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Datasheet for the decision of 19 October 2018

Case Number: T 0341/14 - 3.3.02

Application Number: 05725288.4

Publication Number: 1722634

IPC: A01N57/20, A01N61/00, A01N39/04, A01N37/40, A01N25/30

Language of the proceedings: EN

Title of invention:
HERBICIDAL COMPOSITIONS CONTAINING N-PHOSPHONOMETHYL GLYCINE AND AN AUXIN HERBICIDE

Patent Proprietor:
Monsanto Technology LLC

Opponent:
SYNGENTA LIMITED

Headword:
MONSANTO / GLYPHOSATE/AUXIN HERBICIDES

Relevant legal provisions:
EPC Art. 52(1), 56, 123(2)
RPBA Art. 12(4)

Keyword:
Amendments - allowable (yes)
Inventive step - main request and auxiliary requests I to IV (no) - obvious alternative - auxiliary request V (yes)

Decisions cited:

Catchword:

Europäisches Patentamt
European Patent Office
Office européen des brevets

Beschwerdekammern

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Chambres de recours

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Case Number: T 0341/14 - 3.3.02

D E C I S I O N
of Technical Board of Appeal 3.3.02
of 19 October 2018

Appellant: (Opponent)	SYNGENTA LIMITED Syngenta Jealott's Hill International Research Centre Bracknell Berkshire RG42 6EY (GB)
Representative:	Syngenta International AG WRO B8-Z1-30 Schwarzwaldallee 215 4058 Basel (CH)
Respondent: (Patent Proprietor)	Monsanto Technology LLC 800 North Lindbergh Boulevard Saint Louis, MO 63167 (US)
Representative:	Bosch, Henry Office Hanssens Colens Square Marie-Louise 40, bte 19 1000 Bruxelles (BE)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 19 December 2013 concerning maintenance of the European Patent No. 1722634 in amended form**

Composition of the Board:

Chairman	M. O. Müller
Members:	M. Maremonti
	M. Blasi

Summary of Facts and Submissions

I. The appeal by the opponent (hereinafter "appellant") lies from the interlocutory decision of the opposition division, according to which the European patent EP 1 722 634 in its form modified on the basis of the then pending main request and the invention to which it relates meets the requirements of the EPC.

II. The following documents were among those cited during the opposition proceedings:

D1: WO 02/096199 A2

D3: US 2003/0104943 A1

D5a: Cloud point data of comparative and claimed compositions.

D5b: Cloud point data - Analysis of October 2013.

The opposition division came *inter alia* to the following conclusions:

- The subject-matter of the then pending main request met the requirements of Article 123(2) EPC.
- Documents D5a and D5b were not admitted into the proceedings.
- The subject-matter of claim 1 of said main request was novel and involved an inventive step starting from D1 as the closest prior art.

III. The main request found allowable by the opposition division contains sixteen claims, independent claim 1 reciting as follows:

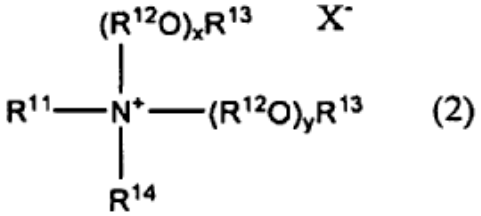
"*1. An aqueous herbicidal concentrate composition comprising:*

(a) glyphosate, predominantly in the form of the potassium salt thereof, in a concentration of at least 175 grams acid equivalent per liter;

(b) an auxin herbicide component comprising one or more auxin herbicides selected from the group consisting of 2,4-D, dicamba and agriculturally acceptable salts or esters thereof; and

(c) a first surfactant component in solution and comprising one or more surfactants selected from the group consisting of:

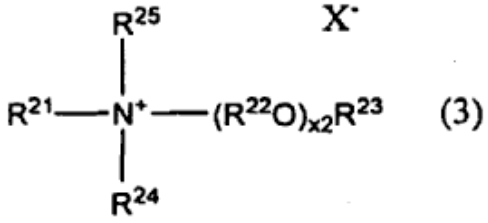
(i) dialkoxylated quaternary ammonium salt having the formula:



(2)

wherein R^{11} is hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, R^{12} in each of the x(R^{12}O) and y(R^{12}O) groups is independently C_2-C_4 alkylene, R^{13} is hydrogen, or a linear or branched alkyl group having from 1 to about 4 carbon atoms, R^{14} hydrocarbyl or substituted hydrocarbyl having from 1 to about 30 carbon atoms, x and y are independently an average number from 1 to about 40, and X^- is an agriculturally acceptable anion;

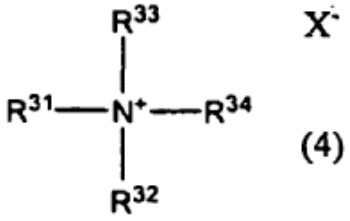
(ii) monoalkoxylated quaternary ammonium salts having the formula:



