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**Datasheet for the decision  
of 3 September 2019**

**Case Number:** T 0899/16 - 3.3.02

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**Language of the proceedings:** EN

**Title of invention:**  
INSECTICIDAL COMPOSITION

**Applicant:**  
McLaughlin Gormley King Company

**Headword:**

**Relevant legal provisions:**

EPC Art. 56, 83  
RPBA Art. 13

**Keyword:**

Inventive step

Sufficiency of disclosure

Late-filed request - amendments after arrangement of oral proceedings

**Decisions cited:**

**Catchword:**



**Beschwerdekammern**  
**Boards of Appeal**  
**Chambres de recours**

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Case Number: T 0899/16 - 3.3.02

**D E C I S I O N**  
**of Technical Board of Appeal 3.3.02**  
**of 3 September 2019**

**Appellant:** McLaughlin Gormley King Company  
(Applicant) 8810 Tenth Avenue North  
Minneapolis, MN 55427 (US)

**Representative:** Greaves Brewster LLP  
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**Decision under appeal:** **Decision of the Examining Division of the  
European Patent Office posted on 2 December 2015  
refusing European patent application No.  
07848379.9 pursuant to Article 97(2) EPC.**

**Composition of the Board:**

**Chairman** M. O. Müller  
**Members:** S. Bertrand  
R. Romandini

## Summary of Facts and Submissions

I. The appeal lies from the decision of the examining division to refuse European patent application EP 07 848 379.9 on the basis of the then sole pending request.

II. Documents D3, D6-D8, D11, D21, D22, D25 and D26, *inter alia*, were referred to during the examination proceedings:

D3 Database CAPLUS [online]  
Chemical Abstracts Service, Columbus, Ohio, US; Handa, S. K. et al: "Evaluation of dillapiole and dihydrodillapiole as synergists for pyrethrins in dust formulations", Database accession no. 1976:473399; & Pyrethrum Post , 13(2), 45-6 Coden: Pyrpan; ISSN: 0048-6043, 1975, XP-002486204

D6 Database CAPLUS [online]  
Chemical Abstracts Service, Columbus, Ohio, US; Wang, Huaiyong: "Natural pyrethrin emulsion in water and its preparation" Database accession no. 2006:644398 ; & CN 1 792 154 A, 28 June 2006 (2006-06-28) XP-002486207

D7 Database CAPLUS [online]  
Chemical Abstracts Service, Columbus, Ohio, US; Wang, Huaiyong et al: "Pyrethrin mothproofing agent for clothing and its preparation", Database accession no. 2006:113524 ; & CN 1 647 645 A, 3 August 2005 (2005-08-03) XP-002486208

D8 Database CAPLUS [online]

- Chemical Abstracts Service, Columbus, Ohio, US; Wang, Huaiyong et al: "Pyrethrin emulsifiable solution", Database accession no. 2006:113518 ; & CN 1 647 644 A, 3 August 2005 (2005-08-03) XP-002486209
- D11 WO 96/39034 A
- D21 Final report "The Efficacy of Pyrethrins and Dill Seed Oil Formulations against Cereal Aphid" (20 October 2006, no prior art)
- D22 Livie Biopesticides Limited - Test Results, BASF, (14 April 2008, no prior art)
- D25 Laboratory bioassay to determine the efficacy of 2 test substances against houseflies, *Musca domestica* (June 2013, no prior art)
- D26 A Novel Plant-based Synergist for Pyrethrum and Pyrethroids against Urban Public Health Pests, Nigel Hill Proceedings of the Sixth International Conference on Urban Pests, 2008 (no prior art)

III. The decision was based on claims 1-15 filed during oral proceedings as the sole request.

According to the contested decision the sole ground for refusal was that the set of claims of the sole request lacked inventive step, taking any of D3, D6, D7 and D8 as the closest prior art.

IV. The applicant (hereinafter: appellant) appealed against that decision. In its statement setting out the grounds of appeal the appellant requested that the decision under appeal be set aside and that the application be granted on the basis of the claim request considered by

the examining division in its decision. Further evidence was also filed.

- V. In preparation for oral proceedings, a communication of the board was sent in which the board raised objections with respect to, *inter alia*, exceptions to patentability (Article 53(c) EPC), sufficiency of disclosure (Article 83 EPC) and inventive step (Article 56 EPC).
- VI. With the letter of 27 August 2019 the appellant filed a new set of claims 1-15 as the main request, and three auxiliary requests.
- VII. During oral proceedings held on 3 September 2019, the appellant filed a set of claims 1-13 as a new main request. The previously pending main request was withdrawn and the three auxiliary requests (filed on 27 August 2019) were maintained.

