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**Datasheet for the decision  
of 23 September 2014**

**Case Number:** T 2321/11 - 3.3.01

**Application Number:** 06775968.8

**Publication Number:** 1921918

**IPC:** A01N43/653

**Language of the proceedings:** EN

**Title of invention:**

CONCENTRATED LIQUID TRIAZOLE FUNGICIDE FORMULATIONS

**Patent Proprietor:**

Chemnova A/S

**Opponents:**

Syngenta Limited, European Regional Centre,  
BASF SE

**Headword:**

Emulsifiable concentrates/CHEMINOVA

**Relevant legal provisions:**

EPC Art. 83, 56

**Keyword:**

Sufficiency of disclosure: main request (no), auxiliary  
request (yes) - reproducibility over claimed breadth  
Inventive step, auxiliary request (yes) - improvement credible

**Decisions cited:**

T 0226/85, G 0004/95, T 0197/86



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Case Number: T 2321/11 - 3.3.01

**D E C I S I O N**  
**of Technical Board of Appeal 3.3.01**  
**of 23 September 2014**

**Appellant:** BASF SE  
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**Decision under appeal:** **Interlocutory decision of the Opposition  
Division of the European Patent Office posted on  
31 August 2011 concerning maintenance of the  
European Patent No. 1921918 in amended form.**

**Composition of the Board:**

**Chairman**            J.-B. Ousset  
**Members:**            L. Seymour  
                             L. Bühler

## Summary of Facts and Submissions

I. The present appeal lies from the interlocutory decision of the opposition division maintaining European patent No. 1 921 918 in amended form based on the main request filed with letter of 27 May 2011, with the following claim 1:

"1. A concentrated liquid formulation comprising

- a) 50-215 g/l of one or more active ingredients selected among triazole fungicides,
- b) 100-600 g/l of one or more solvents selected among esters of plant oils,
- c) 50-400 g/l of one or more water-miscible polar aprotic co-solvents
- d) 50-300 g/l of one or more water-immiscible co-solvents selected among aromatic hydrocarbons and alcohols,
- e) 10-200 g/l of an emulsifier system comprising one or more surfactants, and
- f) 0-300 g/l of further auxiliaries."

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

- (3) A. Knowles, Agrow reports, New Developments in Crop Protection Product Formulation, DS243, T&F Informa UK Ltd, May 2005, pages 50, 190-193
- (4) EP-A-1 023 837
- (11) Test report filed with patentee's letter dated 27 May 2011
- (12) Summary of experimental data, filed by respondent with letter dated 22 August 2014

(13) C M Hansen, Hansen solubility parameters,  
A user's handbook, CRC Press, 2000, preface and  
pages 1, 6-9, 18-21, 50, 51, 167, 170, 171, 176,  
177, 180-183

III. In the decision under appeal, the opposition division considered that the main request fulfilled the requirements of Article 83 EPC, since no evidence of a non-working example within the claimed ranges had been provided. There was therefore no reason to doubt that a concentrated liquid formulation according to claim 1 could be obtained within the whole range claimed.

In view of the amendments introduced in the main request, novelty was no longer considered to be an issue.

Starting from document (4) as closest prior art, the opposition division defined the problem to be solved as lying in the provision of an emulsifiable concentrate composition comprising a triazole fungicide with less tendency to crystallise. The solution proposed, namely, the incorporation of a plant oil ester as solvent, had been demonstrated, in example 1 and comparative example 12 of the patent in suit, to prevent crystallisation on dilution. This solution to the problem posed was not considered to be rendered obvious by the cited prior art.

IV. The appellant (opponent II) lodged an appeal against this decision. With the statement of grounds of appeal, the appellant filed additional experimental data in support of its objections regarding lack of sufficiency and inventive step.

- V. In its reply of 13 July 2012, the respondent (patentee) also filed additional experimental data.
- VI. With letter of 22 August 2014, the respondent filed a replacement main request, which only differed from that underlying the decision under appeal in an amendment to dependent claim 2. An auxiliary request was also submitted. In addition, the respondent requested that, at oral proceedings before the board, an accompanying technical expert be allowed to make oral submissions during the discussion on sufficiency of disclosure.
- VII. Oral proceedings were held on 23 September 2014, during the course of which the respondent replaced its auxiliary request filed with letter of 22 August 2014 with a new auxiliary request.

Claim 1 of the auxiliary request differs from claim 1 of the main request (cf. above points I and VI) with respect to feature (a), which now reads  
"a) 50-215 g/l of one active ingredient selected among triazole fungicides, wherein the the triazole fungicide is selected as tebuconazole".