(3)

wherein R^{21} and R^{25} are independently hydrogen or a linear or branched alkyl, linear or branched alkenyl, linear or branched alkynyl, aryl, or aralkyl group having from 1 to about 30 carbon atoms, R^{24} is a linear or branched alkyl, linear or branched alkenyl, linear or branched alkynyl, aryl, or aralkyl group having from 1 to about 30 carbon atoms, R^{22} in each of the $x^2(R^{22}O)$ groups is independently C_2-C_4 alkylene, R^{23} is hydrogen, or a linear or branched alkyl group having from 1 to about 30 carbon atoms, x is an average number from 1 to about 60, and X^- is an agriculturally acceptable anion;

(iii) quaternary ammonium salts having the formula:

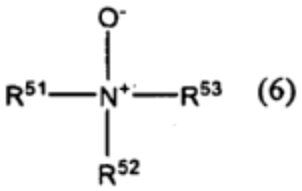


(4)

wherein R^{31} is a linear or branched alkyl or linear or branched alkenyl group having from about 8 to about 30 carbon atoms, and R^{32}, R^{33} and R^{34} are independently a linear or branched alkyl or linear or branched alkenyl

group having from 1 to about 30 carbon atoms, and X^- is an agriculturally acceptable anion;

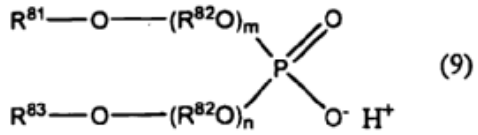
(iv) amine oxides having the formula:



(6)

wherein R^{51} , R^{52} and R^{53} are independently hydrogen, hydrocarbyl or substituted hydrocarbyl, $-(R^{54}O)x^5R^{55}$, or $-R^{56}(OR^{54})x^5OR^{55}$, R^{54} in each of the $x^5(R^{54}O)$ groups is independently C_2-C_4 alkylene, R^{55} is hydrogen, or a linear or branched alkyl group having from 1 to about 30 carbon atoms, R^{56} is hydrocarbylene or substituted hydrocarbylene having from 2 to about 6 carbon atoms, x^5 is an average number from 1 to about 50, and the total number of carbon atoms in R^{51}, R^{52} and R^{53} is at least 8;

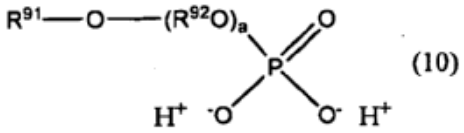
(v) alkyl alkoxylated phosphates having the formula:



(9)

wherein R^{81} and R^{83} are independently a linear or branched alkyl, linear or branched alkenyl, linear or branched alkynyl, aryl, or aralkyl group having from about 4 to about 30 carbon atoms; R^{82} in each of the $m(R^{82}O)$ and the $n(R^{82}O)$ groups is independently C_2-C_4 alkylene; and m and n are independently from 1 to about 30;

(vi) alkyl alkoxylated phosphates having the formula:



(10)

wherein R^{91} is a linear or branched alkyl, linear or branched alkenyl, linear or branched alkynyl, aryl, or aralkyl group having from about 8 to about 30 carbon atoms; R^{92} in each of the a(R^{92}O) groups is independently C_2-C_4 alkylene; and a is from 1 to about 30; and

(vii) alkylpolyglycosides having the formula:

$$[R^{101}\text{-}(R^{104})_q\text{-}(sug)_uOH]_v \qquad (11)$$

where R^{101} is hydrogen or C_{1-18} hydrocarbyl, R^{104} is hydrogen or C_{1-4} hydrocarbyl, q is 0 or 1, sug is (i) an open or cyclic structure derived from sugars or (ii) a hydroxyalkyl, polyhydroxyalkyl or poly(hydroxyalkyl)alkyl group, u is an average number from 1 to about 2, and v is an integer from 1 to 3."

Dependent claims 2 to 15 define particular embodiments of the composition of claim 1. Claim 16 is directed to a method, comprising diluting the composition of claim 1 and applying it to foliage of weeds or unwanted vegetation.

IV. In its statement setting out the grounds of appeal, the appellant contested the reasoning of the opposition division and invoked non compliance with Article 123(2) EPC of the subject-matter of claim 1 of

said main request as well as lack of inventive step in view of D1 taken as the closest prior art.

V. In its reply to the statement of grounds of appeal, the patent proprietor (hereinafter "respondent") defended the patent in suit in the form considered allowable by the opposition division. It maintained that the subject-matter of claim 1 at issue did not extend beyond the content of the application as filed and involved an inventive step starting from D1 as the closest prior art.

In its argumentation concerning inventive step, it referred to documents D5a and D5b. Moreover, it relied on the following new pieces of evidence:

D6: Exhibit: Cloud Point Data

D7: Exhibit: Statistical Inferences from Colby Calculations for Synergy for 2,4-D Amine and potassium glyphosate Combinations

The respondent also filed auxiliary claim requests I to V. Claim 1 of these auxiliary requests was restricted in comparison to claim 1 of the main request by either

- deleting one or more of the above surfactants (i) to (vii), or
- narrowing the list of possible substituents within said formulae of surfactants (i) to (vii),
- or both.

VI. In preparation for the oral proceedings, the Board issued a communication drawing the parties' attention to salient issues that might possibly be debated at the oral proceedings. In particular, it expressed the

preliminary opinion that the claimed subject-matter appeared to comply with Article 123(2) EPC.