The independent claims of the main request read as follows:

*"1. The use of dill oil as a potentiator for a pyrethrin insecticide, wherein the dill oil is obtained from Anethum sowa.*

*2. The use of dill oil for reducing or preventing the development of resistance to a pyrethrin insecticide by the target pest, wherein the dill oil is obtained from Anethum sowa.*

*10. A pesticidal composition which comprises a pyrethrin insecticide and dill oil, wherein the ratio of pyrethrin insecticide: dill oil is in the range of*

*from 1:5% w/w to 5:1% w/w, wherein the dill oil is obtained from Anethum sowa."*

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

Main request - sufficiency of disclosure (Article 83 EPC)

- The effectiveness of dill oil as a potentiator for a pyrethrin insecticide had been achieved over the whole scope of claim 1.
- The effectiveness of the dill oil in the composition had been clearly demonstrated in the examples given in the specification, particularly in examples 4 and 5. In particular, example 4 (and also the data submitted in D21) showed that when aphids were used as a bioindicator, dill oil had no effect when used alone, but synergised the effect of pyrethrin.
- D22 showed that the poor potency of alphacypermethrin (a pyrethroid) to the green peach aphid was effectively reversed by the presence of dill oil, again suggesting that dill oil is acting as an enzymatic synergist.
- The transfer of the effect observed by one pesticide (pyrethrin or alphacypermethrin) to the corresponding members of the same subclass (pyrethrin insecticide or pyrethroids) represented a smaller jump when compared with the jump of the synergistic effect from a member of one subclass (e.g. pyrethrin) to a member of the other subclass (e.g. alphacypermethrin).

- Both combinations, dill seed oil/pyrethrin 50% concentrate and dill seed oil/alphacypermethrin, exhibited a synergy and thus an increase in killing insects. This implied that the use of dill oil as a potentiator reduced the resistance to a pyrethrin insecticide by pests.

Main request - inventive step (Article 56 EPC)

- Taking any of D3, D6, D7 and D8 as the closest prior art, the subject matter of claim 1 differed on account of the use of dill oil from *Anethum sowa* instead of one of its components. Dill oil was not only naturally-occurring, and so less likely to have environmental issues, but was also highly cost-effective as there was no requirement for any chemical separations or synthesis.
- The objective problem was the provision of an alternative active and cost-effective potentiator or synergist for pyrethroid insecticides.
- D11 provided teaching that synergism may be highly affected by the presence of inhibitors that may be found in natural oil. D11 thus taught against using the entire oil on the basis of the finding that neem oil, obtained as a crude product from plants, did not act as a synergist whereas clarified neem oil did, as a result of the removal of "inhibitory factors".
- There was nothing in D3, in light of the teaching of D11, to motivate a skilled person towards using the entire dill oil instead of the isolated dillapiole. Furthermore, D3 taught that the



synthetic derivative, dihydrodillapiole, was a better synergist than dillapiole itself (which is a component of dill oil). The use specifically of dill oil from *Anethum sowa* was not an obvious solution to the problem.

- In view of the teaching of D6, D7 and D8 in combination with D3, the insecticidal properties of limonene could affect the product's true synergist nature, and/or any synergistic effects of the substances containing limonene could be impeded or inhibited by a combination with a different synergist such as dillapiole.
- The skilled person could have no reasonable expectation of success with any combination of oil, in view of the inherent unpredictability of a synergistic effect. It could not be predicted that dill oil, with its mix of components, would be such a good classical insecticidal potentiator, that may not only enhance the efficacy of a pyrethroid insecticide but also address the problem of insect resistance.

IX. The appellant's final requests were that the decision under appeal be set aside and that the application be granted on the basis of the main request filed as Annex III in the oral proceedings before the board, or on the basis of one of the first to third auxiliary requests filed by letter dated 27 August 2019.

