9: EP 0 242 135 A
- D10: WO 02/12348 A
- III. The decision was based on a set of claims 1-39 filed as Annex II at oral proceedings on 19 February 2013.

According to the contested decision:

The requirements of Articles 83, 54 and 123(2) EPC were met. However, the claimed subject-matter did not involve an inventive step. Either of D1 or D2 represented the closest prior art with respect to claim 1, the latter distinguished therefrom by the encapsulation of citral or thymol into a hollow glucan particle, by the presence of a surfactant and by the percentage ranges within which the various components of the composition were present. The problem to be solved was seen as the provision of a method of killing plant parasitic nematodes having a longer lasting effect than those of the closest prior art. The

solution was considered obvious in view of D9 and D10 and the common general knowledge that a surfactant could be added when required by virtue of the low aqueous solubility of thymol and citral. Finally, the percentage ranges recited in claim 1 for the amount of hollow glucan particles, the terpene component and the surfactant present in the composition were routine and could not contribute to inventive step.

- IV. That decision was appealed by the applicant (hereinafter: appellant). With the statement setting out the grounds of appeal the appellant requested that the decision of the examining division be set aside and that the case be remitted for formal completion of the grant procedure on the basis of the set of claims forming the basis for the contested decision.
- V. A communication of the board was sent in preparation for oral proceedings. Therein the board inter alia raised objections in respect of Articles 53(c), 123(2) and 84 EPC, and identified D1 or D2 as suitable starting points for the assessment of inventive step.
- VI. With the letter of 12 October 2018 the appellant filed a new set of claims 1-29 as main request and a set of claims 1-28 as auxiliary request 1. The independent claims of the main request read as follows:

"1. A method of killing plant parasitic nematodes, said method comprising the step of applying to at least a portion of, preferably all of, a volume of soil that is infested with nematodes an effective amount of a nematicidal composition comprising a terpene component, wherein the nematicidal composition comprises hollow glucan particles which encapsulate the terpene component, wherein the terpene component comprises

thymol or citral, and wherein the nematicidal composition further comprises a surfactant in association with the terpene component.

18. A method of preparing a nematicidal composition as defined in any one of claims 1 to 17, said method comprising the steps of;

a) providing a terpene component in association with a surfactant;

b) providing hollow glucan particles;

c) incubating the terpene component with the glucan particles under suitable conditions for terpene encapsulation; and

d) recovering the glucan particles encapsulating the terpene component.

29. A nematicidal composition comprising a terpene component for the extermination of plant parasitic nematodes, wherein the nematicidal composition comprises a terpene component, wherein the nematicidal composition comprises hollow glucan particles which encapsulate the terpene component, wherein the terpene component comprises thymol or citral, and wherein the nematicidal composition further comprises a surfactant in association with the terpene component. (underlined text denoting amendments with respect to the corresponding claims as originally filed).

VII. Oral proceedings before the board took place on 14 November 2018.

VIII. The appellant's arguments, insofar as relevant to the present decision, may be summarised as follows:

Main request - amendments (Article 123(2) EPC)

The back reference in method claim 18 to the nematocidal composition of claims 1-17 found basis in the application as originally filed since it was clear to the skilled person that "a nematocidal composition" recited in this claim referred to the composition disclosed throughout the description, in particular in the preferred embodiments disclosed on pages 12-17 according to which the nematocidal composition is characterised.

Main request - inventive step (Article 56 EPC)

The closest prior art was represented by example XIII of D9, which was directed to a similar purpose as the claimed invention, and had the most relevant technical features in common. The distinguishing features of claim 29 over this example were that the encapsulating vehicle was a **hollow** glucan particle, that the active agent was a terpene component comprising thymol or citral, and that the nematocidal composition comprised a surfactant. The technical problem was the provision of an alternative composition suitable for use in killing nematodes, providing a higher dosage of active agent to the area to be treated per unit volume of formulation and/or providing acceptable active agent release kinetics. The prior art documents D1, D2 or D10 were lacking any teaching which would provide a motivation to the skilled person to modify the composition of example XIII of D9 and thereby arrive at the solution provided by claim 29.