VII. By letter dated 7 September 2018, the appellant communicated that it did not intend to attend the oral proceedings.

VIII. Oral proceedings before the Board were held on 19 October 2018 in the absence of the appellant, in accordance with Rule 115(2) EPC and Article 15(3) RPBA.

IX. Final Requests

The **appellant** requested in writing that the decision under appeal be set aside and the patent be revoked.

The **respondent** requested as its main request that the appeal be dismissed.

Should the main request not be allowable, it requested that the patent be maintained on the basis of the claims of one of auxiliary requests I to V, to be considered in their numerical order, all auxiliary requests having been filed with the reply to the statement of grounds of appeal.

It further requested that documents D5a, D5b, D6 and D7 be admitted into the proceedings.

X. The arguments submitted by the appellant in writing, where relevant for the present decision, may be summarised as follows:

Added matter under Article 123(2) EPC:

- The amendments carried out on claim 1 of the main request resulted in singling out of a particular combination of specific meanings which was not disclosed originally.

- The minimum concentration of glyphosate was increased, the list of possible auxine co-herbicides was restricted, the physical state of the surfactant was limited to being in solution and the Markush groupings of surfactants was limited, whereby within two of the specified formulae, namely formulae (3) and (4), the substituents were restricted.

- All these amendments represented selections from various lists thus resulting in a claimed subject-matter that extended beyond the content of the application as filed.

- In fact, all mentioned features were inextricably linked as shown by the results reported in Table 19a of the application as filed. There was no pointer in the application as filed to the specific combination of features now defined in claim 1 at issue.

- Claim 1 of the main request thus infringed Article 123(2) EPC.

Inventive step:

- Document D1, particularly the compositions exemplified in examples 152, 153, 155 and 156, represented the closest prior art.

- The subject-matter of claim 1 of the main request differed from said compositions of D1 in the nature of the surfactant.

- It was not credible that an improvement of the cloud point of the composition could be achieved for all surfactants falling under formulae (2), (3) and (4) of claim 1.

- An alleged inventiveness conferred by surfactants of formula (4) could not be extrapolated to those of formulae (2) and (3) on the basis of structural similarity.

- As a matter of fact, the surfactants of formulae (2) and (3) were ethoxylated and thus closer in structure to the surfactant used in the closest prior art rather than to surfactants of formula (4).

- The data presented in the contested patent showed wide variations in the measured cloud point even when the surfactant remained the same. The alleged effect was not mediated solely by the surfactant.

- Claim 1 thus did not solve the objective technical problem across its full scope in respect of the solutions provided by surfactants of formulae (2), (3) and (4) and thus the claim as a whole lacked inventive step.

- As to surfactants of formula (11), no technical effect was achieved, so that the objective technical problem merely lied in the provision of an alternative composition.

- The possible use of such surfactants, particularly in compositions based on potassium glyphosate, was clearly recommended in D1, page 72, lines 23 to page 73, line 26.

- The skilled person would therefore substitute a surfactant of formula (11) for the surfactants used in the compositions of the closest prior art. This was an obvious alternative.

- The subject-matter of claim 1 of the main request thus lacked an inventive step.

XI. The respondent essentially counter-argued as follows:

Added matter under Article 123(2) EPC:

- Claim 1 of the main request was based on claim 24 as filed, on paragraph [0020] and on page 14, lines 8-10 and page 15, lines 14-18, of the application as filed.

- The deletion of alternatives from a Markush group did not run afoul of Article 123(2) EPC.

- The restriction to surfactants being present in solution merely shrunk the number of the qualitatively equal alternatives presented in claim 22 as filed. In fact, all examples of the contested patent comprised the surfactant in solution. No new invention was generated.

- Therefore, the main request complied with Article 123(2) EPC.

Admittance of D5a and D5b:

- D5a and D5b even though filed late should have been admitted in the first instance. In fact, they did not represent new experiments but merely provided a graphical representation and a rearrangement of data that were already in the proceedings.

- Inaccuracies present in these documents, if any, were immaterial to the overall conclusion that one could draw from the presented data.

- These documents should be admitted since they were presented in appeal at the earliest opportunity,

the appellant had ample time to study them and the non-admittance by the opposition division was at least partly based on a misunderstanding of the content.

Inventive step:

- The claimed subject-matter offered surprising advantages compared to the formulations taught in D1.

- The data presented in example 19 of the application as filed as well as in D5a, D5b and D6 clearly demonstrated that compositions comprising surfactants of formula (2), (4) and (11) exhibited an unexpectedly improved cloud point relative to the compositions of the closest prior art.

- Formula (3) surfactants fell midway between those of formula (2) and (4), so that the skilled person would understand that the same improvement in cloud point would be provided.

- Additionally, D7 demonstrated that compositions according to claim 1 at issue, particularly including a surfactant of formula (11), exhibited an unexpected and surprising herbicidal synergy for control of *Commelina*. These results provided an additional basis for inventive step of the main request.

