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**Datasheet for the decision
of 2 February 2023**

Case Number: T 1336/19 - 3.3.10

Application Number: 12842371.2

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Language of the proceedings: EN

Title of invention:
ANTIMICROBIAL FORMULATIONS WITH PELARGONIC ACID

Patent Proprietor:
Anitox Corporation

Opponent:
Arnold & Siedsma B.V.

Headword:

Relevant legal provisions:

Keyword:

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Beschwerdekammern

Boards of Appeal

Chambres de recours

Boards of Appeal of the
European Patent Office
Richard-Reitzner-Allee 8
85540 Haar
GERMANY
Tel. +49 (0)89 2399-0
Fax +49 (0)89 2399-4465

Case Number: T 1336/19 - 3.3.10

D E C I S I O N
of Technical Board of Appeal 3.3.10
of 2 February 2023

Appellant: Anitox Corporation
(Patent Proprietor) 1055 Progress Circle
Lawrenceville, GA 30043 (US)

Representative: HGF
HGF Limited
1 City Walk
Leeds LS11 9DX (GB)

Respondent: Arnold & Siedsma B.V.
(Opponent) Bezuidenhoutseweg 57
2594 AC Den Haag (NL)

Representative: van Kooij, Adriaan
Arnold & Siedsma
Bezuidenhoutseweg 57
2594 AC The Hague (NL)

Decision under appeal: **Decision of the Opposition Division of the
European Patent Office posted on 11 March 2019
revoking European patent No. 2768539 pursuant to
Articles 101(2) and 101(3) (b) EPC.**

Composition of the Board:

Chair P. Gryczka
Members: R. Pérez Carlón
F. Blumer

Summary of Facts and Submissions

- I. The appellant (patent proprietor) lodged an appeal against the opposition division's decision revoking European patent No. 2 768 539.
- II. Notice of opposition had been filed on the grounds of added subject-matter (Article 100(c) EPC), insufficiency of disclosure (Article 100(b) EPC) and lack of novelty and inventive step (Article 100(a) EPC).
- III. The following documents are relevant to the present decision:
- D3 WO 2011/017367
- D4 Bisignano et al., In vitro antibacterial activity of some aliphatic aldehydes from *Olea europea* L. FEMS Microbiology Letters 198 (2001) 9-13
- D7 Experimental evidence filed as a declaration by Kurt Richardson dated 28 September 2018
- D8 Experimental evidence filed as a declaration by Kurt Richardson dated 10 July 2019
- IV. Claim 1 of the patent as granted, which is the appellant's main request in these appeal proceedings, reads as follows:

"An antimicrobial composition for extending the shelf-life of water, feed or feed ingredients, comprising:

water,

5-15 wt.% nonanoic acid,

10-20 wt.% acetic acid,

40-50 wt.% propionic acid,

*5-30 wt. % trans-2-hexenal, and
5-30 wt. % of butyraldehyde, undecylenic aldehyde,
2,4 decadienal, cinnamaldehyde, decanal or
furfural."*

V. The opposition division concluded that the claims of the patent as granted had the required basis in the application as originally filed, and that the claimed invention was sufficiently disclosed for it to be carried out by a skilled person. Document D3 was the closest prior art. The available evidence did not prove the presence of synergy between ingredients of the compositions, so the sole problem which could be considered solved by the claimed compositions was providing alternative antimicrobial compositions suitable for extending the shelf-life of water, feed or feed ingredients. The claimed solution, characterised by requiring trans-2-hexenal and a further aldehyde, would have been obvious for a skilled person in view of D4 and was thus not inventive. The objection applied analogously to all the auxiliary requests then pending.

