Internal distribution code:

(A) [-] Publication in OJ
(B) [-] To Chairmen and Members
(C) [-] To Chairmen
(D) [X] No distribution

Datasheet for the decision of 6 November 2024

Case Number: T 0087/22 - 3.3.10

Application Number: 12790544.6

Publication Number: 2787955

IPC: A61K8/34, A61K8/36, A61K8/368, A61Q19/10, A61Q17/00, A61K8/46, A01N31/04, A01N31/08, B08B1/00

Language of the proceedings: EN

Title of invention:
AN ANTIMICROBIAL COMPOSITION

Patent Proprietors:
Unilever Global IP Limited
Unilever IP Holdings B.V.

Opponent:
Beiersdorf AG

Headword:

Relevant legal provisions:
EPC Art. 56

Keyword:
Inventive step - (yes) - unexpected improvement shown

Decisions cited:
T 0041/16

Catchword:

Europäisches Patentamt
European Patent Office
Office européen des brevets

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

Case Number: T 0087/22 - 3.3.10

D E C I S I O N
of Technical Board of Appeal 3.3.10
of 6 November 2024

Appellant: (Opponent)	Beiersdorf AG Unnastrasse 48 20245 Hamburg (DE)
Representative:	Uexküll & Stolberg Partnerschaft von Patent- und Rechtsanwälten mbB Beselerstraße 4 22607 Hamburg (DE)
Respondent: (Patent Proprietor 1)	Unilever Global IP Limited Port Sunlight Wirral, Merseyside CH62 4ZD (GB)
Respondent: (Patent Proprietor 2)	Unilever IP Holdings B.V. Weena 455 3013 AL Rotterdam (NL)
Representative:	van den Brom, Coenraad Richard Unilever Patent Group Bronland 14 6708 WH Wageningen (NL)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 8 November 2021 rejecting the opposition filed against European patent No. 2787955 pursuant to Article 101(2) EPC.**

Composition of the Board:

Chairman	P. Gryczka
Members:	M. Kollmannsberger
	L. Basterreix

Summary of Facts and Submissions

I. The opponent appealed the Opposition Division's decision to reject the opposition against the disputed patent EP 2 787 955 pursuant to Article 101(2) EPC.

II. The patent deals with antimicrobial compositions containing a combination of essential oils and a hydrotrope. The compositions may be used as skin disinfectants. The underlying invention is the finding that the addition of specific hydrotropes to otherwise known compositions allows the essential oils contained therein to be used in a lower amount while maintaining antibacterial efficacy.

III. The following documents are referred to in this decision:

D1: WO 2006/053458 A1

D2: WO 2010/046238 A1

D10: Technical data (Table 1) filed during examination on 7.10.2013

D11: Falbe Jürgen et al., "Römpp Chemie Lexikon" Stuttgart, New York; Thieme Verlag 1995, 9th Ed., pages 1895-1896: Hydrotropie

D12: US 6,468,945 B1

D14a: Kurt Kosswig, "Surfactants", in Ullmann's Encyclopedia of Industrial Chemistry, VBol. 35, pages 421-505; Wiley-VCH Verlag GmbH & Co. KgaA, Weinheim 2012

D15: Kirk-Othmer, Concice Encyclopedia of Chemical Technology, 5th Edition, Volume 2, John Wiley & Sons, Inc, Hoboken, New Jersey, USA 2007, pages 989-994, "Surfactants"

D18: Ivancovic et al., Acta Chim. Slov. 2009, 56, 1003-1009

D19: Handbook of Pharmaceutical Excipients, 5th Edition, Pharmaceutical Press, London, and American Pharmacists Association, Washington, 2006, pages 654-655 and 662-664

D23: WO 96 06153 A2

D24: Hatzopoulos et al., Langmuir 2011, 27, 12346-12353

D25: US 6,204,230 B1

E1: Experimental Report E1, filed 10 July 2022

E2: Experimental Report E2, filed 10 July 2022

IV. Claim 1 of the granted patent reads as follows:

"An antimicrobial composition comprising

(a) an essential oil active mixture of 0.02 wt-% to less than 0.05 wt.-% thymol and 0.05 wt.-% to less than 0.5 wt.-% terpineol, wherein wt.-% is expressed by weight of the composition; and
(b) 0.1 wt.-% to 5 wt.-% of a hydrotrope selected from the group consisting of sodium benzoate, sodium toluene sulphonate, sodium cumene sulphonate, sodium xylene sulphonate, sodium acetate, and mixtures thereof."

V. The opposition had been filed on the grounds of lack of novelty and inventive step (Article 100(a) EPC) and lack of sufficient disclosure (Article 100(b) EPC). The

Opposition Division concluded that none of these grounds precluded the maintenance of the patent. In particular it held that the compositions defined in claim 1 of the granted patent were not obvious over D2 as closest prior art document.