- Since the cited prior art documents did not contain any teaching or suggestion prompting the skilled person to replace the surfactants of the closest prior art with the claimed surfactants in order to obtain the mentioned technical effects of improved

cloud point and herbicidal synergy, the main request involved an inventive step.

- Even if the objective technical problem merely lied in the provision of an alternative composition, still the use of surfactants according to the main request exhibited an inventive step.

- When D1 was considered as a whole, it did not represent a springboard from which the skilled person would explore various surfactants for use in formulations comprising potassium glyphosate and an auxin.

- In fact, D1 addressed the problem of providing stable potassium glyphosate compositions. This was solved by preparing emulsions comprising a stabilizer, particularly by adding significant amounts of a water-immiscible organic solvent. Such solutions did not lead to the claimed invention.

- D1 disclosed several different types of surfactants and several different glyphosate salts. No teaching was provided as to which surfactant was suitable for which glyphosate salt.

- D1 did not contain any guidance as to the selection of surfactants for formulations containing co-herbicides like 2,4-D or dicamba. As a matter of fact, the vast majority of the examples of D1 concerned compositions comprising only glyphosate as herbicide. Aiming at preparing alternative stable compositions, the skilled person had no reason to depart from the surfactants actually used in examples 152, 153, 155 and 156. Actually, according to D1, page 4, lines 5 to 7, the ability of the surfactants to enhance the herbicidal

effectiveness of glyphosate was highly unpredictable. Moreover, potassium glyphosate formulations were said on page 14, lines 1 to 3, to be particularly difficult to stabilize.

- Furthermore, D1 taught away from using surfactants of formula (11). According to D1, page 7, line 22 to page 8, line 22, the viscosity of the composition would increase and a brown colour would develop. The skilled person would have been thus strongly discouraged from replacing the surfactants of examples 152, 153, 155 and 156 of D1 with a surfactant of formula (11).

- Therefore, even without taking into account any technical effect of the claimed surfactants, the main request was based on an inventive step.

- The same argumentation applied even more to the subject-matter of auxiliary requests I to V, wherein claim 1 was restricted by either deleting some groups of possible surfactants or narrowing the lists of meanings of the residues within groups of surfactants, or both.

- All auxiliary requests I to V were thus based on an inventive step.

Reasons for the Decision

1. Main request - claim 1 - compliance with Article 123(2) EPC

1.1 Claim 1 differs from claim 24 (with back-reference to claim 22) as filed in terms of the glyphosate concentration (at least 175 grams acid equivalent per

liter instead of at least 65 grams acid equivalent per liter), the physical state of the surfactant (solution instead of solution, stable suspension, emulsion or dispersion), the deletion of formulae 1, 5, 7 and 8 for the surfactant and the restriction of the substituents in formulae (3) and (4). Contrary to what was submitted by the appellant (X, *supra*), the Board is convinced that the amendments carried out on claim 1 at issue do not result in combinations of features that were not originally disclosed.

1.2 Paragraph [0020] of the application as filed provides an adequate basis for the minimum glyphosate concentration fixed at 175 grams acid equivalent per liter. Indeed, the teaching of this paragraph is general and confirmed by all examples reported in the application as filed.

1.3 Moreover, the mere deletion of some of the formulae originally disclosed as alternatives in claim 24 as filed does not result in new information for the skilled person. The same applies to the deletion of some alternatives concerning the surfactant's physical state. In fact, the presence of the surfactant as a solution is disclosed and thus pointed at in all examples of the application as filed.

1.4 As to the substituents of formulae (3) and (4), these have been restricted to preferred embodiments as disclosed in the application as filed on page 14, lines 7 to 9 and page 15, lines 14 to 18, respectively. In the Board's judgement, these restrictions do not result in singling out particular combinations of compounds or groups of compounds that were not originally disclosed. In other words, the restricted subject-matter is maintained as generic groups only

differing from the original groups by their smaller size. Since the restrictions were originally presented as preferred embodiments of the invention, they are directly and unambiguously derivable from the application as filed.

1.5 The Board thus comes to the conclusion that claim 1 of the main request is not objectionable under Article 123(2) EPC.

1.6 Claims 2 to 16 were not objected to by the appellant under Article 123(2) EPC and the Board is convinced that the requirements of this Article are met for these claims.

2. Admittance of the late-filed evidence

2.1 The respondent relies in its argumentation concerning inventive step on the items of evidence D5a, D5b, D6 and D7 submitted with the reply to the statement of grounds of appeal. It requests that this evidence be admitted into the proceedings.

2.2 The appellant has not objected against the introduction of the mentioned items of evidence. The Board also sees no reasons not to admit them.

2.3 The Board thus decided to admit D5a, D5b, D6 and D7 into the proceedings pursuant to Article 12(4) RPBA.

3. Main request - claim 1 - inventive step

3.1 The invention

The invention as defined in claim 1 of the main request concerns herbicidal compositions containing potassium glyphosate, one or more auxin herbicides particularly selected from 2,4-D and dicamba, and one or more

surfactants selected from the groups of formulae (2), (3), (4), (6), (9), (10) and (11) (see III, *supra*).