VI. With the statement setting out the grounds of appeal, the appellant filed its first to twelfth auxiliary requests. Claim 1 of the first auxiliary request reads as follows:

*"A method for extending the shelf-life of feed or feed ingredients, comprising:
spray-treating or admixing to feed or feed ingredients,
an effective amount of a composition comprising:*

water,

*5-15 wt. % nonanoic acid,
10-20 wt. % acetic acid,
40-50 wt. % propionic acid,*

*5-30 wt.% trans-2-hexenal, and
5-30 wt.% of butyraldehyde, undecylenic aldehyde,
2,4 decadienal, cinnamaldehyde, decanal or
furfural."*

VII. The appellant's (patent proprietor's) arguments were as follows.

There was no word-for-word basis for claim 1 of the patent as granted in the application as originally filed. However, claim 12, which referred back to claim 6, which was dependent on claim 1, disclosed all the features of claim 1 of the patent as granted with the exception of the required "other aldehydes", which were to be found in claim 2 and example 7.

With respect to claim 1 of the first auxiliary request, the combination of originally filed claims 12 and 7 disclosed a method using a composition comprising nonanoic, propionic and acetic acids, trans-2-hexenal in the required proportions, and 5-30 wt.% of "other aldehyde". A skilled person would have looked for which other aldehydes could be used and would have found that information in example 7 of the application. The claimed method thus had the required basis.

It was undisputed that most of the components required by the method of claim 1 of the first auxiliary request had biocide activity on their own. For this reason alone, the claimed method could have been carried out and was sufficiently disclosed.

Experimental evidence D8 should be admitted into the proceedings. The decision under appeal found for the first time that no synergy had been proven due to the lack of data for trans-2-hexenal alone. D8 was filed in

response, at the earliest opportunity.

Document D3 was the closest prior art and disclosed a method for extending the shelf-life of feed or feed ingredients by means of a composition comprising nonanoic, acetic and propionic acids. The problem of providing an improved method was credibly solved in view of D8, which proved a synergistic interaction between the acids disclosed in D3 and trans-2-hexenal. As synergy could not be predicted, the claimed solution would not have been obvious for a skilled person and was inventive.

VIII. The respondent's (opponent's) arguments were as follows.

In the application as filed, claim 12 referred back to claim 6, which referred back to claim 1. This combination did not disclose the component proportions required by claim 1. Furthermore, claim 2 could not provide a basis for the aldehydes specified in claim 1 as multiple selections were needed to arrive at them. This was even more so the case in view of claim 3 as originally filed. The components in example 7 were combined in specific proportions which were not features of claim 1. Claim 1 of the main request therefore did not fulfil the requirements of Article 123(2) EPC. The same argument applied with respect to claim 1 of the first auxiliary request.

The opposition division concluded that it was not clear whether the data in the patent or the alleged correction of those data filed as D7 were accurate. The respondent argued that the discrepancy in the available experimental values meant that the claimed invention was not sufficiently disclosed.

Experimental evidence D8 could and should have been filed sooner. The issue of whether synergy was proven had been raised from the outset of the opposition proceedings. D8 thus should not be admitted into the proceedings.

Document D3 was the closest prior art. The problem of providing an improved method was not credibly solved in view of the numerous inconsistencies in the available data. Even if synergy were proven, it was not surprising in view of the teaching of D3 and D4. The subject-matter of claim 1 of the main request and of auxiliary request 1 would have been obvious for a skilled person and was thus not inventive.

- IX. In a communication in preparation for oral proceedings, the board informed the parties that it was likely to consider the claimed invention to be sufficiently disclosed. It was also likely to conclude that the claims of the patent as granted had the required basis in the application as originally filed. D8 appeared to prove synergy between trans-2-hexenal and the combination of pelargonic, acetic and propionic acids, and the claimed invention was likely to be considered inventive.
- X. Oral proceedings before the board of appeal took place on 2 February 2023.
- XI. The parties' final requests were as follows.

The appellant requested that the decision under appeal be set aside and that the patent be maintained as granted (main request), or that the patent be maintained with the claims of any one of the first to

the twelfth auxiliary requests, all auxiliary requests as filed with the statement setting out the grounds of appeal.