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

Concerning the issue of sufficiency of disclosure of the main request, the appellant argued that the invention was not reproducible within the whole scope claimed. The data provided by the appellant demonstrated, for a number of diverse triazole fungicides, such as epoxiconazole, triticonazole and fluquinconazole, that solubility problems were regularly encountered when attempting to prepare the claimed formulations, in particular with respect to the higher concentrations of

active ingredients claimed. Moreover, the data for triticonazole demonstrated that only very minor modifications in the compositions could transform success into failure. Concerning the Hansen solubility parameters, invoked by the respondent, the appellant submitted that their experimental determination amounted to an undue burden, and the corresponding solubility distance parameters,  $R_a$ , could not reliably be used to predict whether a homogeneous formulation would actually be obtained, as could be seen from the data for epoxiconazole summarised in document (12). Therefore, the patent did not provide adequate guidance, taking into account common general knowledge, that would lead the skilled person towards success through the evaluation of failures.

For the subject-matter of the auxiliary request, the appellant referred to the reasoning provided for the main request. Components (b) to (f) were still very broadly defined in claim 1 of the auxiliary request, and failure was therefore to be expected. The argument of lack of guidance as to how this could be corrected therefore also applied.

In its assessment of inventive step of the auxiliary request, the appellant started from document (4) as closest prior art, and identified the compositions disclosed in examples G and H as closest to those claimed. Valid comparative data would require these examples to be compared with compositions according to the present auxiliary request, differing from the former only in the nature of the active ingredient and in the replacement of the aromatic hydrocarbon solvent with a mixture of solvents comprising plant oil esters. No such data had been provided, and the problem to be solved could therefore only be defined as lying in the



provision of an alternative concentrated liquid triazole formulation. The solution proposed, namely, the use of tebuconazole and a plant oil ester as part of the water-immiscible solvent was already rendered obvious by the teaching of document (4) itself. The use of greener solvents as a substitute for aromatics was also suggested in document (3).

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

With respect to the issue of sufficiency, the appellant argued that an oral presentation of its technical expert would be of assistance in demonstrating how the skilled person would employ Hansen solubility parameters in order to achieve successful liquid concentrates according to the invention.

Turning to the the main request, the respondent maintained that it had performed numerous experiments demonstrating that the claimed liquid formulations could be prepared for a variety of triazole fungicides, namely, for tebuconazole, flutriafol, epoxiconazole, and triticonazole.

The non-working examples submitted by the appellant could not be seen as jeopardising sufficiency, since the skilled person had at his disposal adequate information leading necessarily and directly towards success through the evaluation of initial failures, as specified in decision T 226/85. The skilled person would be aware of the fact that, depending on the physical and chemical properties of the specific triazole fungicide, adjustments might be required in the formulation ingredients used, and in their ratios and amounts. Moreover, the skilled person would know how to make such

adjustments, based on the information provided in the patent in suit, together with common general knowledge. For example, the Hansen solubility parameters, referred to in the patent in suit and in document (13), provided a simple tool for predicting solubility of a material in a solvent system, based on the principle that "like dissolves like". In order to achieve high concentrations, it was generally desirable to minimise the solubility distance parameter,  $R_a$ , between the active ingredient and the solvent mixture.

In the case of flutriafol, the appellant had shown a single instance of an unsatisfactory product. However, the examples provided by the respondent demonstrated how this could be corrected, namely, by lowering the concentration of flutriafol or by lowering the  $R_a$  value. In the case of epoxiconazole, the respondent conceded that it might not be possible to avoid crystallisation at the highest concentrations claimed. However, the respondent's experiments had demonstrated that a homogeneous product could be obtained simply by lowering concentrations. The respondent noted that it was not always advantageous to achieve high concentrations, as had been demonstrated in Example 6 of the patent in suit. For fluquinconazole, counter-experiments had not been performed by the respondent, since it had not been possible to acquire this compound. However, using the principles outlined previously, experiments could certainly be designed of solutions at concentrations within the limits specified in claim 1. The requirement of sufficiency was therefore fulfilled, since means for correction of failure were available to the skilled person.

With respect to the issue of sufficiency of disclosure of the auxiliary request, the respondent argued that its

previous submissions for the main request applied all the more to the claims limited to formulations wherein the triazole fungicide was tebuconazole. The appellant had not demonstrated non-working examples for this active ingredient.

