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Datasheet for the decision of 30 March 2010

Case Number: T 1550/05 - 3.3.05

Application Number: 01300083.1

Publication Number: 1118382

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Language of the proceedings: EN

Title of invention:
Microcapsule and process for production thereof

Patentee:
Kureha Corporation

Opponent:
Papierfabrik August Koehler AG

Headword:
Process for producing microcapsules/KUREHA

Relevant legal provisions:
-

Relevant legal provisions (EPC 1973):
EPC Art. 56

Keyword:
"Inventive step (main request and auxiliary requests 1 to 5): no - technical problem not solved over the whole scope of the claims, reformulation of the technical problem, obvious alternative"

Decisions cited:
T 0197/86

Catchword:
-

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Case Number: T 1550/05 - 3.3.05

D E C I S I O N
of the Technical Board of Appeal 3.3.05
of 30 March 2010

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Decision under appeal: **Interlocutory decision of the Opposition Division of the European Patent Office posted 28 October 2005 concerning maintenance of the European patent No. 1118382 in amended form.**

Composition of the Board:

Chairman: G. Raths
Members: E. Waeckerlin
S. Hoffmann

Summary of Facts and Submissions

I. This appeal lies from the interlocutory decision of the opposition division to maintain European patent No. EP 1 118 382 B in amended form on the basis of claims 1 to 13 of the first auxiliary request submitted with letter dated 23 August 2005.

II. The opposition division held that the process for producing microcapsules according to claim 1 was novel in respect of the cited prior art, in particular documents D2 and D5.

D2: US 4 557 755 A;

D5: DE 37 43 427 C1.

The claimed process differed from the disclosure of document D5 by two features, namely (i) the order of mixing the components in the first coating step, and (ii) the addition of a base to increase the pH value in the second coating step.

Regarding inventive step, the opposition division held that example 1 of D5 represented the closest prior art. Starting from D5 the technical problem consisted in providing microcapsules having a more uniform coating layer on a hydrophobic core material with extreme suppression of the occurrence of isolated or aggregated film material alone, aggregated microcapsules and isolated core material.

Having regard to the comparative tests submitted by the proprietor of the patent, the opposition division

considered that the technical problem was solved by the claimed process.

The opposition division came to the conclusion that the process according to claim 1 involved an inventive step. The same applied to independent claim 13 relating to microcapsules obtainable by the process according to claim 1.

III. In the grounds of appeal dated 28 February 2006 the appellant (opponent) raised *inter alia* various objections under Article 56 EPC 1973. The appellant argued that the coating materials were defined in very general terms in claim 1. In particular the terms *"cationic amino resin"*, *"anionic surfactant"* and *"amino resin prepolymer"* were inadequately broad in scope, so that the claim covered an unmanageable multitude of diverse substances. The skilled person could not expect that all embodiments encompassed by claim 1 provided microcapsules having the desired advantageous properties. There was no evidence of a link between the distinguishing feature of claim 1 on the one hand, and the alleged technical advantages on the other hand. In the appellant's view the comparative tests performed by the respondent and reported in D7 and D8, respectively, were not conclusive.

D7: *"Experimental Record"* filed by the respondent during opposition proceedings with letter dated 23 November 2004.

D8: *"Experimental Record (2)"* filed by the respondent with letter dated 9 November 2006.

Relying on its own comparative tests reported in D6 and D9, respectively, the appellant argued that the properties of microcapsules produced according to the process of claim 1 were not substantially distinguished from those of microcapsules produced according to the process of D5.

D6: *"Versuchsbeschreibungen"*, filed by the appellant with letter dated 28 February 2006.

D9: *"Versuchsbeschreibungen"*, filed by the appellant with letter dated 1 March 2010.

For these reasons the appellant held that both the process according to claim 1 and the microcapsules according to claim 13 did not involve an inventive step.

Regarding the product-by-process claim 13, the appellant submitted further that in any case this claim was not allowable for two reasons, namely because the substitution of the product claim 1 of the application as originally filed by a product-by-process-claim was not occasioned by one of the grounds for opposition set out in Article 100 EPC, and because claim 13 extended the protection over the scope of the patent as granted, which was not in conformity with Article 123(3) EPC.

IV. The respondent (proprietor of the patent in suit) contested the submissions of the appellant.

Having regard to general technical terms like *"cationic amino resin"*, *"anionic surfactant"* and *"amino resin*

prepolymer", the respondent submitted that these terms are well understood by the skilled person.

