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

Datasheet for the decision of 12 November 2014

Case Number: T 0096/13 - 3.3.01

Application Number: 08252036.2

Publication Number: 2008520

IPC: A01P1/00, A01N43/80, A01N37/04, A01N35/02, A01N43/653

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. 56

Keyword:
Inventive step (no), obvious combination of prior art teachings

Europäisches Patentamt
European Patent Office
Office européen des brevets

Beschwerdekammern
Boards of Appeal
Chambres de recours

European Patent Office
D-80298 MUNICH
GERMANY
Tel. +49 (0) 89 2399-0
Fax +49 (0) 89 2399-4465

Case Number: T 0096/13 - 3.3.01

D E C I S I O N
of Technical Board of Appeal 3.3.01
of 12 November 2014

Appellant: (Applicant)	ROHM AND HAAS COMPANY 100 Independence Mall West Philadelphia, Pennsylvania 19106-2399 (US)
Representative:	Hoggins, Mark Andrew; Buckley, Guy Julian Patent Outsourcing Limited 1 King Street Bakewell Derbyshire DE45 1DZ (GB)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 16 August 2012 refusing European patent application No. 08252036.2 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	A. Lindner
Members:	L. Seymour
	O. Loizou

Summary of Facts and Submissions

I. The present appeal lies from the decision of the examining division refusing the European patent application No. 08 252 036.2, published as EP-A-2 008 520.

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

(1) EP-A-1 772 055

(2) JP-A-10 298012, machine-generated English language translation, and EPODOC abstract

(15) EP-A-1 500 331

(16) J O Morley et al., Org. Biomol. Chem., 2005, 3, 3713 - 3719

In addition, the following abbreviations are used:

DBNPA 2,2-dibromo-3-nitrilopropionamide
MBIT *N*-methyl-1,2-benzisothiazolin-3-one
BBIT *N*-(*n*-butyl)-1,2-benzisothiazolin-3-one
MIT 2-methyl-4-isothiazolin-3-one.

III. The decision under appeal was based on the main and sole request filed with letter dated 14 June 2010. The single claim of this request reads as follows:

"1. A microbicidal composition comprising:
(a) N-methyl-1,2-benzisothiazolin-3-one; and
(b) 2,2-dibromo-3-nitrilopropionamide, wherein the weight ratio of 2,2-dibromo-3-nitrilopropionamide

to N-methyl-1,2-benzisothiazolin-3-one is from 1:0.02 to 1:5.8".

The examining division considered that the subject-matter claimed lacked an inventive step. Document (15), which disclosed biocides comprising MIT and DBNPA, was identified as representing the closest prior art. The problem was defined as lying in the provision of a more effective biocide, and this was assumed to have been solved in view of document (16), which demonstrated that MBIT was over 13 times more effective than MIT in inhibiting the growth of *E. coli*. However, this disclosure of document (16) was also found to render the claimed solution obvious since the skilled person would be motivated to replace MIT with MBIT. Moreover, it was well within the normal competence of the skilled person to optimise the compositions comprising the active ingredients, thus arriving at the ratios claimed.

IV. With the statement of grounds of appeal, the appellant (applicant) submitted auxiliary request 1 to 6.

Claim 1 of auxiliary request 1 differs from that of the main request in the replacement of the word "microbicidal" with "fungicidal". The respective claims 1 of auxiliary request 2 to 6 differ from claim 1 of auxiliary request 1 in various limitations to the ranges of ratios recited.

V. In a communication dated 29 August 2014, the board referred to document (2) as being of possible relevance to the discussion of inventive step.

VI. With its letter of response of 10 October 2014, the appellant filed a machine-generated English language translation of document (2).

VII. Oral proceedings were held before the board on 12 November 2014.

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

With respect to the issue of inventive step of the subject-matter of the main request, the appellant acknowledged that document (2) could be seen as constituting the closest prior art. During the examination procedure, the examining division had already, at least implicitly, acknowledged an inventive step starting from this document.

The appellant defined the problem to be solved as lying in the provision of further synergistic microbicidal compositions. The data in Table 2 of the application in suit demonstrated that the claimed compositions comprising MBIT and DBNPA solved this problem.