On the issue of inventive step, the respondent agreed that document (4) represented the closest prior art. The problem to be solved was defined as lying in the provision of an emulsifiable concentrates that, when diluted, did not occlude filters and nozzles in the spraying equipment. Examples 1 and 8 of the patent in suit, in combination with examples 4 and 10, as well as the example according to document (11), demonstrated that this problem had been solved. Moreover, the comparative examples in the patent in suit, such as example 12, demonstrated that the claimed features were crucial for achieving the desired effect. There was no suggestion in the prior art to undertake a twofold modification of Examples G and H of document (4) as a solution to the problem posed.

- X. The party as of right (opponent I) did not take an active part in the appeal proceedings.
- XI. The appellant (opponent II) requested that the contested decision be set aside and that the European patent No. 1 921 918 be revoked.

The patentee (respondent) requested that the contested decision be set aside and that the patent be maintained on the basis of the main request filed with letter of 22 August 2014 or, alternatively, on the basis of the first auxiliary request and the description filed during the oral proceedings of 23 September 2014.

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

### **Reasons for the Decision**

1. The appeal is admissible.
2. *Request for oral presentation by the respondent's expert (see above points VI and IX)*

According to decision G 4/95 (point 2.(a) of the headnote), oral submissions by accompanying persons can only be made with the permission of and at the discretion of the EPO. In the board's view, hearing the technical expert offered by the respondent on the subject of common general knowledge with respect to the "Hansen solubility parameters" was not necessary in the present case, since the relevant excerpts from a textbook on the subject had already been provided in the form of document (13). No explanation was given by the respondent as to why additional information or clarification on specific issues might be required in this respect. Accordingly, the board decided to refuse the respondent's request.

3. *Main request - Sufficiency of disclosure (Articles 100(b), 83 EPC)*
  - 3.1 The present invention as reflected in claim 1 relates to liquid formulations, comprising triazole fungicide(s) as active ingredient in a concentration of 50-215 g/l (component (a)), and further characterised by the presence of solvent components (b) to (d), namely,

"esters of plant oils", "water-miscible polar aprotic co-solvents" and "water-immiscible co-solvents selected among aromatic hydrocarbons and alcohols", in specified concentrations. The feature defining the formulations as being "liquid" is to be understood as designating a homogeneous product (cf. patent in suit, paragraph [0033]), that is, not containing solid or crystalline components.

In order to assess whether the requirement of sufficiency of disclosure is fulfilled, it must be assessed whether the patent in suit as a whole, that is, the claims and the description (including the examples), makes available to the skilled person, in the light of his general common knowledge, all the information necessary for achieving said formulations within the whole range claimed and without undue burden.

In the present case, the parties disagreed on whether the general disclosure in paragraphs [0016] to [0020] of the patent in suit, in combination with examples 1, 7 and 8 and common general knowledge could be regarded as being sufficient in this context. In support of their respective positions, the parties submitted additional experimental evidence during the opposition/appeal proceedings (see document (11); statement of grounds of appeal, pages 3 to 7; reply to statement of grounds of appeal, pages 3 to 12; and appellant's letter of 14 August 2014, pages 3 to 9). This data was summarised by the respondent in document (12), which will be referred to below.

- 3.2 In document (12), data is listed for tebuconazole, flutriafol, epoxiconazole, triticonazole and fluquinconazole as component (a) of the liquid formulation. It can be seen from the depicted formulae

that the class of triazole fungicides encompasses a structurally diverse range of compounds. Moreover, the corresponding data confirms that the compounds tested also differ significantly in their solubility properties:

For tebuconazole, it can be seen that homogeneous products can be obtained for concentrations close to the claimed upper limit 215 g/l. Similar results were demonstrated for flutriafol, with only one example of failure (entry #4.1).

In contrast, for epoxiconazole, the maximum concentration for which a homogeneous product was obtained was 150 g/l (entry #7.8). Above this value, only non-working examples are available. With triticonazole, crystal formation was also regularly observed, and relatively minor changes in the mixture of solvents were found to transform success into failure (cf. e.g. entries ORT-3.3.2 and #8.2). Finally, the three attempts provided by the appellant for fluquinconazole failed to give homogenous products.

- 3.3 As outlined above in point 3.2, the evidence summarised in document (12) demonstrates that, for a number of triazole fungicides, namely, epoxiconazole, triticonazole, and fluquinconazole, repeated failure is encountered for a substantial part of the invention as defined in claim 1.