## **Reasons for the Decision**

1. Admittance of the main request
  - 1.1 During oral proceedings, the amendments made in the claims of the previous main request filed on 27 August 2019 (VI, *supra*) were discussed. In an attempt to overcome the objections raised by the board under Articles 53(c) and 123(2) EPC, the appellant filed a new main request (VII, *supra*).
  - 1.2 A request filed at such a late stage of the proceedings may only be admitted at the discretion of the board pursuant to Article 13 RPBA.
  - 1.3 The set of claims of the new main request differs from the set of claims of the previous main request in that method claim 14 and first medical use claim 15 of the previous main request were deleted and in that the ratio of pyrethrin insecticide : dill oil in product claim 10 of the previous main request (1:6 w/w to 5:1 w/w) was amended to read 1:5 % w/w to 5:1 %w/w. The board is convinced that the amendments made in the set of claims of the new main request overcome the objections made during oral proceedings under Articles 53(c) and 123(2) EPC. Furthermore, the request did not raise any new issues that the board was not in a position to deal with.
  - 1.4 For these reasons, the main request filed during oral proceedings was admitted into the proceedings pursuant to Article 13(1) and (3) RPBA.

2. Amendments (Article 123(2) EPC)
  - 2.1 Independent claim 1 is based on the combination of claims 1-3 as originally filed.
  - 2.2 Independent claim 2 is based on the passages in the description as originally filed on page 4, lines 10-12, 17-18 and on page 7, line 7
  - 2.3 Independent claim 10 is based on the combination of claims 4-6 as originally filed, and the passages in the description as originally filed on page 13, lines 27-34 and on page 7, line 7.
  - 2.4 Dependent claims 3 and 12 are based on the description as originally filed on page 7, line 9. Dependent claims 4 and 11 are based on claim 7 as originally filed. Dependent claims 5, 8 and 9 are based on claims 8, 11 and 12 as originally filed, respectively. Dependent claim 6 is based on the passage on page 4, lines 29-31 of the application as originally filed. Dependent claims 7 and 13 are based on the application as originally filed on page 5, lines 5-9.
  - 2.5 It follows that the requirements of Article 123(2) EPC are met.
3. Sufficiency of disclosure (Article 83 EPC)
  - 3.1 Claim 1 relates to the use of dill oil obtained from *Anethum sowa* as a potentiator for a pyrethrin insecticide.
    - 3.1.1 In its communication pursuant to Article 15(1) RPBA (point 4.5), the board objected to the sufficiency of

disclosure of claim 1. The board had doubts whether the synergistic effect mentioned in claim 1 (expressed by the feature "use ... as a potentiator") was achieved over the whole scope of the claim.

- 3.1.2 The board is convinced that the application as filed, D21, D22, D25 and D26 show that a synergistic effect is achieved by using dill seed oil with pyrethrin.

In the application as filed a formulation blank (without any insecticide, figure 1) has no effect against cereal aphids, as shown by the mean number of aphids at four days after application ("96hr AA") which is higher than the mean number of aphids counted before application ("precount") at any application rate ("Rate g product/ha"). A formulation comprising a pyrethrin 50% concentrate (figure 2) and formulations comprising dill (seed) oil and a pyrethrin 50% concentrate at different ratios of pyrethrin insecticide : dill oil (figures 3-6) exhibit a significant activity against cereal aphids, the mean number of aphids at 96hr AA being lower than the precount mean number of aphids. As shown by the mean number of aphids at 96hr AA, the comparison between figure 2 and figures 3-6 demonstrates improved activity of the formulations comprising dill oil and a pyrethrin 50% concentrate (figures 3-6) at a treat rate of at least 500 g product/hectare when compared with the formulation comprising only a pyrethrin 50% concentrate (figure 2).

In D21 a formulation blank (without any insecticide, figure 1) and a formulation comprising dill (seed) oil (figure 2) have no inherent activity against cereal aphids at any application rate (as shown by the mean number of aphids at 96hr AA which is higher than the precount mean number of aphids). A formulation

comprising a pyrethrin 50% concentrate (figure 3) and a formulation comprising dill oil and a pyrethrin 50% concentrate (figure 4) exhibit a significant activity against cereal aphids. The comparison between table 3 and table 5 of D21 shows that the formulation comprising dill oil and a pyrethrin 50% concentrate (table 5) is more efficient than the formulation comprising a pyrethrin 50% concentrate (table 4) at a rate of at least 1000 g product per hectare.

The examples in D22 show a synergy between dill oil and pyrethrin, and between dill oil and alphacypermethrin (a pyrethroid), as evidenced by the observed higher-than-expected mortality of green peach aphids, see pages 6 and 7 of D22.

Lastly, figure 1 of D25 and table 1 of D26 also exhibit a higher than expected mortality of houseflies, demonstrating a synergy between dill oil and pyrethrin against houseflies. Synergy between dill oil and pyrethrin is additionally evidenced against cockroaches and mosquitoes in D26 (table 1).