- IX. The appellant requested that the decision under appeal be set aside and that the case be remitted to the examining division with the order to grant a patent on the basis of the set of claims 1-29 of the main request or, alternatively, the set of claims 1-28 of auxiliary request 1, both filed with the letter dated 12 October 2018, or the set of claims of auxiliary request 2 (filed as main request at the oral proceedings before the examining division on 19 February 2018, annex II to the minutes of that hearing).

Reasons for the Decision

Main Request

1. Amendments (Article 123(2) EPC)
 - 1.1 Independent claim 1 finds basis in claim 1 of the application as originally filed in combination with at least:
 - claim 36, with the additional amendment of "soil to be infested" to "soil that is infested", which the board considers allowable in view of at least page 17, lines 25-31;
 - claim 7 and 8 in respect of citral or thymol, wherein a single selection in claim 7 has been made for thymol;
 - claim 17 and 19 in respect of the hollow glucan particles which encapsulate the terpene component;
 - claim 28 in respect of the nematicidal composition further comprising a surfactant in association with the terpene component.

- 1.2 With the exception of the back reference, independent method claim 18 finds basis in claim 39 as originally filed, the text "in association with a surfactant" originating in claim 28 as originally filed.
- 1.3 The back reference in method claim 18 to a nematicidal composition "as defined in any one of claims 1 to 17" is not supported by an explicit basis in the application as originally filed in terms of a direct link establishing that the compositions recited in claims 1-17 are to be prepared according to said method. However, the skilled person would implicitly understand that the nematicidal compositions prepared according to the method of claim 39 as originally filed, while not necessarily limited thereto, would at least include those compositions directly and unambiguously disclosed in the application as filed, i.e. those compositions recited in method claim 1 and claims 2-17 dependent thereon as presently numbered. The skilled person would in particular derive from page 13, lines 23 to 28 (referring to the nematicidal composition used in the method of the present invention), and page 16, lines 20-22 (referring to the association of the terpene with a surfactant) in conjunction with page 18, line 28 to page 19, line 19 (referring to the method of preparing that composition) of the application as filed that the composition to be prepared according to claim 18 is the one according to the invention and thus as defined in claims 1 to 17.

Consequently, the application as originally filed provides a basis for said back reference.

- 1.4 The text "... 0.1% to 10% by volume of the total reaction mixture" added to dependent claim 23 finds basis in claim 47 as originally filed, which in turn

refers back to claim 44 and ultimately method claim 39 as originally filed.

- 1.5 Composition claim 29 was not present in the claims as originally filed. Basis therefor is the same as that provided for claim 1, which recites the same composition (see paragraph 1.1, *supra*), as well as throughout the description as originally filed (e.g. page 1, lines 3-7).
- 1.6 It follows that the requirements of Article 123(2) EPC are met.
2. Clarity, sufficiency of disclosure and novelty (Articles 84, 83 and 54 EPC, respectively)
 - 2.1 The board is satisfied that the claims according to the main request are clear, and that the invention described therein is disclosed in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art. The board furthermore sees no reason to deviate from the conclusion of the examining division, which applies equally to the claims of the present main request, that the claimed subject-matter is novel.
3. Inventive step (Article 56 EPC)

Claim 29 is directed to a composition for the extermination of plant parasitic nematodes. Since inventive step in respect of the composition is to be assessed taking into account the intended use thereof as a plant parasitic nematicide, it follows that should claim 29 be deemed to involve an inventive step, the same will apply to method claim 1, which recites that

composition. The same will also apply to claim 18 which concerns a method of preparation thereof.

4. Closest prior art

4.1 According to the contested decision D1 or D2 were seen as the closest prior art, while the appellant held that example XIII of D9 represents the most appropriate starting point for the skilled person.