The respondent argued that, on the basis of the guidance provided in the patent in suit (cf. paragraph [0019]) and the corresponding common general knowledge relating to the Hansen solubility parameters as disclosed in document (13), the skilled person had at his disposal adequate information leading necessarily and directly

towards success through the evaluation of initial failures, as stipulated in decision T 226/85 (OJ EPO 1988, 336).

However, in the case of epoxiconazole, the respondent was not able to demonstrate how the Hansen solubility parameters could be employed to obtain formulations with concentrations of above 150 g/l. Indeed, the respondent conceded that it might not be possible to avoid crystallisation at these higher concentrations. The range between 150 g/l and the claimed upper limit of 215 g/l, for which solubility problems were invariably encountered, constitutes a substantial portion of the claimed range. This situation is to be distinguished from one in which occasional and correctable failures occur. Indeed, decision T 226/85 further stipulates that "substantially any embodiment of the invention, as defined in the broadest claim, must be capable of being realised on the basis of the disclosure" (see point 2 of the reasons). This requirement is not fulfilled in the present case.

Similarly, it is noted that, for triticonazole, approximately equal number of working and non-working examples are listed in document (12). No trend can be discerned and no guidance is available allowing failures to be directly turned into success. For fluquinconazole, only non-working examples are disclosed. The submission of the respondent that Hansen solubility parameters, if available, would guide the skilled person towards success amounts to an unsubstantiated assertion.

The additional argument advanced by the respondent in this context, namely, that it was not always advantageous to achieve high concentrations, is clearly only relevant to the question of inventive step, and not

to the question of whether an invention can be carried out over the whole breadth claimed.

3.4 Consequently, the invention as defined in claim 1 of the main request fails to meet the requirements of Article 83 EPC.

4. *First Auxiliary request*

4.1 *Amendments (Articles 123(3), 123(2), 84 EPC)*

The appellant did not raise any formal objections with respect to the auxiliary request, and the board sees no reason to differ.

4.2 *Sufficiency of disclosure (Articles 100(b), 83 EPC)*

In claim 1, the triazole fungicide has been limited to tebuconazole. For this active ingredient, it has been demonstrated that the general guidance disclosed in the patent in suit in paragraphs [0016] to [0020] can be applied for a variety of solvent systems as claimed, in order to obtain homogeneous products at concentrations close to the claimed upper limit of 215 g/l, that is, at levels where any solubility problems would be most likely to be encountered (see patent in suit, examples 1 and 8, and document (11)).

The appellant did not provide any evidence to support its attack with respect to the breadth of the definitions of components (b) to (f). This objection is to be rejected as being unsubstantiated in the absence of evidence to the contrary.

Hence, the board sees no reason to doubt that the patent in suit contains all the information necessary for



achieving the desired tebuconazole formulations in the whole range claimed without undue burden.

Consequently, the requirement of sufficiency of disclosure is considered to be met.

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

4.3.1 The subject-matter of claim 1 relates to concentrated liquid formulations, comprising the triazole fungicide tebuconazole as active ingredient (component (a)). The solvent system is defined in components (b) to (d), in terms of specific concentrations of "esters of plant oils", "water-miscible polar aprotic co-solvents" and "water-immiscible co-solvents selected among aromatic hydrocarbons and alcohols", respectively. Surfactants are also present (see component (e)). Such compositions are normally distributed as concentrates, and are then diluted by the end consumer before use. According to the patent in suit, the present formulations do not give rise to significant precipitation of crystals after dilution, thus avoiding blockage of filters and nozzles in the spraying equipment (see patent in suit, paragraphs [0002] and [0006]).

4.3.2 The board considers, in agreement with the appellant, respondent and the opposition division, that document (4) represents the closest state of the art.

Document (4) relates to emulsifiable concentrate formulations for fungicidal azole compounds (see claim 1 and paragraph [0001]). Suitable azoles are disclosed in paragraph [0008], including tebuconazole.

A mixture of two solvent types are employed in the concentrate, namely, "one or more polar aprotic organic

solvents" and "one or more non-polar organic solvents" (see claim 1). The former may be water-miscible (see paragraph [0037]); the latter are "as a rule, a water immiscible solvent", and are preferably "selected from the group consisting of aromatic hydrocarbons, aliphatic hydrocarbons, glycols and plant oil esters or mixtures thereof" (see paragraph [0038]).