The step-wise premixing of the components in the first coating step gives rise to improved results in terms of gradual release properties, uniformity of the coating and suppression of uncoated core material as well as isolated film material. The respondent challenged the comparative experiments submitted by the appellant. In its view, these tests were neither a fair repetition of the prior art, as represented in particular by document D5, nor did they follow the teaching of the patent.

With letter dated 16 June 2009, the respondent submitted six sets of claims as main request and as first to fifth auxiliary requests.

V. Claim 1 of the main request reads as follows:

"1. A process for producing a microcapsule, comprising: a first coating step of mixing a water-soluble cationic amino resin, an anionic surfactant and an acid catalyst to adjust the aqueous medium to a pH of 3 - 9 in the presence of a hydrophobic core material dispersed in an aqueous medium to coat the dispersed core material with a solidified coacervate of the cationic amino resin and the anionic surfactant, wherein the hydrophobic core material is first mixed with one of the water soluble cationic amino resin and the anionic surfactant and then with the other one of the water-soluble cationic amino resin and the anionic surfactant, and a second coating step of adding an amino resin prepolymer in the presence of an acid catalyst at pH 2 - 7 into an aqueous dispersion liquid containing the coated

dispersed core material and polycondensating the amino resin prepolymer to further coat the coated dispersed core material with a polycondensate of the amino resin prepolymer."

Independent claim 13 of the main request reads as follows:

"13. A microcapsule obtainable by the process according to any one of Claims 1 to 12."

The first auxiliary request corresponds to the main request except that the following additional limitation has been added to claim 1:

"wherein the water-soluble cationic amino resin has been formed by polycondensation of an amino resin prepolymer with a cationic modifier agent selected from the group consisting of diethylenetriamine, triethylenetetramine, tetraethylenepentamine, guanidine, dicyandiamide, guanylurea, dicyandiamide formate, dimethylaminoethanol, diethylaminoethanol, diethanolamine, oxazolidine and polyphenyl-biguanide."

The second auxiliary request corresponds to the first auxiliary request except for the additional limitation that the order of mixing in the first coating step has been limited to first mixing the hydrophobic core material with the anionic surfactant and then with the water-soluble cationic amino resin.

The third auxiliary request corresponds to the second auxiliary request except for the additional limitation that the second coating step is a stepwise coating in

which the microcapsule is partially coated with polycondensate and then additional acid catalyst is added during the completion of the polycondensation.

The fourth auxiliary request corresponds to the third auxiliary request except for the additional limitation that the amino resin prepolymer has been defined as being a urea resin prepolymer (see claim 1, lines 18 - 19).

The fifth auxiliary request corresponds to the fourth auxiliary request except for the additional limitation that the hydrophobic core material comprises an agricultural chemical.

VI. The appellant requested that the decision under appeal be set aside and that the patent be revoked in its entirety.

The respondent requested that the patent be maintained in amended form according to the main request or, in the alternative, according to one of the auxiliary requests 1 to 5, all requests having been filed with the letter dated 16 June 2009.

Reasons for the Decision

Main request

1. *Allowablility of the amendments, sufficiency of disclosure, novelty*

1.1 Regarding claim 1 of the main request, the board is satisfied that the requirements of Article 123(2) and (3) EPC, as well as Article 83 EPC and Article 54 EPC are met.

1.2 On the other hand it is *prima facie* questionable, whether the independent claim 13 of the main request meets the requirements of Article 123(3) EPC, Rule 80 EPC and Article 54 EPC (see below, point 3.3).

1.3 Since the appeal fails for lack of inventive step, there is no need to investigate the issues under Articles 54 EPC, 83 EPC, 123(2) and (3) EPC and Rule 80 EPC in more details.

2. *Inventive step - Claim 1 of the main request*

2.1 A principal object of the invention was to provide a process for producing microcapsules having a more uniform coating layer, with *"extreme suppression of the occurrence of isolated or aggregated film material alone, aggregated microcapsules and isolated core material"* (see patent in suit, page 3, lines 3 - 6, paragraph [0009]).

2.2 As acknowledged by the parties, the closest prior art in respect of the process according to claim 1 is represented by D5, particularly example 1 of D5. Document D5 discloses a process for producing microcapsules comprising a first coating step of mixing a water-soluble cationic melamine-formaldehyde resin, an anionic surfactant in the form of a sulfonated melamine-formaldehyde prepolymer, and formic acid to adjust the aqueous medium to a pH of about 3.6 in the

presence of a hydrophobic core material dispersed in an aqueous medium to coat the dispersed core material. The aqueous medium contains both the water-soluble cationic melamine-formaldehyde resin and the anionic surfactant. In a second coating step a methylated melamine-formaldehyde prepolymer is added to the aqueous dispersion liquid containing the formic acid and the coated dispersed core material from the first coating step. This results in further coating the coated dispersed core material with a polycondensate of the methylated melamine-formaldehyde prepolymer (see D5, page 7, lines 44 - 62, *"Beispiel 1"*).