VI. The Opposition Division's findings on novelty and sufficiency of disclosure were not contested in appeal proceedings.

VII. The appellant submitted that the Opposition Division's decision on inventive step was erroneous. The Opposition Division was correct to state that starting from D2 the objective technical problem to be solved was the provision of alternative antimicrobial compositions. However, in contrast to the findings of the Opposition Division the addition of the hydrotropes defined in the claim to the compositions disclosed in D2 would have been an obvious solution to this problem in view of at least D1 and D19. Thus, the compositions defined in the patent claims were not based on an inventive step.

VIII. The respondent submitted that the data on file showed an improvement in antibacterial efficacy obtained when adding the hydrotropes defined in claim 1 to the compositions known from D2. Such an improvement was not foreseeable from the cited documents, in particular not from D1 and D19. Thus, starting from D2 the claimed compositions provided a non-obvious solution of the technical problem to find unexpectedly improved skin disinfectants. The patent claims were thus based on an inventive step.

IX. The appellant (opponent) requested that the appealed decision be set aside and the patent be revoked. The appellant further requested that documents D12, D18, D23, D24 and D25 be admitted into the proceedings and that experimental reports E1, E2 and document D14a not be admitted into the proceedings.

X. The respondent requested the appeal to be dismissed. Should the appeal not be dismissed the respondent requested maintenance of the patent in amended form under Article 101(3)(a) EPC on the basis of the claim sets filed as auxiliary requests 1-3 together with its reply to the appellant's statement setting out the grounds of appeal. The respondent further requested that documents D12, D18 and D25 not be admitted into the proceedings and that experimental reports E1 and E2 be admitted into the proceedings, as well as document D14a.

XI. Oral proceedings before the Board took place on 9 November 2024. The decision was announced at the end of the oral proceedings.

Reasons for the Decision

1. The appeal is admissible

2. Admission of evidence

As apparent from the reasoning below, the content of neither of E1, E2, D12, D14a, D18, D23 or D24 is relevant for the outcome of the proceedings. The objection based on D25 was not maintained, see point 3.3.6 below.

Thus, the parties' requests for admission or non-admission of these documents need not be addressed.

The patent as granted

3. Inventive step (Article 56 EPC)

3.1 Closest prior art

The patent deals with antimicrobial compositions containing a combination of thymol and terpineol as well as at least one hydrotrope selected from a list of six possibilities.

D2 discloses antimicrobial compositions containing thymol and terpineol, in concentrations covered by the claims of the patent, see e. g. claim 1. According to D2 thymol and terpineol act together in a synergistic way as regards their antibacterial activity. Such a synergism is observed in particular in wash-off processes where only short contact times of less that 15 seconds are available for disinfection, see page 11 lines 4-21 and examples 1-3. Achieving high antibacterial efficacy when only short contact times are available is also the object of the disputed patent. Moreover, the disclosure of D2 is acknowledged in the patent in paragraph [0004].

The Opposition Division chose D2 as the document representing the closest state of the art and the Board agrees. This choice was undisputed by the parties.

It was likewise undisputed that claim 1 of the granted patent differs from the disclosure of D2 in feature (b), i. e. in the presence of one of the six hydrotropes listed there or mixtures thereof, in the specified concentration.

3.2 Objective technical problem solved by the claimed compositions

3.2.1 The parties disagreed on the question of which objective technical problem, starting from D2, is solved by the claimed compositions.

3.2.2 The respondent argued that the addition of the hydrotropes increased the antimicrobial efficacy of the compositions. Thus, the terpineol and thymol could be used at lower concentrations while maintaining the antibacterial effect. It relied on the comparative data in the patent and in D10. The respondent relied as well on the newly filed data contained in E1 and E2, the admission of which was contested by the appellant.

3.2.3 The appellant argued that the objective technical problem to be solved could only be the provision of an alternative antimicrobial composition. No improvement could be attributed to the presence of the hydrotropes.

Example 3 of D2 showed that a composition containing thymol and terpineol in concentrations corresponding to the upper limit defined in the patent claim lead to a complete antibacterial kill, already without the presence of the hydrotropes. This result was confirmed

by the patent itself, which reproduces example 3 of D2 as example 1 in table 1. Thus, no further improvement was possible when using amounts of thymol and terpineol at the upper limit defined in the claim.

Moreover, comparing examples 6-8 with example 1 of the patent it was clear that not all compositions covered by the claim showed improved antibacterial efficacy compared to compositions lacking the hydrotropes.