The board is furthermore convinced that, on the basis of the application as originally filed, D21, D22, D25 and D26, the synergy can be credibly regarded as being achieved over the whole scope of claim 1, i.e. for all pyrethrin insecticides. Pyrethrin insecticides cover natural and synthetic pyrethrins such as those listed on page 9, lines 6-22, and pyrethroids, such as those listed from page 9, line 25 to page 13, line 7 of the application as filed. The board acknowledges that pyrethrins and pyrethroids as covered by the term "pyrethrin insecticide" of claim 1 do not belong to the same subclass of pyrethrin insecticides, but rather represent two distinct subclasses. The synergistic

effect observed when using dill oil with a pyrethrin 50% concentrate is evidence of synergy for a pyrethrin insecticide of the subclass encompassing natural and synthetic pyrethrins. The synergistic effect observed when using dill oil with alphacypermethrin (a pyrethroid) is evidence of synergy for a pyrethrin insecticide of the subclass of pyrethroids. Hence synergy has been proven to be present for two members of two different subclasses of pyrethrin insecticides. If synergy is present for members of different subclasses, this is all the more reason to assume that synergy is present for members within a given subclass. More specifically, the transfer of the effect of one member to the corresponding other members of the same subclass represents a "smaller jump" when compared with the jump from a member of one subclass (pyrethrin 50% concentrate) to a member of the other subclass (alphacypermethrin).

- 3.1.3 Since the synergistic effect is credibly achieved over the whole scope of claim 1, the board considers the invention as defined in claim 1 to be sufficiently disclosed.
  
- 3.2 Claim 2 (VII, *supra*) relates to the use of dill oil obtained from *Anethum sowa* for reducing or preventing the development of resistance to a pyrethrin insecticide by the target pest.
  - 3.2.1 The board is convinced by the appellant's argument (VIII, *supra*) that the fact that both combinations dill seed oil/pyrethrin 50% concentrate and dill oil/alphacypermethrin exhibit a synergy and thus an increase in killing insects implies that the resistance to a pyrethrin insecticide by pests is reduced. More specifically, the use of the claimed combination of

components leads to fewer insects on the plant and the lower the number of insects, the lower the likelihood of developing resistance. Since the use of dill oil as a potentiator for any pyrethrin insecticide is credibly achieved over the whole scope of claim 1 (3.1.2, *supra*), it must be assumed that the effect of reducing or preventing the development of resistance to a pyrethrin insecticide by the target pest is achieved over the whole scope of claim 2 as well. The board thus considers that the invention as defined in claim 2 is sufficiently disclosed.

3.3 The board therefore comes to the conclusion that the invention as defined in the main request is sufficiently disclosed pursuant to Article 83 EPC.

4. Novelty (Article 54 EPC)

The board sees no reason to deviate from the examining division's finding in the contested decision that the claimed subject-matter is novel, which applies equally to the claims of the present main request.

5. Inventive step (Article 56 EPC)

5.1 The present application aims at providing new potentiators for pyrethrin pesticides (page 2, lines 17-19).

5.2 Closest prior art

According to the decision under appeal, any of D3, D6, D7 or D8 represents the closest prior art. In its statements of ground of appeal (points B.1-B.5), the appellant submitted arguments taking any of those documents as the closest prior art.

In the same way as the patent application, D3, D6, D7 and D8 aim at providing potentiators for pyrethrin insecticides, see the documents' abstract. Each of D3, D6, D7 and D8 teaches the use of dillapiole or limonene, which are components of dill oil, as a potentiator for pyrethrin. The board thus sees no reasons to deviate from the examining division's and appellant's position.

### 5.3 Claim 1

The subject-matter of claim 1 differs from each of D3, D6, D7 and D8 on account of the use of dill oil obtained from *Anethum sowa* instead of the dill oil components dillapiole or limonene.

#### 5.3.1 Formulation of the technical problem

Claim 1 is restricted to uses in which a synergistic effect (expressed by the feature "use ... as a potentiator") is achieved. Furthermore, dill oil is naturally-occurring and does not require chemical separations or synthesis unlike dillapiole or limonene, referred to in D3, D6, D7 and D8.

Considering this, the objective technical problem is the provision of an alternative active and cost-effective potentiator for pyrethrin insecticides.

#### 5.3.2 Obviousness

In order to solve the technical problem and arrive at the subject-matter of claim 1, the skilled person would be required to replace dillapiole and limonene with dill oil obtained from *Anethum sowa*.



