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**Datasheet for the decision  
of 6 August 2015**

**Case Number:** T 0505/14 - 3.3.01

**Application Number:** 10179157.2

**Publication Number:** 2311320

**IPC:** A01N43/80, A01P1/00, A01N31/04,  
A01N31/14, A01N37/40

**Language of the proceedings:** EN

**Title of invention:**  
Microbicidal composition

**Applicant:**  
Rohm and Haas Company

**Headword:**  
Microbicides/ROHM AND HAAS

**Relevant legal provisions:**  
EPC Art. 123(2), 56

**Keyword:**  
Main, auxiliary request 1: added subject matter (yes),  
inadmissible amendment based on weight ratio disclosed only in  
examples  
Auxiliary request 2: allowable, non-  
obvious synergistic microbicidal compositions

**Decisions cited:**  
T 0962/98



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Case Number: T 0505/14 - 3.3.01

**D E C I S I O N  
of Technical Board of Appeal 3.3.01  
of 6 August 2015**

**Appellant:** Rohm and Haas Company  
(Applicant) 100 Independence Mall West  
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**Representative:** Hoggins, Mark Andrew  
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**Decision under appeal:** **Decision of the Examining Division of the  
European Patent Office posted on 14 October 2013  
refusing European patent application No.  
10179157.2 pursuant to Article 97(2) EPC.**

**Composition of the Board:**

**Chairman** A. Lindner  
**Members:** L. Seymour  
M. Blasi

## Summary of Facts and Submissions

I. The present appeal lies from the decision of the examining division refusing the European patent application No. 10 179 157.2, published as EP-A-2 311 320, and filed as a divisional application of European patent applications No. 07 075 457.7 (parent application) and No. 05 257 046.2 (root application).

II. Of the documents cited during the examination/appeal proceedings, the following are referred to below:

(2) WO 01/00022

(6) US-A-5 008 150

(7) US-B-6 511 673

(9) P J Collier et al., J. Appl. Bacteriol.,  
1990, 69, 569-577

III. The following abbreviations are used below:

BIT 1,2-benzisothiazolin-3-one

MIT 2-methyl-4-isothiazolin-3-one

IV. The decision under appeal was based on the main and sole request filed with letter dated 20 January 2013, consisting of five independent claims. Claims 1 to 3 read as follows:

- "1. A microbicidal composition comprising:
- (a) 1,2-benzisothiazolin-3-one; and
  - (b) benzyl alcohol,

wherein the weight ratio of 1,2-benzisothiazolin-3-one to benzyl alcohol is from 1:10 to 1:35.

2. A microbicidal composition comprising:

- (a) 1,2-benzisothiazolin-3-one; and
- (b) chlorphenesin,

wherein the weight ratio of 1,2-benzisothiazolin-3-one to chlorphenesin is:

- (i) from 1:20 to 1:25; or
- (ii) from 1:30 to 1:67.

3. A fungicidal composition comprising:

- (a) 1,2-benzisothiazolin-3-one; and
- (b) ethylparaben,

wherein the weight ratio of 1,2-benzisothiazolin-3-one to ethylparaben is

- (i) from 1:13 to 1:27; or
- (ii) from 1:40 to 1:400."

- V. The examining division considered that the subject-matter of claims 1 and 3 to 5 lacked an inventive step. In particular, the closest prior art for claim 3 was identified as being document (7). The problem was defined as lying in the provision of an alternative synergistic microbicidal composition. The proposed solution of substituting MIT by BIT was found to be obvious in view of the teaching of document (9).
- VI. The appellant (applicant) lodged an appeal against this decision. With its statement of grounds of appeal, the appellant filed a main request and a number of auxiliary requests.
- VII. In a communication sent as annex to the summons to oral proceedings, the board *inter alia* pointed to issues to be discussed pursuant to Article 123(2) EPC.

VIII. With letter dated 4 July 2015, the appellant filed a main request and auxiliary requests 1 to 6 to replace those previously on file.

The main request differs from that considered in the decision under appeal (cf. above point IV) in the definition of the weight ratio in claim 3 as being "from 1:13 to 1:400".

IX. Oral proceedings were held before the board on 6 August 2015. During the course of these proceedings, the appellant withdrew its auxiliary requests 1 to 5 filed with letter of 4 July 2015, filed new auxiliary requests 1 and 2, and renumbered its previous auxiliary request 6, filed with letter of 4 July 2015, as auxiliary request 3.

Auxiliary request 1 consists of three claims corresponding to claims 1 to 3 of the main request whereby the weight ratio in claim 2 is modified to read "from 1:20 to 1:50" (cf. above points IV and VIII).