3.2.4 The Opposition Division followed the patent proprietor's arguments insofar as it considered the presence of the hydrotropes to allow thymol and terpineol to be used in lower concentrations, while maintaining the antibacterial activity. However, it considered that the concentrations defined in claim 1 were too close to those disclosed in example 3 of D2 so that this effect could not be acknowledged over the whole of claim 1, see point 19.7 of the decision.

3.2.5 In the Board's view the data in the patent, supplemented by the data present in D10, clearly show that adding hydrotropes as defined in the claim to the compositions known from D2 increases short contact antibacterial efficacy. The results of example 3 of D2 may show that under the test conditions used there the addition of further components would not have a measurable effect, since all bacteria are already killed without their presence. However, as argued by the respondent, this allows at most the conclusion that the test conditions are unsuitable, i. e. not sensitive enough, to detect any additional effect of a further component. It does not contradict the conclusion that the compositions defined in the claim of the patent have increased antibacterial efficacy upon short contact, as shown in the patent and in D10.

This conclusion is neither compromised by the comparison of examples 6-8 with example 1 of the patent, as argued by the appellant. Such a comparison is not valid because, although in examples 6-8 hydrotropes are added, the concentration of essential oils is only one eighth of the concentration used in example 1. In order to show that the addition of a hydrotrope increases antibacterial activity it must be shown that, for a given composition, the addition of a hydrotrope has an effect on antibacterial efficacy. It is not required that any possible composition covered by the claim shows increased antibacterial properties compared to a given composition of the prior art, see T 41/16, headnote.

The Board cannot follow the Opposition Division's conclusion that increased antibacterial efficacy of the compositions would not be credible over the whole of the patent claim. The Opposition Division reasoned that this was due to the proximity of the claim to example 3 of D2 in terms of concentrations of thymol and terpineol. However, there is no data on file from which one could conclude that the antibacterial efficacy of a composition corresponding to example 3 of D2 is not also increased by the addition of the hydrotropes. As outlined above, the only conclusion that can be drawn is that any such increase could not be detected by the test protocol used.

3.2.6 The data filed as E1 and E2 is irrelevant for the above conclusion. Admission of these experimental reports and of the documents D23 and D24 filed as a reaction thereto does not need to be decided.

3.2.7 Thus, starting from D2 the claimed compositions solve the technical problem of providing compositions with increased antibacterial efficacy, in particular when used at short contact times.

3.3 Obviousness

3.3.1 The decisive question with respect to inventive step of granted claim 1 is the following: Would a skilled person, starting from the compositions disclosed in D2, have added any one of the six hydrotropes defined in the claim of the patent or mixtures thereof *in the expectation of achieving an increase in short contact antibacterial efficacy*? Regarding this question various lines of arguments were submitted by the appellant. It was argued that the hydrotropes would have been added as preservatives (D19), as surfactants, as solubility enhancers, or in view of the teaching of D1.

3.3.2 Preservatives

The appellant referred to page 11 lines 27-31 of D2 and argued that D2 foresaw the addition of preservatives. Sodium acetate and sodium benzoate were known preservatives. Preservatives had an antimicrobial activity. D19 disclosed that sodium acetate was widely used to enhance the antimicrobial properties of cosmetic and pharmaceutical formulations by inhibiting the growth of relevant bacteria, see points 7 and 14 of D19. Thus, a skilled person would have added sodium acetate, one of the hydrotropes defined in claim 1, in order to increase antibacterial efficacy of the compositions disclosed in D2.

However, there is no document on file from which a skilled person could deduce that the addition of

preservatives, such as sodium acetate, not only leads to long-term stabilization of compositions by inhibiting bacterial growth, but to an enhancement of short contact antimicrobial activity. Antimicrobial activity upon short contact is based on killing bacteria, not on inhibition of their growth.

3.3.3 Surfactants

The appellant referred to page 10 lines 1-16 and page 11 lines 4-21 and argued that according to D2 surfactants, among others alkyl benzene sulphonates, would enhance the antimicrobial activity of the compositions. The appellant argued that sodium toluene sulphonate, sodium cumene sulphonate and sodium xylene sulphonate were all alkyl benzene sulphonate surfactants.

However, due to their short alkyl chain, a skilled person would not have considered the three sulphonates defined in the claim to be surfactants. The appellant referred to D11, D12, D15, D18 and D24. However, D12 and D18, independent of the question of their admission into the proceedings, are specific disclosures and cannot illustrate common general knowledge. The same holds for D24. D11 describes xylene or cumene sulphonates as hydrotropes, not as surfactants. D15 does not relate to short chain alkyl benzene sulphonates.

Importantly, also D1, the document used by the appellant in its argumentation below, classifies toluene sulphonate, xylene sulphonate and cumene sulphonate as hydrotropes which are to be used *in addition to* surfactants, not as surfactants themselves (see page 10 lines 4-6 and 30 to 36).