2.3 The respondent argued that in the light of the disclosure of D5, the technical problem to be solved was to be seen in the provision of a process for producing microcapsules having improved properties in terms of gradual release properties, uniformity of the coating and suppression of uncoated core material and isolated film material.

2.4 As a solution to the above problem, the patent in suit proposes the process according to claim 1, which is characterised in that the hydrophobic core material is first mixed with one of the water soluble cationic amino resin and the anionic surfactant and then with the other one of the water-soluble cationic amino resin and the anionic surfactant.

2.5 It remains to be investigated whether the technical problem is successfully solved by the proposed process, or not. In this context both parties have submitted evidence from experimental tests comparing microcapsules obtained by the process of claim 1 with

microcapsules obtained by the process according to the closest prior art, namely D5.

2.6 The board observes that in the case where comparative tests are chosen 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. (see decision T 0197/86, headnote and point 6.1.3 of the reasons, OJ EPO 1989, 371).

2.7 The process according to claim 1 of the patent is exemplified by experiments I and II of D7 filed by the respondent.

2.7.1 In experiment I an emulsion was prepared by mixing under stirring 6.1 Kg of a water-soluble cationic urea-formaldehyde resin (*"U-RAMIN P-1500"*) and 115.4 Kg of an aqueous solution of polyethylene oxide. The pH value was adjusted to 4.75 with citric acid. Subsequently 77.3 Kg of a hydrophobic core material, namely *"chlorpyrifos"* (i.e. O,O-Diethyl-O-(3,5,6-trichlorpyridin-2-yl)-thiophosphate) were added in an emulsifying vessel equipped with a high speed stirrer, followed by the addition of 0.69 Kg of a 10 % aqueous solution of sodium dodecylbenzenesulfonate (*"NEOPELEX"*). In a further step, the emulsion thus obtained was transferred into a polycondensation vessel, and 29.4 Kg of a urea-formaldehyde resin prepolymer and 30.0 Kg of a melamine-formaldehyde prepolymer were added. The pH value was adjusted to 4.75 with citric acid. 70 Kg of water was added, and the system was held under stirring for 24 hours at 50 °C at pH 4.75, and further for

48 hours at pH 2.8 to complete the microencapsulation. Thus, the total the stirring phase was 72 hours.

2.7.2 In experiment II the same conditions as in experiment I were used, except that the mixing order was changed in the following manner: The hydrophobic core material ("*chlorpyrifos*") was first mixed under stirring with the sodium dodecylbenzenesulfonate ("*NEOPELEX*"). Subsequently the mixture was brought into contact with the water-soluble cationic urea-formaldehyde resin ("*U-RAMIN P-1500*").

2.8 Experiment IV of D7 was performed in order to reproduce the technical teaching of the closest prior art represented by D5.

2.8.1 An amount of 0.69 Kg of a 10 % aqueous solution of sodium dodecylbenzenesulfonate ("*NEOPELEX*") was mixed under stirring with 6.1 Kg of the water-soluble cationic urea-formaldehyde resin, followed by the addition of 77.3 Kg of the hydrophobic core material ("*chlorpyrifos*"). The emulsion thus obtained was transferred into a polycondensation vessel and treated as in examples I and II, except that the pH value was adjusted uniformly at 2.8 from the beginning of the stirring, which was 72 hours in total.

2.9 The results were assessed by comparing various properties of the microcapsules obtained in experiments I, II and IV, respectively. Thus, the average particle size, the amount of eluted core material and the amount of isolated core material were determined. In addition photographs showing the physical structure of the surface of the microcapsules were taken (see D7, page 3,

Table; Figures I, II and IV). The table reveals that the respective amounts of eluted core material and isolated core material are significantly lower in experiments I and II on the one side, compared to experiment IV on the other side (amount of eluted core material: measured values of 0.5 and 0.6 ppm in experiments I and II, as opposed to measured values of 1.2 and 1.5 ppm in experiment IV; amount of isolated core material in water: measured values of 0.5 and 0.6 ppm in experiments I and II, as opposed to measured values of 1.4 and 1.6 ppm in experiment IV). The level of eluted core material may be interpreted as an indication of the gradual-release properties of the microcapsules. The photographs represented by Figures I and II show a very smooth surface structure of the microcapsules obtained in experiments I and II, whereas the microcapsules shown in Fig. IV representing experiment IV exhibit an increased surface roughness, thus indicating significant surface projections of the microcapsules.