Auxiliary request 2 differs from auxiliary request 1 in the deletion of claim 1.

X. The appellant's arguments on the issue of added subject-matter (Article 123(2) EPC), insofar as they are relevant to the present decision, may be summarised as follows:

With respect to the basis for claim 2 of the main request, the appellant pointed to page 2, lines 27 to 30, in combination with the data provided in Table 2 of the application as originally filed. In particular, the data for *A. niger* demonstrated synergistic biocidal

activity for compositions comprising BIT and chlorphenesin in a plurality of weight ratios across the scope, including all end points, of the claimed ranges. This provided sufficient basis for restricting ratios in the more general context of the claims.

In this regard, the appellant acknowledged that the incorporation of the restricted ratios into claim 2 of the main request might be considered to be an intermediate generalisation of the specific embodiments disclosed in Table 2. However, the appellant argued that, in the present case, these amendments conformed with the criteria set out in decision T 962/98, point 2.5 of the reasons. Thus, from the application as a whole, the skilled person would understand that synergism represented an essential attribute of the claimed microbicidal compositions. Moreover, the application as originally filed generally disclosed microbicidal compositions comprising a mixture of BIT and chlorphenesin, that is, optionally including additional components, with a preferred range of weight ratios of BIT to chlorphenesin of 1:20 to 1:600. Further, the skilled person was unambiguously taught from Table 2 that, by selecting specific subranges from said preferred range as now claimed, a synergistic microbicidal mixture was obtained. Consequently, the claimed subject-matter was the result of unambiguous information that a skilled person would draw from a review of the examples and the content of the application as originally filed.

The same reasoning applied to claim 1 of the main request and of auxiliary request 1, for which support in the application as originally filed could be found at page 2, lines 23 to 26 in combination with the data provided in Table 1, in particular, that for *A. niger*

and *C. albicans*. In this case, the preferred range of weight ratios of BIT to benzyl alcohol was 1:0.4 to 1:35, and the restriction of the lower limit to 1:10 was supported by said data.

- XI. The appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the set of claims filed as main request with letter dated 4 July 2015 or, alternatively, on the basis of one of the auxiliary requests 1 to 2 filed during the oral proceedings before the board or, further alternatively, on the basis of the auxiliary request 3 filed as auxiliary request 6 with letter dated 4 July 2015.

### **Reasons for the Decision**

1. The appeal is admissible.
2. *Main request and auxiliary request 1 - claim 1, Article 123(2) EPC*

At oral proceedings before the board, the issue of added subject-matter was discussed for both claims 1 and 2 of the main request (cf. above point X). In view of the fact that the respective claims 1 of the main request and of auxiliary request 1 are identical, the analysis below has been confined to this subject-matter.

Said claim 1 is directed to a microbicidal composition comprising combinations of BIT with benzyl alcohol, in a range of weight ratios of "from 1:10 to 1:35".

It is undisputed that the ranges generally disclosed in the application as original filed for these components is preferably "from 1:0.4 to 1:600, more preferably from 1:0.4 to 1:35" (see page 2, lines 23 to 26). The range now claimed is formed by combining a lower limit of "1:10", based on a ratio of appearing in Table 1 of the application as originally filed, with the upper limit of said more preferred range.

According to the decision T 962/98 (point 2.5 of the reasons) referred to by the appellant, characteristics taken from a working example may be used for restricting the scope of a claim, "if the skilled person can recognize without any doubt from the application as filed that those characteristics are not closely related to the other characteristics of the working example and apply directly and unambiguously to the more general context". In order to allow an assessment of whether these criteria are fulfilled in the present case, Table 1 is reproduced below:

Table 1

First Component (A) = BIT  
Second Component (B) = Benzyl alcohol

Microorganism	Q <sub>a</sub>	Q <sub>b</sub>	SI	A/B
A. niger 16404 - PDB	0	5000	1.00	-----
(1 week)	10	5000	1.20	1/500
	20	4000	1.20	1/200
	30	30	0.61	1/1
	30	40	0.61	1/1.3
	30	50	0.61	1/1.7
	30	60	0.61	1/2
	30	80	0.62	1/3
	30	100	0.62	1/3



30	200	0.64	1/7
30	300	0.66	1/10
30	400	0.68	1/13
30	500	0.70	1/17
30	600	0.72	1/20
30	800	0.76	1/27
30	1000	0.80	1/33
30	2000	1.00	1/67
50	0	1.00	-----