4.2 The board is of the opinion that either of D1 or D2 on the one hand, or D9 on the other hand could equally serve as appropriate starting point for the skilled person. Consequently, the assessment of inventive step will be applied starting from both of these viewpoints.

5. D1 or D2 as closest prior art

5.1 D1 is the closest prior art when the terpene component of the composition comprises citral, and D2 when it comprises thymol. The following discussion applies equally to both alternatives.

Technical problem solved

5.2 D1 discloses that citral is toxic and/or repellent to inter alia worms of the class Nematoda (column 1, lines 21 - 25). An example is reported according to which application of an aqueous solution of citral to soil containing *Rotylenchulus reniformis nematodes* reduced the nematode count from 61 to 0.3 nematodes per 100 ml of soil after 70 days (column 1, lines 47-52).

5.3 D2 discloses that aqueous solutions of vermicides chosen from a list including thymol, can be used to kill all kinds of nematodes in soil, while having no

undesirable side-effect on plants. In this context, the assertion of the appellant that thymol is one of a list of ingredients in a formulation from which there is no indication that thymol is the active agent is not accepted. The relevant statement in D2 clearly identifies the materials listed as "[s]uitable vermicides".

- 5.4 The distinguishing features of claim 29 over D1 or D2 are that the composition thereof comprises the nematocidal terpene (citral or thymol) encapsulated into a hollow glucan particle and a surfactant is present in association with the terpene component.
- 5.5 In order to formulate the objective technical problem effectively solved by the claimed subject-matter, it must be determined whether the distinguishing features of the claim provide the alleged technical effects or advantages. Alleged effects or advantages which are neither credible nor supported by sufficient evidence cannot be taken into consideration in determining the problem.
- 5.6 The application as filed refers to "advantages" (i.e. technical effects) provided by the encapsulation of the terpene component in hollow glucan particles (page 13, line 30 - page 14, line 9). These include control of payload release kinetics and maximisation of the terpene payload.
- 5.7 It is plausible that these advantages are achieved by the compositions of claim 29. In comparison to an aqueous solution of a terpene whose "release profile" when applied to a sample of soil can only be described as immediate (since the terpene solution is applied directly to the soil), a terpene component encapsulated

into a hollow glucan particle will have a certain release profile over time which is necessarily slower. It is furthermore demonstrated in example 20, in contrast to the low aqueous solubility of terpenes (see example 2 and table 1), that very high loading of L-carvone in association with a surfactant in hollow glucan particles is possible with a minimal amount of water (see in particular table 31 and the subsequent text up to page 76, line 24). There is no reason to doubt that this result, demonstrated for L-carvone, would apply equally to terpene components comprising thymol or citral.

5.8 Furthermore, it has been demonstrated separately in the application that the use of a surfactant in association with the terpene component in accordance with claim 1 has the technical effect of increasing the terpene loading in the hollow glucan particles compared to when a surfactant is absent. Thus, according to example 14, the loading of citral into Baker's yeast particles (YP) was shown to increase with increasing addition of Tween-80 surfactant (see in particular table 22, entries 20 and 21). There is no reason to doubt that these results, demonstrated for citral and Tween-80, would apply equally to other terpene components and surfactants falling within the scope of claim 29.

5.9 In view of the above, the objective technical problem solved by the subject-matter of claim 29 starting from D1 or D2 as closest prior art is the provision of an improved composition for the extermination of plant parasitic nematodes having (at least) a slower release profile and increased terpene loading.