2.10 The appellant contested the significance of the results obtained by the respondent in its experiments reported in D7. The appellant argued that the process conditions in experiment IV differed substantially from the conditions in experiment I, particularly in respect of the pH value and the length of the stirring phase during the polycondensation step. In the appellant's view the results of experiments I and II could not be compared with the results of experiment IV in order to show the technical effects of the relevant distinguishing feature, namely the mixing order of the components in the first coating step.

2.11 In this respect, the appellant referred to its own experiments summed up in D6. Experiment 1 was performed to illustrate the process according to example 1 of D5, whereas experiments 2 and 3 were in accordance with claim 1 of the patent in suit.

2.11.1 In experiment 1 an amount of 26.5 g of a 40 % solution of an anionic amino resin, namely a sulfonated melamine precondensate (*"Melapret AAS 40 M"*), were diluted with water and mixed with 33.7 g of an aqueous solution of a cationic amino resin, namely a cationic melamine-formaldehyde precondensate (*"Melapret KMS 30 N"*), using a high performance dispersing device (*"Ultra Turrax T 50"*). A stable emulsion was obtained by adding 194.24 g of a hydrophobic core material in the form of an oily phase containing various components, followed by adding 92.75 of a mixture of high boiling hydrocarbons. The emulsion was adjusted with formic acid to a pH value of 3.9. Subsequently 73.9 g of a 41.2 % solution of a methylated melamine-formaldehyde precondensate were added under stirring with a blade stirrer. After 4 hours the pH value was re-adjusted with sodium hydroxyde solution to the value of 7 to obtain a 40 % dispersion of microcapsules.

2.11.2 Experiment 2 was identical to experiment 1, except that the hydrophobic core material was emulgated in a solution of the anionic amino resin prior to adding the cationic amino resin.

2.11.3 In experiment 3 the order of mixing was inverted in comparison with experiment 2. This time the hydrophobic core material was emulgated in a solution of the

cationic amino resin prior to adding the anionic amino resin.

2.12 The microcapsules obtained in experiments 1, 2 and 3, respectively, were tested in respect of their size (*"Emulsionsgröße"*, *"Kapselgröße"*), the density of the capsules (*"Kieselsolwert"*) and the viscosity. Moreover various properties of samples of paper coated with the microcapsules were investigated. It was found that the properties of the microcapsules of experiments 1, 2 and 3 were similar, except that the capsules of experiment 3 were slightly larger than the capsules of experiments 1 and 2 (5,86 µm , compared to 5,30 µm and 5,31 µm, respectively. See D6, page 2, table *"Ergebnistabelle"*). Photographs of the microcapsules showed no significant differences regarding the surface characteristics of the microcapsules (see D6, page 3, last paragraph and pictures 1 to 6).

2.13 Regarding the experiments performed by the appellant, the respondent criticised that the tests were carried out on what he called *"a miniature scale"*, i.e. in quantities of gram of the materials rather than in quantities of Kg. Another criticism was that the cationic amino resin and the anionic surfactant were mixed extremely rapidly by means of a high performance dispersing device and not by means of a conventional stirrer, for example a blade stirrer. Furthermore the aqueous solution of the cationised melamine-formaldehyde precondensate used in experiments 1 to 3 of D6 was not the same as in example 1 of D5, the latter being based on *"Resin 42-05"* (see D5, page 7, line 49). In the respondent's view the appellant had failed, however, to show that the two types of cationic

amino resin are substantially equivalent, particularly in respect of the water-solubility of the resin. D5 did not disclose a process using a water-soluble cationic amino resin as required by claim 1 of the patent (see D6, page 4, lines 47 - 50). At the oral proceedings the respondent argued that by virtue of these differences the experiments reported in D6 could not be regarded as a true reproduction of the technical teaching of D5. As a result, *"less pronounced differences between the microcapsules according to the state of the art (D5) and claim 1 of the patent"* were observed.