The compositions of the invention are aimed at being "storage-stable", i.e. characterised by a cloud point of 50°C or more. "*Cloud point of a composition is normally determined by heating the composition until the solution becomes cloudy, and then allowing the composition to cool, with agitation, while its temperature is continuously monitored. A temperature reading taken when the solution clears is a measure of cloud point*" (see the contested patent, paragraph [0056]). The higher the cloud point, the more stable the composition is upon storage.

3.2 The closest prior art

3.2.1 Both parties indicated D1, and in particular the compositions exemplified in examples 152, 153, 155 and 156, as the closest prior art for the subject-matter of claim 1 of the main request.

3.2.2 By considering the issues addressed in D1 and the herbicidal compositions disclosed therein, the Board sees no reasons to take another stance.

3.2.3 Indeed, said examples 152, 153, 155 and 156 of D1 disclose compositions comprising potassium glyphosate, 2,4-D and a surfactant. Hereinafter, by way of example, reference will be made to example 152. What follows hereinafter however equally applies to the remaining examples.

3.2.4 It is undisputed that the surfactants listed in this example pertain to the Markush groups of formulae (7) or (8) according to the application as filed for the

contested patent (see pages 18 to 20). Specifically (cf. D1, pages 88-89):

- C124 pertains to formula (8)
- C108, C109, C123, C129, C130 and C131 pertain to formula (7).

In the Board's judgement, any of the compositions listed in example 152 represents an adequate starting point for the assessment of inventive step of the claimed subject-matter.

3.3 The technical problem

3.3.1 It is undisputed that the subject-matter of claim 1 at issue differs from said compositions of the closest prior art only in the nature of the surfactant since surfactants of formulae (7) and (8) (3.2.4, *supra*) are not part of the claimed subject-matter.

3.3.2 The Board observes that the composition defined in claim 1 of the main request includes several alternative surfactants, respectively pertaining to the groups of formulae (2), (3), (4), (6), (9), (10) and (11), (see III, *supra*). An inventive step of the claimed subject-matter, if any, must therefore be present in respect of every single group of surfactant.

Surfactants of formula (11):

In particular for the surfactants of formula (11), the respondent argued that based on the data reported in D5a, D6 and D7, these were able to improve the cloud point of the composition relative to the formulations of the closest prior art and further provided an unexpected and surprising herbicidal synergy for control of *Commelina.*

3.3.3 In view of the above, the respondent formulated the technical problem as the provision of compositions exhibiting an improved cloud point and herbicidal synergy.

3.4 Success of the claimed solution

Cloud point's improvement

3.4.1 During the written proceedings, the respondent referred to D5a and D6, Table 1, reporting that samples 612A7G and 312A6E, concerning compositions including NIS2 as surfactant of formula (11), showed a cloud point of 72°C. This was higher than the average cloud point measured for compositions including a surfactant as used in the closest prior art (identified in D5a and D6, Table 1, as "Comparative compositions" and having cloud points ranging from 55°C to 73°C). Moreover, Table 2 of D6 demonstrated (cf. samples 22 to 25) that by increasing the proportion of Agnique, a surfactant of formula (11), within a composition also including a surfactant according to the closest prior art (AGM 550), the cloud point was improved.

3.4.2 The Board is not convinced by this argumentation.

Samples 612A7G and 312A6E referred to in D5a and D6, Table 1, were extracted from Table 19a of the application as filed (see pages 65 to 68). However, said Table 19a also contains other examples of compositions including the same surfactant NIS2 of formula (11), e.g. samples 613A9L, 313A1V, 346B6T and 317A0J, for which cloud points as low as 52°C, 52°C, 55°C and 57°C are respectively reported.

Additionally, Table 2 of D6 (cf. samples 22 to 24) actually shows that quite high proportions of Agnique

(25%, 33% and 50%) result in very low cloud points (45°C, 42°C and 40°C) and that by increasing the proportion of Agnique in relation to the surfactant of the closest prior art, the cloud point even decreases. It is only when 100% Agnique is used that a cloud point greater than 90°C is achieved (cf. sample 25).

The Board thus concludes that an improvement of the cloud point has not been credibly shown for surfactants of formula (11). It has to be noted that during oral proceedings the respondent did not want to comment on this issue but merely referred to its written submissions.

Herbicidal Synergy

3.4.3 During the written proceedings, the respondent also invoked a herbicidal synergy against *Commelina* which was allegedly achieved by using surfactants of formula (11). It based its argumentation on D7.

3.4.4 The Board is not convinced.

D7 reports the *observed* herbicidal efficacy versus a calculated *expected* value for different herbicidal compositions. From the results reported in the Table on page 2 of D7, one can infer that the observed efficacy against *Commelina* is higher than the expected value when a surfactant is included in the composition. On the contrary, in the absence of any surfactant, the observed efficacy is generally lower than the expected value.

However, these results were obtained by employing as the surfactant a combination of a surfactant of formula (11) with a surfactant according to the closest prior art (AGM 550). Therefore, D7 does not demonstrate

that the obtained effect necessarily originates from the surfactant of formula (11). In fact, no comparison with formulations only including a surfactant as used in the closest prior art was made. It has to be noted that also in this case, during oral proceedings the respondent did not want to comment on this issue but merely referred to its written submissions.