3.3.4 Solubility

The appellant argued that thymol and terpineol were hydrocarbons and their solubility in water was thus limited. It would have been obvious for a skilled person to add hydrotropes, i. e. solubility enhancers, in order to enhance the antimicrobial activity of the former. It was known that an active agent was only active in dissolved form.

It was uncontested that at least some of the compounds defined in feature (b) of the claim were known as hydrotropes, i. e. for their ability to enhance the solubility of other solutes.

However, the cited documents do not show that increased solubility generally correlates with increased antibacterial activity. As argued by the respondent, the solubilized essential oil needs to somehow interact with the bacterial cell wall and it cannot be predicted in which way the addition of the hydrotropes influences this interaction. As shown in tables 1 and 4 of the patent the addition of a hydrotrope does not increase short contact antibacterial efficacy of the single components thymol and terpineol alone, only of the combination of both.

3.3.5 D2 in combination with D1

The appellant argued that a skilled person would have known from D1 that the hydrotropes defined in the claim would enhance the antibacterial activity of the compositions disclosed in D2.

D1 discloses antibacterial compositions comprising essential oils, a hydrotrope and a surfactant, see e. g. claim 1. The essential oils are named "perfume ingredients" in D1 and may comprise thymol, see e. g. page 8 lines 28-32 and example 2. The hydrotrope may be preferably chosen from, among others, toluene sulphonate, xylene sulphonate or cumene sulphonate and may be present in concentrations of 4-12%, see page 11 lines 1-10. The hydrotrope is added in order to solubilize the essential oil in compositions with low surfactant levels, see page 10 lines 23 to 28. Compositions comprising thymol and xylene sulphonate are tested in example 3. The addition of the xylene sulphonate in appropriate concentrations is said to provide rapid antibacterial activity, see page 17 lines 18-22.

However, the Board considers that the disclosure of D1 would not have prompted a skilled person to add hydrotropes in order to increase short contact antibacterial activity of the thymol/terpineol mixtures of D2, for the following reasons:

D1 does not disclose an increase in antibacterial activity correlated with the addition of hydrotropes. The hydrotropes are rather added in order to make turbid solutions clear, see page 10 lines 23-28. The results obtained in example 3 do not support an increased antibacterial activity upon the addition of hydrotropes. The results obtained in table 3 for compositions containing surfactants and hydrotropes are much worse than the results obtained using compositions containing the "naked" essential oils in corresponding concentrations, see table 1. From the results in table 3 obtained using the compositions of table 2 it can be concluded that the activity of the compositions

increases when the amount of surfactants is reduced (compositions I-IV), but if then the amount of hydrotropes is also reduced, the compositions become unstable and turbid (VI and VII). Compositions VI and VII are turbid already even without the addition of essential oils. It is correct that compositions IV and V, having a relatively low surfactant concentration and containing hydrotropes, show the best results, however, still far away from the "naked" essential oil compositions of table 1. Thus, a skilled person could draw at most the conclusion that the hydrotropes are used to mitigate the loss of antibacterial activity caused by the surfactants, but not the conclusion that the use of hydrotropes generally increases antibacterial activity.

Moreover, the essential oil composition used in D1 (see example 1) contains thymol only in minor amounts of three parts per 1000 parts of essential oil, and no terpineol at all. The main components are other essential oils. A skilled person could thus not draw any conclusion on the effect of the addition of hydrotropes to mixtures of terpineol and thymol. That such an effect is achieved not in general, but only for the mixture of these two components has been shown in the patent, see tables 1 and 4.

3.3.6 In its reply to the Board's communication under Article 15(1) RPBA the appellant had raised a further objection combining the teachings of D2 and D25. The admission of such an objection into appeal proceedings was contested by the respondent. However, the objection was not maintained during oral proceedings and, therefore, does not need to be addressed.

3.3.7 In its statement setting out the grounds of appeal the appellant argued inventive step also starting from D3 but since the distinguishing feature is the same the assessment does not change compared to the objection starting from D2. This objection was not pursued later in the proceedings.

3.3.8 None of the lines of arguments presented by the appellant lead to the conclusion that a skilled person, starting from the compositions disclosed in D2, would have added any one of the six hydrotropes defined in the claim of the patent or mixtures thereof in the expectation of achieving an increase in short contact antibacterial efficacy

3.4 The compositions defined in claim 1 of the patent are thus based on an inventive step.

4. No objections under Article 100 EPC remaining, the Opposition Division's decision to reject the opposition under Article 101(2) EPC is confirmed.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

C. Rodríguez Rodríguez P. Gryczka

Decision electronically authenticated