2.14 In support of its arguments the respondent submitted a further experimental report, i.e. D8, containing results of experiments V to VII. Experiments V and VI reproduced the process according to claim 1, using in the second coating step a two step adjustment of the pH value (experiment V: pH 4.75 during 24 hours, followed by a pH value of 2.8 during 48 hours) or, alternatively, a one step pH adjustment (experiment VI: pH 2.8 during 72 hours). Virtually the same process conditions were used in experiments VII and VIII, respectively, except that the order of mixing in the first coating step corresponded to D5.

2.14.1 The microcapsules obtained in experiments VII and VIII were found to be inferior to the microcapsules formed in experiments V and VI in terms of an unwanted larger particle size of 8.7 and 9.4 µm, respectively, compared to 5.1 and 5.4 µm. In addition, more eluted and isolated core material showing poorer controlled release properties, a poorer solvent resistance, and poorer surface characteristics were found in

experiments VII and VIII (see D8, page 6, table; Figs. V, VI and VII, VIII, respectively).

2.14.2 Having regard to these results the respondent concluded that the process according to claim 1 of the patent in suit gave rise to microcapsules having improved properties.

2.15 The appellant carried out further experiments to counter the respondent's criticisms against its previous experiments described in D6. The corresponding report D9 describes two experiments 1 and 1a, respectively. Both tests were performed under the same process conditions, except that in experiment 1 a high-performance dispersing apparatus of the type *"Ultra Turrax T50"* was used at a speed of 5000 min^{-1}, whereas in experiment 1a the mixing device was a blade stirrer operated at a speed of 500 min^{-1}. Photographs of the products obtained in experiments 1 and 1a showed no significant differences between the microcapsules.

2.16 In the board's view the experiments performed by the respondent show that under the specific process conditions used in the experiments the microcapsules obtained according to the process of claim 1 of the patent in suit exhibit improved properties over the microcapsules produced according to the process of D5. The improvements relate in particular to the amount of eluted core material, the amount of isolated core material and the surface characteristics (see D7, experiments I, II together with D8, experiments V, VI as opposed to D7, experiments III, IV together with D8, experiments VII, VIII).

2.17 On the other hand it follows from the appellant's experiments that, depending on the choice of the specific process conditions, the microcapsules obtained according to claim 1 of the patent in suit and D5, respectively, have substantially the same properties. In particular, the comparison of experiments 2 and 3 of D6 on the one hand, and experiment 1 of D6 together with experiments 1 and 1a of D9 on the other hand, leads to the conclusion, that there exists no significant difference between the microcapsules regarding the uniformity of the coating layer and the degree of aggregation of microcapsules (see D6, Figures 1 to 6; D9, pages 2 to 7, photographs).

2.18 On the basis of the experimental evidence presented by both the appellant and the respondent, the board concludes that the process according to claim 1 of the patent in suit does not solve the technical problem set out above over the whole scope of claim 1. By varying the process conditions, microcapsules having substantially the same properties can be obtained, irrespective of whether they are produced according to the process of claim 1 of the patent in suit, or according to the teaching of D5.

2.19 The board notes that there is no evidence in support of the respondent's allegation according to which the experimental results of the appellant are *"a biased reworking of D5 in order to minimise coacervate formation"* (see respondent's letter dated 9 November 2006, page 9, lines 25 - 26) and, thus, not a fair repetition of example 1 of D5 (see respondent's letter dated 24 March 2010, page 3, paragraph 3.4).

2.19.1 Neither the type of mixing device to be used, nor the scale of the process (i.e. whether the components should be processed on small or in large scale in the first step of the process) form part of the features contained in claim 1 of the patent in suit.

2.19.2 Regarding the argument relating to the water-solubility of the cationic amino resin, the board observes that D5 does not teach to use cationic amino resins which are generally insoluble in water. What D5 teaches is that certain commercially available cationic melamine-formaldehyde precondensates are particularly suitable, namely precondensates which are not soluble in water in the neutral range of the pH and above, in particular at a pH value of 5 and more (see D5, page 4, lines 47 - 50). Thus the teaching of D5 is by no means limited to the use of cationic amino resins which are insoluble in water. Moreover according to the wording of claim 1 of the patent in suit, the value of the pH during the first coating step may be as low as 3. Under such acidic conditions the preferred cationic amino resins of D5 are undoubtedly soluble in water. Therefore, the water solubility of the cationic amino resin is not a technical feature which distinguishes the claimed process over the process of D5.

2.20 Since the technical problem as defined initially is not solved over the whole scope of claim 1, it has to be reformulated in less ambitious terms.