3.5 Reformulation of the technical problem

3.5.1 For the reasons given under items 3.4.2 and 3.4.4, *supra*, the Board concludes that no sufficient evidence has been provided by the respondent that surfactants of formula (11) were able to solve the technical problem put forward (3.3.3, *supra*).

3.5.2 At least as regards the surfactants of formula (11), therefore, the technical problem must be reformulated as a less ambitious one, i.e. as the provision of an *alternative* herbicidal composition. This thus represents the objective technical problem.

3.6 Obviousness of the solution

Contrary to the arguments submitted by the respondent (XI, *supra*), the Board is convinced that the inclusion of surfactants of formula (11) in the herbicidal compositions of the closest prior art (3.2.4, *supra*) does represent an obvious alternative for the skilled person, and this for the reasons set out below.

3.6.1 D1 (cf. page 72, line 23 to page 73, line 26) clearly discloses that "*Alkylpolyglycosides are also suitable for use in the compositions and concentrates of the invention*". It is undisputed that the compounds referred to in the cited passage of D1 fall under the

definition of the surfactants of formula (11) according to claim 1 of the main request.

3.6.2 Looking for an alternative to the compositions of the closest prior art, the skilled person thus finds in the above passage of D1 a clear pointer to the employment of surfactants of formula (11). This represents, therefore, a straightforward possibility that the skilled person would immediately consider in order to solve the technical problem posed (3.5.2, *supra*).

3.6.3 The respondent invoked the statement from page 7, line 26 to page 8, line 22 of D1, teaching that the addition of alkylglycosides to formulations already containing another surfactant, namely an alkoxylated alkylamine, resulted in compositions dark brown in colour and of higher viscosity.

The Board observes that such statement refers to prior art formulations using mixtures of specific surfactants (cf. D1, page 7, line 20). It is not regarded as to deterring the skilled person from following the clear teaching contained in D1 and referred to above that surfactants of formula (11) may be used in the compositions ***of the invention*** of D1, i.e. *inter alia* in the compositions taught in the examples of D1.

3.6.4 The passage on page 4, lines 5 to 7 of D1, also referred to by the respondent, recites that "*the relative ability of different surfactants* ***to enhance the herbicidal effectiveness*** *of glyphosate is highly unpredictable*" (emphasis added by the Board).

However, as mentioned above, the objective technical problem merely lies in the provision of *alternative* compositions. An *enhancement* of the herbicidal effectiveness is not required. Therefore, the above

passage also does not deter the skilled person from using surfactants of formula (11).

3.6.5 Finally, it is acknowledged that D1 in its description generally discloses several glyphosate salts and several groups of surfactants.

However, the inventive step of the claimed subject-matter has to be assessed in view of the specific formulations of the closest prior art (3.2.4, *supra*) and not in view of this general disclosure of D1.

3.7 For the reasons expressed above, the Board comes to the conclusion that the subject-matter of claim 1 of the main request, in so far as it includes surfactants of formula (11), does not involve an inventive step.

The main request is therefore not allowable (Articles 52(1) and 56 EPC).

4. Auxiliary requests I to IV - claim 1 - inventive step

4.1 The Board notes that claim 1 according to all auxiliary requests I to IV, as already claim 1 of the main request, only differs from the compositions of the closest prior art (3.2.4, *supra*) in the nature of the surfactant.

4.2 Moreover, the compositions defined in claim 1 according to all auxiliary requests I to IV still includes as an alternative, the surfactants of formula (11) already present in claim 1 of the main request.

4.3 The Board therefore concludes that the same reasoning for lack of inventive step of the subject-matter of the main request applies *mutatis mutandis* to claim 1 of all auxiliary requests I to IV. This conclusion was also not disputed by the respondent during oral proceedings.

4.4 Therefore, the subject-matter of claim 1 of all auxiliary requests I to IV lacks an inventive step.

Auxiliary requests I to IV are thus not allowable (Articles 52(1) and 56 EPC).

5. Auxiliary request V - claim 1 - compliance with Articles 123(2) and 84 EPC

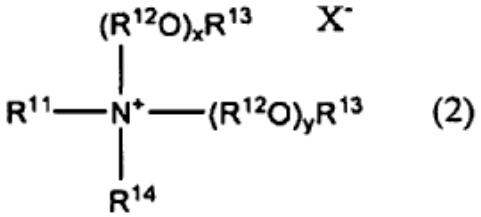
5.1 Claim 1 of auxiliary request V differs from claim 1 of the main request in that only surfactants of formulae (2), (3) and (4) were retained in the claim. Moreover, the meanings of the residues in the retained formulae were restricted so that claim 1 reads as follows (amendments in comparison to claim 1 of the main request emphasised by the Board):

"*1. An aqueous herbicidal concentrate composition comprising:*

[...] and

(c) a first surfactant component in solution and comprising one or more surfactants selected from the group consisting of:

(i) dialkoxylated quaternary ammonium salt having the formula:

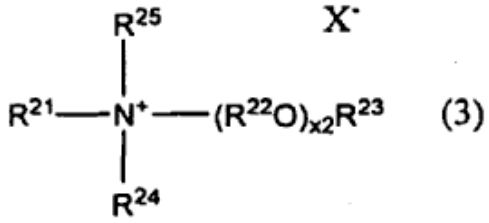


(2)

wherein R^{11} is ~~hydrocarbyl or substituted hydrocarbyl~~ ***a linear or branched alkyl group*** *having from ~~1 to about 30~~* ***about 8 to about 22*** *carbon atoms, R^{12} in each of the*

x($R^{12}O$) and y($R^{12}O$) groups is independently ~~C_2-C_4 alkylene~~ ***ethylene or propylene,*** *R^{13} is hydrogen* ***or methyl,*** *~~or a linear or branched alkyl group having from 1 to about 4 carbon atoms,~~ R^{14}* ***is a linear or branched alkyl group*** *~~hydrocarbyl or substituted hydrocarbyl~~ having from 1 to about ~~30~~* ***6*** *carbon atoms,* ***the sum of*** *x and y* ***is*** *~~are independently~~ an average number from ~~1 to about 40~~* ***about 2 to about 15,*** *and X^- is an agriculturally acceptable anion;*

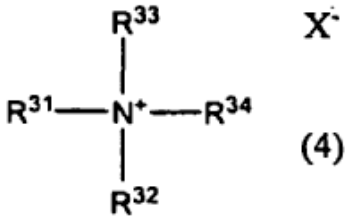
(ii) monoalkoxylated quaternary ammonium salts having the formula:



(3)

wherein R^{21} ***is*** *~~and R^{25} are independently hydrogen or~~ a linear or branched alkyl~~, linear or branched alkenyl, linear or branched alkynyl, aryl, or aralkyl~~ group having from ~~1 to about 30~~* ***about 8 to about 22*** *carbon atoms, R^{24}* ***~~is~~ and R^{25} are independently a*** *linear or branched alkyl~~, linear or branched alkenyl, linear or branched alkynyl, aryl, or aralkyl~~ group having from 1 to about ~~30~~* ***6*** *carbon atoms, R^{22} in each of the x^2($R^{22}O$) groups is independently ~~C_2-C_4 alkylene~~* ***ethylene or propylene,*** *R^{23} is hydrogen* ***or methyl,*** *~~or a linear or branched alkyl group having from 1 to about 30 carbon atoms,~~ x is an average number from ~~1 to about 60~~* ***about 5 to about 25,*** *and X^- is an agriculturally acceptable anion;* ***and***

(iii) quaternary ammonium salts having the formula:



*wherein R^{31} is a linear or branched alkyl ~~or linear or branched alkenyl~~ group having from about 8 to about ~~30~~ **16** carbon atoms, and R^{32}, R^{33} and R^{34} are independently a linear or branched alkyl ~~or linear or branched alkenyl~~ group having from 1 to about ~~30~~ **6** carbon atoms, and X^- is an agriculturally acceptable anion.*"

5.2 The Board notes that the meanings of the residues in the retained formulae were restricted to preferred embodiments as disclosed in the application as filed on page 13, lines 16 to 20 (formula (2)), page 14, lines 21 to 26 (formula (3)) and page 15, lines 20 to 23 (formula (4)), respectively.

5.3 The appellant did not raise any objection against these amendments under Articles 84 or 123(2) EPC. The Board sees no reasons to take another stance and thus concludes that the amendments in auxiliary request V do not introduce deficiencies under Articles 84 and 123(2) EPC.

6. Auxiliary request V - claim 1 - inventive step

6.1 The technical problem

6.1.1 The subject-matter of claim 1 according to auxiliary request V, as already claim 1 of the main request, differs from the compositions of the closest prior art

(3.2.4, *supra*) in the nature of the surfactant, now restricted to one or more compounds of formulae (2), (3) and (4).

6.1.2 The respondent argued that the results reported in D6 and in Table 19a on pages 65 to 68 of the application as filed demonstrated that by employing the surfactants defined in claim 1 of auxiliary request V a clear improvement of the cloud point of the composition relative to the formulations of the closest prior art could be achieved.

6.1.3 In view of the above, the respondent formulated the technical problem as the provision of compositions exhibiting an improved cloud point.

6.2 Success of the solution

6.2.1 The appellant (X, *supra*) submitted that it was not credible that an improved cloud point could be achieved across the full breadth of claim 1, i.e. for all surfactants falling under formulae (2), (3) and (4).

The Board does not agree for the following reasons.

The results reported in Table 19a of the application as filed:

6.2.2 It is undisputed that compounds CIS13 and CIS14 referred to in Table 19a fall under the definition of surfactants of formula (4) according to claim 1 at issue. Compounds CIS2 and CIS6 are instead of the same nature as the surfactants used in the formulations of the closest prior art (for the definitions of said compounds, see the application as filed, pages 33 and 34).

6.2.3 By keeping the concentration of the two herbicides (glyphosate and 2,4-D) approximately constant, the results of Table 19a show that sample 645A7S only containing CIS13 has a much higher cloud point (>85°C) than sample 640B7Q only containing CIS6 (55°C) and samples 505A4R, 506B1V and 508B2M only containing CIS2 (60°C).