The specific formulations G and H (paragraph [0055]), which were highlighted by the appellant, comprise the following components (labeled, for ease of comparison, according to the corresponding components of present claim 1):

- a) metconazole (a triazole: cf. document (4), paragraph [0013]),
- c) *N*-cyclohexylpyrrolidone (water-miscible polar aprotic solvent: see document (4), paragraph [0037], and patent in suit, paragraph [0017]);
- d) solventnaphtha (water-immiscible aromatic hydrocarbon solvent: see document (4), paragraph [0038]); and
- e) Rhodocal 70/B (calcium dodecylbenzene sulfonate classed as anionic surfactant: see document (4), paragraph [0035], and patent in suit, paragraph [0022]).

4.3.3 According to the patent in suit, as outlined above in point 4.3.1, the problem to be solved in the light of the closest prior art lies in the provision of emulsifiable concentrates which, when diluted, avoid blockage of filters and nozzles in the spraying equipment.

The solution as defined in claim 1 relates to a formulation characterised in that a plant oil ester is incorporated into the solvent system.

4.3.4 In order to demonstrate that the problem has been plausibly solved, the respondent relied on the patent in suit, specifically examples 1 and 8, in combination with examples 4 and 10, and comparative example 12, and, additionally, on document (11). In all the formulations disclosed therein the active ingredient is tebuconazole. Moreover, the following solvents are exemplified for components (b), (c) and (d):

(b) Agnique ME890-G or Witconol 2309 (methyl ester of plant oils, cf. patent in suit, paragraph [0016]),

(c) *N*-methylpyrrolidone or 2-propanol (cf. patent in suit, paragraph [0017]),

and

(d) octanol or Solvesso 100 (blend of aromatic hydrocarbons, cf. patent in suit, paragraphs [0018] and [0020]).

It can be seen from Examples 4 and 10 that, following dilution of the formulations according examples 1 and 8, spraying only leads to minimal residue formation in the filter and nozzle. Similarly, according to document (11), the spray liquid provided a constant flow rate through the nozzle throughout the test periods.

In contrast, with the comparative concentrate according to example 12, which only differs from that of example 1 in that the plant oil ester component (b) is absent and replaced by further component (d), filter and nozzle blockage is observed.

Thus, it can be seen from the comparison between examples 1 and 12 that blockage is avoided by incorporation of the plant oil ester component (b), and

the remaining examples discussed above demonstrate that this effect is maintained for a variety of solvent systems falling within the scope of present claim 1.

The appellant contested the validity of comparative examples 1 and 12, arguing that they did not represent a proper comparison with the closest prior art concentrates G and H. However, according to established case law of the Boards of Appeal, for a comparative test to demonstrate an inventive step with an improved effect over a claimed area, the nature of the comparison with the closest state of the art must be such that the effect is convincingly shown to have its origin in the distinguishing feature of the invention. For this purpose it may be necessary to modify the elements of comparison so that they differ only by such a distinguishing feature (see decision T 197/86, OJ EPO 1989, 371, point 6.1.3 of the reasons). In the present case, as outlined above, the tests provided by the respondent are considered to satisfy these criteria, since they fairly reflect the impact of the essential feature distinguishing the claimed compositions from the closest prior art. A comparison of formulations containing different active ingredients, as invoked by the appellant, would not be meaningful, since it would introduce additional variability, precluding any reliable conclusion as to the effect of the solvents employed on the solubility of tebuconazole.

In view of the above considerations, the board is satisfied that the problem posed has been successfully solved.

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

As outlined above in point 4.3.2, document (4) itself suggests the use of plant oil esters as non-polar organic solvents, either alone or in mixtures, for example, with aromatic hydrocarbons. However, the latter is not disclosed as being in any way preferred. The skilled person would not therefore expect to derive any advantage from the use of the present mixture based on this teaching.

Similarly, document (3), cited by the appellant, discloses that there is a move to greener solvents, such as vegetable oil triglyceride esters, as a substitute for aromatics (page 190, section 10.2.2.1), but does not suggest that any solubility advantages would be derived from employing mixtures thereof.

4.3.6 Accordingly, since no teaching can be found in the cited prior art that would have led the skilled person to the present solution to the problem posed, it is concluded that the subject-matter of the auxiliary request involves an inventive step.

#### 4.4 *Adapted description*

The appellant did not object to the amended description submitted by the respondent during the oral proceedings before the board. The board is satisfied that the amendments merely serve to adapt the description to the amended claims.

## Order

### For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the department of first instance with the order to maintain the patent as amended in the following version:  
Description:  
Pages 2 to 11 of the description received during the oral proceedings of 23 September 2014.  
Claims:  
No. 1 to 22 of the first auxiliary request received during the oral proceedings of 23 September 2014.

The Registrar:

The Chairman:



M. Schalow

J.-B. Ousset

Decision electronically authenticated