2.21 Thus, in the present case the technical problem was to provide an alternative to the process disclosed in D5.

2.22 The process according to claim 1 solves this problem by observing the specific conditions set out in claim 1, in particular in respect of the mixing order of the components in the first coating step.

2.23 In the board's view, however, premixing certain components in a chemical process with an aim of minimising unwanted interactions forms part of the standard operations in process technology and is, as such, widely applied in the field of chemical process engineering. Therefore the process according to claim 1 is obvious to the skilled person.

2.24 For all these reasons, the process according to claim 1 of the main request does not involve an inventive step as required by Articles 52(1) and 56 EPC.

3. *Claim 13 of the main request*

3.1 As far as the product-by process claim 13 of the main request is concerned, the board notes that there is no need to examine this claim in detail, because the main request fails on the ground of lack of inventive step of claim 1.

3.2 Incidentally, at the oral proceedings the respondent has expressed his willingness to delete the product-by process-claim 13, if there was a need to do so.

3.3 Merely as a side remark the board observes that, *prima facie*, the objections raised by the appellant under Article 123(3) EPC and Rule 80 EPC against the product-by-process claim 13 appear to be justified. Moreover, it is questionable whether the microcapsules according

to the product-by-process claim are novel *per se*, i.e. that they possess at least one structural feature which distinguishes them from the microcapsules obtained by the process disclosed in D5.

4. *Auxiliary requests 1 to 5*

4.1 The respective claims 1 of auxiliary requests 1 to 5 all relate to the process as defined in claim 1 of the main request, whereby a number of limitations are included.

The technical problem to be solved in the light of D5 remains the same as for the main request, namely to provide an alternative process to the one disclosed in D5.

In the board's view the process according to the respective claims 1 of the auxiliary requests 1 to 5 solves this problem.

It remains to be examined whether the respective processes are obvious to the skilled person, or not.

4.1.1 According to claim 1 of auxiliary request 1 the water-soluble cationic amino resins are formed by polycondensation of amino resin prepolymers with certain cationic modifiers. As explained by the respondent at the oral proceedings, the emphasis of this limitation lies on the water-solubility of the cationic amino resin.

The board observes, however, that the use of cationic amino resins which are water-soluble under the process

conditions is encompassed by the teaching of D5 (see D5, page 7, lines 46 - 49, example 1).

4.1.2 According to claim 1 of auxiliary request 2, the order of mixing in the first coating step is to first mix the hydrophobic core material with the anionic surfactant and then with the water-soluble cationic amino resin. The respondent has filed no evidence, however, that this feature gives rise to a specific technical effect. Thus, the process variation falls within normal process modifications requiring no inventive skill.

4.1.3 Claim 1 of auxiliary request 3 contains the further limitation that the second coating step is carried out stepwise by coating the microcapsules partially with polycondensate and then adding additional acid catalyst. As in the case of auxiliary request 2, the process variation as such requires no inventive skills, and there is no evidence that it gives rise to a specific technical effect.

4.1.4 Claim 1 of auxiliary request 4 has been further limited by the feature that the amino resin prepolymer is a urea resin prepolymer. In this respect the board notes that it is well known in the state of the art to use water-soluble cationic urea resins in similar microencapsulation processes (see, for example, D2, column 6, lines 18 - 24).

4.1.5 Claim 1 of auxiliary request 5 contains the limitation that the hydrophobic core material comprises an agricultural chemical. The board notes that D5 discloses a number of agricultural chemicals which are suitable for microencapsulation, including fertilisers,

insecticides, fungicides and plant protection products (see D5, page 5, lines 61 - 65: *"Düngemittel, Insektizide, Fungizide, Pflanzenschutzmittel"*).

4.2 When considering the limitations made in the respective claims 1 of auxiliary requests 1 to 5, the board notes that the respondent has not submitted convincing evidence that these limitations give rise to any specific technical effects. Furthermore nothing supports the presumption that these limitations lead to improvements regarding the gradual release properties of the microcapsules, the uniformity of the coating and the suppression of uncoated core material and isolated film material. In the absence of such evidence, however, it cannot be acknowledged that the process as defined in auxiliary requests 1 to 5 involves an inventive stepas required by Article 52(1) and 56 EPC.

4.3 Under these circumstances there is no need to investigate whether the product-by-process according to the respective claims 13 of the first to third auxiliary requests, claim 12 of the fourth auxiliary request and claim 11 of the fifth auxiliary request define patentable subject-matter, or not (see above, points 3.1, 3.2 and 3.3).

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The patent is revoked.

The Registrar: The Chairman:

C. Vodz G. Raths