Starting from the synergistic mixtures comprising BBIT and DBNPA, as disclosed in document (2), the skilled person would not have been motivated to substitute the BBIT component with MBIT in the expectation that a synergistic effect would be maintained in the compositions now claimed. The general teaching of document (2) with respect to suitable combinations of *N*-substituted benzoisothiazolone (NBIT) components with other biocides (non-NBIT) was extremely broad. No preference was given to MBIT, which appeared in a long list of possible NBIT components. Similarly, the non-NBIT component DBNPA was to be selected from a long

list, subdivided into twelve very broadly defined categories. No indication was given as to which of the hundreds of further combinations covered by this general disclosure of document (2) would actually exhibit the same benefits as the exemplified compositions. Therefore, this document did not contain any clear signpost directing the skilled person to the claimed combinations.

Indeed, the skilled person would be aware of the fact that synergism was inherently unpredictable, and that even small structural modifications within a single class of microbicide could result in loss of synergy. Therefore, despite the structural similarities between MBIT and BBIT, the skilled person would not consider these to be functional equivalents. This was confirmed by the teaching of document (1), since the lists of combinations partners for BBIT and MBIT disclosed in claims 1 and 2, respectively, were not identical. For example, 1,3-dimethylol-5,5-dimethyl hydantoin (DMDMH) was present in claim 1 but not in claim 2. The corresponding Tables 9 and 36 demonstrated that the combination BBIT and DMDMH was highly synergistic, whereas no synergy was observed between MBIT and DMDMH. Moreover, document (1) taught that MBIT and BBIT interacted synergistically, whereas functional equivalents would be expected to have an additive effect on microbicidal efficacy.

Finally, the appellant argued that the range of weight ratios claimed was far removed from that disclosed in Table 9 of document (2), and the skilled person was not provided with a clear motivation to seek synergistic combinations outside this exemplified range.

With respect to the auxiliary requests, the appellant submitted that these had been filed as a precautionary measure to more closely reflect the results provided in Table 2 of the application in suit, but that the same arguments with respect to inventive step applied as for the main request.

IX. The appellant (applicant) requested that the decision under appeal be set aside and that a patent be granted on the basis of the main request filed with letter dated 14 June 2010, or alternatively on the basis of one of the auxiliary requests 1 to 6 filed with the statement of grounds of appeal dated 13 December 2012.

X. At the end of the oral proceedings, the decision of the board was announced.

Reasons for the Decision

1. The appeal is admissible.

2. *Main request, inventive step (Articles 52(1), 56 EPC)*

2.1 The single claim of the main request is directed to a microbicidal composition comprising (a) MBIT and (b) DBNPA, in a weight ratio of DBNPA to MBIT of from 1:0.02 to 1:5.8 (cf. above point III). These combinations are disclosed to be synergistic, and to be useful in inhibiting the growth of microorganisms in loci, including industrial process water (application as originally filed, page 1, lines 3, 4; page 1, line 30 to page 2, line 3; and page 4, line 23 to page 5, line 25, in particular page 4, line 28).

2.2 The board considers that document (2) represents the closest state of the art. In view of the greater structural proximity of the claimed subject-matter to the BBIT/DBNPA compositions specifically disclosed in document (2), as detailed below, this is considered to be a more appropriate starting point for assessing inventive step than the MIT/DBNPA biocides according to document (15).

Document (2) discloses microbicidal compositions containing an *N*-substituted 1,2-benzisothiazolin-3-one of formula (1) and a second microbicide component, abbreviated as NBIT and non-NBIT compounds, respectively. These compositions are said to exhibit high activity against propagation of microorganisms, such as fungi, bacteria, yeast, and algae, at low doses of active ingredients, and to be particularly useful for the sterilisation of industrial water (see EPODOC abstract, and document (2), paragraphs [0007] to [0009], [0012], [0025] and [0036]).

The preferred NBIT components include MBIT and BBIT (see paragraph [0018], first and fourth compounds listed). The non-NBIT component may be an amide compound, including DBNPA (see paragraphs [0021] and [0039], ingredient B9). The disclosed ranges of weight ratios of the NBIT to non-NBIT components are, for example, 0.01:1 to 2000:1, and most preferably 0.3:1 to 50:1; when used as an antifungal, the preferred ranges are 0.1:1 to 10:1 and 0.2:1 to 5:1, and a synergistic effect is observed in many cases (paragraph [0025]).

The examples relate to thirteen combinations of BBIT with various non-NBIT components, including DBNPA (see paragraphs [0039] and [0052]), which are demonstrated to act synergistically against a number of bacteria

(Tables 1 to 10) and moulds (Tables 11 to 13). In particular, in Table 9 (paragraph [0048]), compositions are disclosed comprising 0.5 ppm DBNPA in combination with from 10 to 250 ppm BBIT.

2.3 The problem to be solved in the light of document (2) may be defined as lying in the provision of further synergistic microbicidal compositions.