The respondent requested that the appeal be dismissed.

XII. At the end of the oral proceedings, the decision was announced.

Reasons for the Decision

1. The appeal is admissible.
2. Amendments - main request
 - 2.1 Claim 1 of the main request relates to a composition comprising water and defined proportions of nonanoic acid (pelargonic acid), acetic acid, propionic acid, trans-2-hexenal and a second aldehyde selected from a list of six specific aldehydes.
 - 2.2 The appellant relied on the combination of claims 12, 6 and 1 as originally filed as the basis for the component proportions specified in claim 1.

This, however, is not correct. Claim 1 as filed limits the amount of aldehyde to a maximum of 30 wt.%. This maximum is not required by claim 1 of the patent.

The appellant argued that claim 1 as filed defined two types of aldehyde: (i) a mixture of C₁-C₂₄ aldehydes, and (ii) a second type which had to be present in an amount of 0-30 wt.%. The upper limit of 30 wt.% thus did not apply to the total amount of aldehydes in the composition.

However, claim 1 as originally filed does not specify two different types of aldehyde as argued by the appellant. The only aldehydes defined in this claim are mixtures of C₁-C₂₄ aldehydes, so for the skilled reader the feature "0-30 wt.% aldehyde" at the end of the claim only defines the total amount of aldehydes in the composition and does not relate to a second type of aldehyde which was not structurally defined in claim 1 as filed. In other words, claim 1 as filed requires a mixture of aldehydes with a defined number of carbon atoms and limits the amount of aldehyde in the mixture to 30 wt.%. Since this limitation is not present in claim 1 of the patent, this claim does not find any support in the application as filed.

2.3 The ground for opposition set out by Article 100(c) EPC thus precludes the maintenance of the patent as granted.

3. First auxiliary request - amendments

3.1 As a basis for claim 1 of the first auxiliary request, the appellant relied on the combination of claims 12 and 7, both relating to a method for extending the shelf-life of feed or feed ingredients, with example 7, which discloses what was meant by "other aldehyde".

The combination of claims 12 and 7 leads to a method using an antimicrobial composition having the proportions set out in claim 1 of auxiliary request 1. The combination of claims 12 and 7 requires 5-30 wt.% of "other aldehyde" whereas claim 1 requires 5-30 wt.% of butyraldehyde, undecylenic aldehyde, 2,4 decadienal, cinnamaldehyde, decanal or furfural. The nature of the "other aldehyde" can be found in example 7, which discloses a number of mixtures containing pelargonic,

propionic and acetic acids, trans-2-hexenal and another aldehyde (see Tables 9 and 11 to 15). The complete list of "other aldehydes" is provided on page 16, first and second lines of the penultimate paragraph. All these aldehydes, with the exception of citral, are specified in claim 1.

Claim 1 of the first auxiliary request thus has a basis in the application as originally filed.

- 3.2 The respondent argued that example 7 disclosed specific compositions which could not be generalised to the proportions required by claim 1.

However, the appellant did not rely on a generalisation of example 7 as a basis for claim 1. The issue is how a skilled person could have found the information which is missing from claim 12, namely the nature of the "other aldehyde" which needs to be present. The skilled person would have found this information in example 7.

- 3.3 The respondent also argued that, in the version as originally filed, the sole aldehyde different from trans-2-hexenal mentioned in the method claims was formaldehyde, which was not required by claim 1 of the patent. For that reason too, the claimed invention did not have the required basis.

However, whether formaldehyde could also be regarded as "other aldehyde" within the meaning of claim 12 of the application as originally filed does not change the fact that the aldehydes in claim 1 had the required basis.

4. Sufficiency of disclosure

4.1 Experimental evidence D7 was filed in opposition in order to correct an alleged error in the entry for 2-hexenal in Tables 10 to 15 of the patent. The opposition division concluded that it was not clear whether the data in the patent or in D7 were correct. The respondent argued that this unreliable experimental evidence could not prove any synergistic effect. Since the desired effect had not been achieved, the claimed invention could not be deemed sufficiently disclosed for it to be carried out by a skilled person.