Obviousness

- 5.10 In order to arrive at the solution provided by claim 29, the skilled person, in a first step, would be required to combine either of D1 or D2 with D9. D9 discloses the potential encapsulation of a wide range of materials, including nematocides such as dichlorphen (page 3, lines 10-11) in microbes such as baker's yeast or brewer's yeast. Example XIII concerns the preparation of a nematocidal formulation comprising dichlorphen and baker's yeast which is said to release dichlorphen on digestion of the cell wall. However, the microbes according to D9 are **grown and intact**, and are consequently not to be considered as "hollow glucan particles" in the sense of claim 29 (see in particular D9, page 2, lines 28-32; page 2, lines 41-42; page 3, lines 1-3; page 3, lines 48-49; page 4, lines 21-24; claim 1). Thus a combination of D1 or D2 with D9 still lacks both the teaching that hollow glucan particles are to be employed, and that a surfactant is to be employed in association with the terpene component.
- 5.11 Consequently, in addition to D9 the skilled person would be required to combine D1 or D2 with D10, which teaches the isolation of hollow glucan particles in general together with their use in crop protection (page 12, lines 11 to 13).
- 5.12 The skilled person would not bypass D9 and combine D1 or D2 with D10 directly, since D10 represents a general teaching on the method of isolation of (hollow) glucan particles. References to the potential uses thereof in D10, although including the formulation of products needed in agriculture, in particular crop protection (page 12, lines 11-13) among a long and diverse list of possibilities, are broadly defined and do not include

any reference to use in a composition for killing plant parasitic nematodes. Thus the board considers it a necessary and indispensable first step for the skilled person to turn to D9 which explicitly discloses a nematicidal composition encapsulated in a microbe, before he could conceivably consider taking the teaching of D10 into account.

- 5.13 More importantly, none of the prior art documents D1, D2, D9 or D10 even mention the possibility of using a surfactant, let alone that it leads to an increased terpene loading. The skilled person faced with the technical problem as formulated above would thus have had no reason to include a surfactant in the composition, even if the latter were to be considered taught by a combination of D1 or D2 with D9 and D10.
- 5.14 It would therefore not have been obvious to the skilled person, starting at D1 or D2 and faced with the technical problem as formulated above, to arrive at the solution provided by claim 29 through a combination of D1 or D2 with D9 and D10.
- 5.15 Additionally, the board is of the view that even if the objective technical problem were to be seen as the mere provision of an alternative nematicidal composition to those of D1 or D2, the solution would remain non-obvious to the skilled person. More specifically, even when combining all three prior art documents D1 or D2, D9 and D10 in order to arrive at an alternative composition, the skilled person still does not arrive at the surfactant-containing composition as defined in claim 29.
- 5.16 Consequently, claim 29 involves an inventive step starting from either of D1 or D2 as closest prior art.

6. Example XIII of D9 as closest prior art
 - 6.1 The distinguishing features of claim 29 over example XIII of D9 (see paragraph 5.10, above) are that the active component is encapsulated in a **hollow** glucan particle, that the active component is a terpene comprising thymol or citral, and that a surfactant is present in association with the terpene component.
 - 6.2 Even if the skilled person were to combine D9 with D1 or D2, he would merely arrive to a composition comprising the yeast particle of example XIII of D9 and the citral or thymol of D1 or D2. Such a composition still would differ from that of claim 29 in terms of the hollow glucan particles and the presence of a surfactant. Consequently, the same applies as set out above (paragraphs 5.11-5.15).
 - 6.3 Thus, whether one chooses D1 or D2, or alternatively example XIII of D9 as closest prior art, composition claim 29 involves an inventive step.
 - 6.4 It follows, as noted above (paragraph 3) that claims 1 and 18, and all claims dependent thereon, also involve an inventive step.
7. The set of claims 1-29 according to the main request fulfills the requirements of the EPC and is consequently allowable.

Order

For these reasons it is decided that:

The decision under appeal is set aside.

The case is remitted to the examining division with the order to grant a patent with the following claims and a description to be adapted thereto:

Claims:

1-29 of the main request, filed with the letter of 12 October 2018.

The Registrar:

The Chairman:



N. Maslin

M. O. Müller

Decision electronically authenticated