Also the results obtained when CIS13 or CIS14 are used in combination with CIS6 consistently show that by increasing the proportion of CIS13 or CIS14 relative to CIS6, the cloud point increases, see samples 682B5V/ 682C7P for CIS13 in combination with CIS6 and samples 638A1J/638B4T/639A5Z, 697A3U/697C2T and 338A2W/338B4F/ 339A3Q for CIS14 in combination with CIS6.

The results reported in D6, Table 2

6.2.4 As to the results of D6, Table 2, the Board notes that samples 15 to 21 exhibit an increase in the cloud point by increasing the proportion of a surfactant of formula (4) (Arquad C33) relative to a surfactant according to the closest prior art (AGM 550).

6.2.5 For samples 1 to 14, the trend is recognizable that by increasing the proportion of a surfactant of formula (2) (Ethoquad C-12) relative to a surfactant according to the closest prior art (AGM 550), the measured cloud point is generally increased.

It is noted that the appellant did not file any comment to contest the results shown in D6.

6.2.6 In the Board's judgement, the above results convincingly demonstrate that the use of surfactants of formulae (2) and (4) in lieu of or in addition to the surfactants employed in the formulation of the closest

prior art (3.2.4, *supra*), leads to an improvement (increase) of the cloud point of the composition.

6.2.7 As to the surfactants of formula (3), the Board notes that no experimental results are available. However, the argument of the appellant that these compounds, being ethoxylated, were closer in structure to the surfactant used in the closest prior art rather than to surfactants of formula (4) cannot be followed. As already mentioned above, the surfactants of the prior art fall under the general formulae (7) and (8) as disclosed in the application as filed, pages 18 and 19. These compounds are nonionic, whereas all compounds of formulae (2), (3) and (4) are ionic. Moreover, the structure of the compounds of formula (3) (monoalkoxylated quaternary ammonium salts) lies in between the structure shown in formula (2) (dialkoxylated quaternary ammonium salt) and that shown in formula (4) (quaternary ammonium salts).

6.2.8 In the absence of any counter evidence based on verifiable facts, the Board finds it therefore plausible that surfactants of formula (3) would behave similar to those of formulae (2) and (4) so that their use would also lead to an increase of the cloud point of the composition relative to the formulations of the closest prior art.

6.2.9 The Board further observes that despite of its allegation that surfactants falling under claim 1 at issue were not able to improve the cloud point of herbicidal compositions, the appellant did not provide any experimental evidence in this respect, and this notwithstanding the fact that the opposition division already acknowledged a technical effect of the

surfactants of formulae (2), (3) and (4) in the impugned decision.

6.2.10 The appellant has therefore not discharged its burden to prove that an improvement of the cloud point would not be achieved over the whole scope of claim 1 at issue.

The Board is thus satisfied that the subject-matter of claim 1 of auxiliary request V solves the technical problem as proposed by the respondent (6.1.3, *supra*). This is hence the objective technical problem.

6.3 Obviousness of the solution

6.3.1 What remains to be decided is whether or not, having regard to the state of the art and common general knowledge, it was obvious to the skilled person seeking to solve the posed technical problem (6.1.3, *supra*) to modify the formulations of the closest prior art (3.2.4, *supra*) by incorporating one or more surfactants of formulae (2), (3) or (4).

6.3.2 D1 acknowledges on page 9, lines 7 to 23, that an indication of the storage stability of herbicidal concentrates based on glyphosate is given by the cloud point of the composition, which should ideally be 50°C or more. A surfactant component comprising one or more surfactants should be present in a concentration sufficient to provide a cloud point of at least 50°C (cf. claim 1).

6.3.3 Several surfactants are presented in D1 as to being suitable for inclusion in the herbicidal compositions (cf. page 26, line 18 to page 59, line 21). Compounds of formulae (2), (3) and (4) as defined in claim 1 at issue are also mentioned among others (cf. pages 46 to

50). However, no indication is provided in D1 that especially these surfactants would provide an improved cloud point relative to the others. All described surfactants are presented in D1 as to being equivalent to each other.

6.3.4 The disclosure of D3, also referred to by the appellant, essentially contains the same teaching of D1 (cf. paragraph [0028] as well as paragraphs [0050] to [0212] disclosing the various suitable surfactants).

6.3.5 Based on the above considerations, the Board concludes that having regard to the cited state of the art, it was not obvious to the skilled person seeking to solve the technical problem posed, to modify the herbicidal formulations of the closest prior art such as to arrive at a composition falling within the ambit of claim 1 at issue.

6.3.6 In the Board's judgement, the subject-matter of independent claim 1, of claims 2 to 15 dependent on claim 1, and of method claim 16, comprising employing the composition of claim 1, thus involves an inventive step (Articles 52(1) and 56 EPC).

6.4 Auxiliary request V is therefore 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 in amended form on the basis of the claims of auxiliary request V filed with

the reply to the statement of grounds of appeal, and a description to be adapted thereto.

The Registrar: The Chairman:

N. Maslin M. O. Müller

Decision electronically authenticated