4.2 It was not disputed that the antimicrobial activity of the components specified in claim 1 was known from the prior art. There is thus no reason to believe that the shelf-life of feed or feed ingredients would not be extended if they were spray-treated or admixed with a composition containing such compounds. Whether the components would additionally act in a synergistic way is irrelevant for the question of the sufficiency of the claimed invention's disclosure.

The board therefore concludes that the invention is sufficiently disclosed to be put into practice by a skilled person.

5. Admissibility of experimental evidence D8

5.1 This evidence was filed with the statement of grounds of appeal and is part of the appeal proceedings unless the board makes use of its discretion to hold it inadmissible as per Article 12(4) RPBA 2007. The appellant filed the evidence in order to prove the alleged synergistic effect between the antimicrobial components specified in claim 1.

5.2 The respondent argued that the issue of whether synergy was proven had been raised from the outset of the opposition proceedings and that the opposition division had mentioned it in its communication in preparation for oral proceedings. For this reason, D8 could and should have been filed earlier and thus should not be admitted into the proceedings.

5.3 The annex to the summons for oral proceedings before the opposition division mentioned that synergy was not considered proven because the claims included amounts which corresponded to an "overkill" situation (page 6, last paragraph). In contrast, in the decision under appeal, the division concluded that synergy could not be considered proven due to the lack of data on the effect of trans-2-hexenal alone (page 10, sixth paragraph). This reasoning is on file for the first time in the decision under appeal. D8 is thus a reply to the opposition division's reasoning in the decision under appeal. It was filed at the earliest opportunity, i.e. with the grounds for appeal.

5.4 The board therefore decided to admit D8 into the proceedings.

6. Inventive step - first auxiliary request

6.1 Closest prior art

The opposition division and the parties considered document D3 to be the closest prior art. The board sees no reason to disagree.

Document D3 discloses a method for treating feed or feed ingredients with a composition comprising nonanoic acid, acetic acid and propionic acid. D3 relies on

synergy between nonanoic acid and acetic or propionic acid (page 19, last two lines). On page 7, last paragraph, D3 discloses a composition comprising 1 wt.% to 100 wt.% organic acids. Of the organic acid component, 2 wt.% to 20 wt.% is pelargonic acid and the rest is acetic acid, propionic acid or a mixture of these.

6.2 Technical problem underlying the invention

The technical problem addressed by the claimed invention is providing an improved method for extending the shelf-life of feed or feed ingredients using a composition.

6.3 Solution

The claimed solution to this technical problem is the method comprising a mixture of acids of claim 1, characterised by additionally requiring defined proportions of trans-2-hexenal and of butyraldehyde, undecylenic aldehyde, 2,4 decadienal, cinnamaldehyde, decanal or furfural.

6.4 Success

6.4.1 The appellant relied on the results obtained in D8 to show that the components of the composition required by claim 1 worked synergistically.

6.4.2 Part A of D8 provides the effect of different compositions on *S. typhimurium* cultures. Formulation 1 contains propionic acid, acetic acid, pelargonic acid and trans-2-hexenal. Formulation 4 only contains the aldehyde trans-2-hexenal. Formulation 5 contains a mixture of the three acids and is representative of the

disclosure of D3.

Table 3 on page 2 of D8 shows the reduction in *Salmonella* obtained by applying a number of compositions, including formulations 1, 4 and 5, at different concentrations. Table 4 provides the comparison of the results of formulation 1 with the sum of the effect achieved by formulations 4 and 5, labelled (b). The results obtained by formulation 1 are well above what would have been expected from the mere addition of the effects of the individual components, at all the tested concentrations.