Microorganism	Q <sub>a</sub>	Q <sub>b</sub>	SI	A/B
P. aeruginosa 15442 - M9GY (48 hours)	0	200	1.00	-----
	20	200	1.20	1/10
	30	100	0.80	1/3
	30	200	1.30	1/7
	40	80	0.80	1/2
	40	100	0.90	1/2.5
	40	200	1.40	1/5
	80	30	0.95	1/0.4
	100	0	1.00	-----

Microorganism	Q <sub>a</sub>	Q <sub>b</sub>	SI	A/B
E. coli 8739 - M9GY (24 hours)	0	4000	1.00	-----
	2.5	4000	1.33	1/1600
	5	4000	1.67	1/800
	7.5	0	1.00	-----

Microorganism	Q <sub>a</sub>	Q <sub>b</sub>	SI	A/B
C. albicans 10231 - PDB (48 hours)	0	4000	1.00	-----
	5	3000	0.92	1/600
	5	4000	1.17	1/800
	10	1000	0.58	1/100
	10	2000	0.83	1/200
	10	3000	1.08	1/300
	15	600	0.65	1/40
	15	800	0.70	1/53
	15	1000	0.75	1/67
	15	2000	1.00	1/133
	15	3000	1.25	1/200

20	80	0.69	1/4
20	100	0.69	1/5
20	200	0.72	1/10
20	300	0.74	1/15
20	400	0.77	1/20
20	500	0.79	1/25
20	600	0.82	1/30
20	800	0.87	1/40
20	1000	0.92	1/50
20	2000	1.17	1/100
30	0	1.00	-----

The synergistic ratios of BIT/benzyl alcohol range from 1/0.4 to 1/600. The BIT/benzyl alcohol combinations show enhanced control of bacteria, yeast and mold.

From a review of this table, it can be seen that the conclusion reached in the footnote of Table 1 is based on the results presented therein as a whole, as reflected in the preferred range disclosed in the description, as set out above. However, when it comes to the individual results listed therein, it is apparent, from the table itself in combination with the preceding section of the application as originally filed (page 6, line 15 to page 8, line 5), that the synergy tests were conducted on specific binary compositions, and under specific conditions, whereby the SI values were calculated based on the following equation:

$$Qa/QA + Qb/QB = \text{Synergy Index ("SI")}$$

wherein:

QA = concentration of compound A (first component) in ppm, acting alone, which produced an end point (MIC of Compound A).

Qa = concentration of compound A in ppm, in the mixture, which produced an end point.

QB = concentration of compound B (second component) in ppm, acting alone, which produced an end point (MIC of Compound B).

Qb = concentration of compound B in ppm, in the mixture, which produced an end point.

The ratio in the last column is calculated from dividing Qa/Qb.

On review of the above information, the skilled person would therefore readily recognise that each individual ratio is closely linked to the other characteristics of the composition, most notably the concentrations of components as tabulated, which are adjusted for use in a particular microorganism for a specific incubation time, in order to determine the corresponding SI value. This is also true of the ratio of "1/10" which appears three times in Table 1, respectively embedded in different series of data (see data for *A. niger*, *P. aeruginosa*, and *C. albicans*), and in each case associated with specific further parameters.

Consequently, the board concludes that the ratio of "1/10" is only disclosed in the application as originally filed in combination with the particular features of the given examples, and is not directly and unambiguously identifiable as representing a lower limit of the general range defining the antimicrobial compositions as claimed. Contrary to the appellant's submissions, it cannot be accepted that the ratios for which synergy has been observed in a specific context can be used as a reservoir for creating any number of

distinct subranges of weight ratios in the more general context of the claims.

Hence, the main request and auxiliary request 1 are rejected for non-compliance of the subject-matter of their respective claims 1 with Article 123(2) EPC.

3. *Auxiliary request 2*

3.1 *Amendments (Articles 76(1) and 123(2) EPC)*

The claims find their basis in the application as originally filed at page 2, line 27 to page 3, line 4; and page 1, lines 8 to 32. Corresponding passages are to be found in the parent and root applications (cf. above point I).

The requirements of Articles 76(1) and 123(2) EPC are therefore met.

3.2 *Novelty (Articles 52(1) and 54 EPC)*

None of the cited prior art documents specifically disclose compositions comprising the combinations of components in the ranges of weight ratios as claimed. In particular, document (6) discloses a photographic undercoating solution comprising BIT and ethylparaben in a weight ratio of 1:10 (see column 15, lines 38 to 43, and Table 4, column 17, Run No. 17; see also claims 3, 4, and 9), which lies below the lower limit of 1:13 specified in claim 2.

Consequently, novelty is acknowledged for the claimed subject-matter.