2.4 The solution proposed in claim 1 relates to a composition characterised in that MBIT is used instead of BBIT as combination partner with DBNPA, in a weight ratio of from 1:0.02 to 1:5.8.

The experimental results reported in Table 2 of the present application 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.

2.5 It remains to be investigated whether the proposed solution would have been obvious to the skilled person in the light of the prior art.

2.5.1 As becomes evident from the analysis under point 2.2 above, document (2) specifically discloses synergistic combinations of BBIT with DBNPA. Starting from these exemplified compositions, the skilled person, seeking a solution to the problem defined above, would consider replacing the preferred component BBIT with further *N*-substituted 1,2-benzisothiazolin-3-ones of formula (1) envisaged therein, and would therefore turn to paragraph [0018], which lists ten specific combination partners. In order to assess which of the suggested components would be most likely to solve the problem

posed, the skilled person would consult further prior art relating to synergistic biocides comprising *N*-substituted 1,2-benzisothiazolin-3-ones, such as document (1).

Document (1) discloses the results of an investigation into potential synergies in combinations of BBIT (Tables 1 to 26) and MBIT (Tables 28 to 54) with a structurally diverse range of further microbicides (components (B)). Table 27 provides data for the combination MBIT/BBIT. For twenty-three of the components (B), synergy was obtained for both the MBIT and the BBIT combinations (cf. Tables 1 to 8, 10 to 14, 16, and 18 to 26 with Tables 28 to 35, 37 to 41, 43, and 45 to 53). In two cases, no synergy was observed with both MBIT and BBIT (cf. Tables 15 and 17 with Tables 42 and 44). In the case of 1,3-dimethylol-5,5-dimethyl hydantoin (DMDMH) synergy was observed for BBIT (Table 9), but not MBIT (Table 36). Finally, results with zinc pyrithione are only provided for combinations with MBIT (Table 54). On reviewing these results, the skilled person would establish that BBIT and MBIT exhibit very similar patterns of synergy with further biocides. Based on this teaching, he would have had every reason to expect that the replacement of BBIT with MBIT as suggested in the general teaching of document (2) would lead to further synergistic combinations.

Provided with this pointer to the claimed combination, it would be a matter of routine experimentation for the skilled person to determine the appropriate weight ratios, within the general ranges disclosed in document (2), in order to achieve the desired synergism.

Thus, the skilled person would not require any inventive skill in order to arrive at the subject-matter claimed.

2.5.2 The board cannot accept the appellant's submission according to which document (1) would not lead the skilled person to expect similar synergistic behaviour from BBIT and MBIT. As outlined above in point 2.5.1, the differences highlighted by the appellant in the case of DMDMH are very much the exception. In view of the overwhelming similarities, as reflected by the substantial overlap in the lists of claims 1 and 2, an isolated result cannot call into question the conclusion drawn above in point 2.5.1. Similarly, there is no reason why the synergistic interaction between MBIT and BBIT would detract from the the clear overall teaching of document (1) regarding the similarity in their behaviour with a wide range of further biocides.

Moreover, contrary to the submission of the appellant, an inventive step cannot be based on the claimed range of weight ratios. The skilled person would be well aware of the fact that synergistic ratios must be established for each specific combination tested (see, for example, document (1), paragraphs [0008] to [0056], [0071] and [0072]), and would not therefore restrict himself to the specific ratios disclosed in Table 9 of document (2). In the present case, the claimed range substantially overlaps with the most preferred ranges generally suggested in paragraph [0025] of document (2), and more particularly that suggested for antifungal applications (cf. above point 2.2). Therefore, the skilled person would clearly contemplate working within the claimed range.

2.6 In view of the above analysis, the subject-matter of the main request is found to represent an obvious solution to the problem posed and does not involve an inventive step.

Consequently, the appellant's main request is rejected for lack of inventive step.

3. *Auxiliary requests, inventive step (Articles 52(1), 56 EPC)*

The auxiliary requests mainly differ from the main request in the replacement of the word "microbicidal" with "fungicidal", and in various limitations to the ranges of ratios recited.

The appellant did not submit any additional arguments in favour of inventive step for these requests.

Indeed, in view of the fact that documents (1) and (2) also address the issue of fungicidal activity (see document (1), paragraphs [0006] and [0070]; and above point 2.2), and that no additional effect has been argued for the more limited ranges claimed, the reasoning and conclusions set out above in point 2 apply *mutatis mutandis* to the subject-matter of the auxiliary requests.

Hence, the auxiliary requests are also rejected for lack of inventive step.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

M. Schalow A. Lindner

Decision electronically authenticated