As set out below, the board is convinced that the skilled person would not have carried out this replacement.

The closest prior art D3 discloses that the synthetic equivalent, dihydrodillapiole, is a better synergist than the natural dillapiole (see abstract of D3). Faced with the technical problem posed, the skilled person would not have been inclined to start from a component of dill oil (dillapiole), let alone use natural dill oil as required by claim 1. They instead would have considered the compound with the greater synergistic activity (i.e. dihydrodillapiole) as a starting point and investigated **synthetic** analogues thereof.

In view of the teaching of the closest prior art documents D6, D7 and D8 (VIII, *supra*), the skilled person would not be prompted to use entire dill oil instead of limonene as disclosed in those documents. More specifically, dill oil does not represent the main source of limonene, whereas citrus oil, for instance, does. The skilled person would therefore have chosen citrus oil, not dill oil, as the more promising limonene source.

Lastly, in view of D11, the skilled person would not have been inclined to use dill oil instead of the dill oil components dillapiole or limonene as disclosed in the closest prior art documents. D11 (claims 1, 3 and 5) relates to a composition having pest control activity, the composition comprising pyrethrum, and azadirachtin and/or clarified neem oil at a specific weight ratio. On page 5, lines 22-26, it is explained that the activity of the composition is attributed to the use of clarified neem oil, which lacks inhibitory factors present in crude neem oil. From the above-cited

passages it may therefore be concluded that synergy for pyrethrum is achieved by using a clarified neem oil and/or a component thereof (azadirachtin). D11 teaches the skilled person that crude neem oil may not be used as such, since it comprises compounds which inhibit the synergism of the oil for pyrethrum. They would conclude that synergism may be highly affected by the presence of inhibitors that may be found in natural unrefined oil. In view of this teaching of D11, the skilled person would not exclude the possibility that dill oil from *Anethum sowa* as required by claim 1 comprises inhibitory factors. Therefore, the skilled person would not attempt to use dill oil obtained from *Anethum sowa*, with its complex mix of components, for solving the technical problem posed.

5.3.3 It follows that the subject-matter of claim 1 involves an inventive step.

5.4 Claim 2

5.4.1 As set out above when discussing sufficiency of disclosure, claim 2 is directed to the use of dill oil obtained from *Anethum sowa* for reducing or preventing the development of resistance to a pyrethrin insecticide by the target pest. The technical problem underlying the subject-matter of claim 2 may thus be formulated as the provision of an alternative potentiator for reducing or preventing the development of resistance to a pyrethrin insecticide by a target pest. The solution proposed by claim 2 is to use dill oil obtained from *Anethum sowa* as a potentiator for a pyrethrin insecticide for reducing or preventing the development of resistance to a pyrethrin insecticide by a target pest. For the same reasons as set out in point 5.3.2 above, the use of dill oil obtained from *Anethum*

*sowa* as a potentiator for a pyrethrin insecticide and thus for reducing or preventing the development of resistance to a pyrethrin insecticide by the target pest is not obvious. Therefore, inventive step of the subject-matter of claim 2 may be acknowledged.

5.5 Claim 10

5.5.1 Claim 10 relates to a pesticidal composition which comprises a pyrethrin insecticide and dill oil, wherein the ratio of pyrethrin insecticide : dill oil is in the range of from 1:5% w/w to 5:1% w/w, wherein the dill oil is obtained from *Anethum sowa*. For the same reasons as given when discussing sufficiency of disclosure of the invention underlying claim 1, it is credible that a synergistic effect is achieved over the whole scope of claim 10. The technical problem underlying the subject-matter of claim 10 is therefore the same as that formulated for claim 1 (5.3.1, *supra*). For the same reasons as given for claim 1 (5.3.2, *supra*), the solution to the technical problem provided by claim 10 is not obvious and the subject-matter of claim 10 involves an inventive step.

5.6 Since claims 3-9 are dependent on claims 1 and 2 and claims 11-13 are dependent on claim 10, they equally involve an inventive step (Article 56 EPC).

6. For these reasons, the set of claims 1-13 according to the main request fulfils the requirements of the EPC and is consequently allowable.

## Order

### For these reasons it is decided that:

7. The decision under appeal is set aside.
8. The case is remitted to the examining division with the order to grant a patent on the basis of the claims according to the main request filed as Annex III during the oral proceedings before the board and a description to be adapted thereto.

The Registrar:

The Chairman:



N. Maslin

M. O. Müller

Decision electronically authenticated