3.3 *Inventive step (Articles 52(1) and 56 EPC)*

*Claim 1*

3.3.1 Claim 1 is directed to microbicidal compositions comprising BIT and chlorphenesin in a range of weight ratios of "from 1:20 to 1:50" (cf. above point IX); these combinations are disclosed as being synergistic (application as originally filed, page 1, lines 3, 4; page 6, lines 16 to 18).

3.3.2 Document (2), which can be seen as representing the closest state of the art, discloses synergistic microbicidal compositions comprising an isothiazole bactericide, preferably BIT, and an aryloxyalcohol, preferably phenoxyethanol (claims 1 to 4; page 5, lines 7 to 16; Examples 1 and 3 to 9).

The problem to be solved in the light of document (2) can be seen in the provision of further synergistic microbicidal compositions.

The solution proposed in claim 1 relates to compositions characterised in that the aryloxyalcohol component is chlorphenesin.

The experimental results reported in Table 2 of the application in suit render it credible that synergy can be achieved for the claimed combinations within the range of weight ratios claimed. Having regard to this data, the board is satisfied that the problem has been solved.

In document (2) itself, the only aryloxyalcohol component specifically named and exemplified is phenoxyethanol. Neither this document nor any of the

remaining cited documents provide an incentive that would lead the skilled person to undertake the present structural modifications to the phenoxyethanol-based compositions disclosed in document (2) as a solution to the problem posed.

*Claim 2*

- 3.3.3 Claim 2 is directed to fungicidal compositions comprising BIT and ethylparaben in a range of weight ratios of "from 1:13 to 1:400" (cf. above points VIII and IX); these combinations are disclosed as being synergistic (application as originally filed, page 1, lines 3, 4; page 6, lines 16 to 18).
- 3.3.4 Document (7), which can be seen as representing the closest state of the art, relates to synergistic fungicidal combinations of non-halogenated 2-alkyl-3-isothiazolones, preferably MIT, and *para*-hydroxybenzoic acid esters (see column 2, lines 33 to 42, 48 to 56; column 3, lines 6 to 40; Example 1). Ethylparaben is listed amongst the preferred second components (column 3, line 30; claim 2). The combinations tested in the examples are MIT with propylparaben, or MIT with a mixture of methyl- and propylparaben.
- 3.3.5 The problem to be solved in the light of document (7) can be seen in the provision of further synergistic fungicidal compositions.

The solution proposed relates to compositions characterised in that the MIT component is replaced by BIT.

The experimental results reported in Table 3 of the application in suit for *A. niger* render it credible

that synergy can be achieved for the claimed combinations within the range of weight ratios claimed. It is noted that data points for which  $Q_b$  is equal to  $Q_B$  may be disregarded as being unsuitable for demonstrating synergy (cf. equation in above point 2). Having regard to this data, the board is satisfied that the problem has been solved.

- 3.3.6 It remains to be investigated whether the proposed solution would have been obvious to the skilled person in the light of the prior art.
- 3.3.7 As outlined above in point 3.3.4, document (7) itself discloses the 2-alkyl-3-isothiazolone to be a mandatory component of the compositions. Therefore, this document, taken alone, does not point to the solution proposed.

None of the further prior art cited during examination/appeal proceedings are considered to render the present modifications to the closest prior art compositions obvious, as a solution to the problem posed; the most relevant of the documents cited are discussed in more detail below:

As set out above in point 3.2, document (6) discloses mixtures of BIT and ethylparaben comprised in a photographic undercoating solution. However, there is no teaching in this document pointing to the claimed ratio of these components, or suggestion that synergistic activity could be achieved by such a combination.

Document (9) is a scientific article reporting a study into the growth inhibitory and biocidal activity of three isothiazolinone biocides, including MIT and BIT

(see abstract). In Table 1, various estimates are provided for minimum growth inhibitory concentrations against *S. pombe* and *E. coli*. However, the biological efficacies of individual isothiazolinones, as disclosed in document (9), do not allow the skilled person to draw any conclusions as to whether they would act synergistically when combined with further biocides, nor are any such combinations disclosed in this document. Therefore, no incentive is provided that would lead the skilled person to modify the compositions disclosed in document (7) in the expectation that synergy would be maintained.

- 3.3.8 In view of the above considerations, the board concludes that the subject-matter of auxiliary request 2 fulfills the requirements of Article 56 EPC.
4. Since auxiliary request 2 is considered to be allowable, the board need not decide on the lower ranking request.



## Order

### For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the examining division with the order to grant a patent on the basis of claims 1 and 2 of auxiliary request 2 filed during the oral proceedings before the board, and a description to be adapted thereto.

The Registrar:

The Chairman:



M. Schalow

A. Lindner

Decision electronically authenticated