6.4.3 The board thus concluded that the problem as formulated by the appellant has been successfully solved by the method of claim 1 of the first auxiliary request.

6.4.4 The respondent argued that the problem as defined by the appellant had not been credibly solved and criticised the results in D8 for a number of reasons. It argued that composition 1 of D8 was the same as composition F18 in the examples of the patent. F18, however, achieved much less of a reduction in *Salmonella* than that obtained according to D8, casting doubt on all the results of D8.

However, composition F18 is tested under different conditions. It is thus not surprising that the obtained results differ. In addition, composition F18 of the patent contains 20% of 56% acetic acid while formulation 1 in D8 contains 20% of acetic acid, so the concentration of acetic acid is different too.

6.4.5 The respondent argued that the application only contained a mere statement that synergy was present but the data at the filing date did not support that

effect. The appellant could not rely only on post-published evidence such as D8 to prove it.

However, synergy between aldehydes and organic acids, especially nonanoic acid, is mentioned on page 9, second full paragraph. Examples 3 to 6 of the application show the combined effect of pelargonic acid and trans-2-hexenal. The desired synergy is thus not merely an assertion but is at the core. The board sees no reason why the content of experimental evidence D8 could not be taken into consideration.

- 6.4.6 The respondent also argued that it had calculated the LD₅₀ from the data available in Table 3 following the statistical analysis protocol in point 7 of D8. The obtained values greatly differed from those in D8.

The respondent has not provided said calculations. The board thus cannot examine the correctness of the respondent's conclusion. This argument is thus not convincing, regardless of whether it is also belated.

- 6.4.7 The respondent further argued that the patent showed pelargonic acid to be active at the dilutions tested in D8, which, nevertheless, disclosed it as being non-active.

As with composition F18, the conditions differ between the tests of the patent and of D8. For this reason alone, the argument is not convincing.

- 6.4.8 The board thus concluded that the respondent's arguments relying on alleged inconsistencies in the available data were not convincing.

- 6.5 Since the technical problem as formulated by the appellant has been credibly solved by the claimed method, it remains to be decided whether the proposed solution to this problem was obvious for a skilled person.
- 6.5.1 In principle, synergy is unpredictable. The state of the art does not hint at combining the three acids specified in claim 1 with any aldehyde, let alone with trans-2-hexenal, with the aim of obtaining a synergistic composition. The claimed solution would therefore not have been obvious for a person skilled in the art and is thus inventive.
- 6.5.2 The respondent argued that a synergistic effect was disclosed not only in D3, relating to acids, but also in D4, which related to aldehydes. D3 disclosed (fourth paragraph of page 7) that mixtures of acids resulted in a synergistic preservative effect. On page 12, right-hand column, first full paragraph, D4 disclosed a synergistic mixture of aldehydes. D4 further disclosed (second paragraph of the right-hand column of page 12) that aldehydes had an application as food preservatives. Lastly, D4 disclosed trans-2-hexenal as being very effective against *Listeria monocytogenes* (Table 3), so a skilled person would have chosen it from among the aldehydes disclosed in D4.

However, neither D3 nor D4 hints at the existence of synergy between biocide acids and biocide aldehydes. For this reason alone, the respondent's argument is not convincing.

The argument that the skilled person would have chosen trans-2-hexenal in view of D4 is not convincing either. D4 discloses that aldehydes with longer aliphatic

chains are preferred (page 12, paragraph bridging both columns); trans-2-hexenal is the shortest of the aldehydes disclosed in D4. According to Table 3, other aldehydes are as active as trans-2-hexenal against *L. monocytogenes* (4) or even more active (8).

7. The board thus concludes that the appellant's first auxiliary request is allowable.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the opposition division with the order to maintain the patent on the basis of the claims of the first auxiliary request as filed with the statement setting out the grounds of appeal and a description yet to be adapted.

The Registrar:

The Chair:



C. Rodríguez Rodríguez

P. Gryczka

Decision electronically authenticated