Candidate's answer

AMENDED CLAIMS

1. *Microcapsules having an average diameter of 1-100 micrometers consisting of a core of a herbicide dissolved in a water-immiscible organic solvent and an aminoplast resin shell containing a protective colloid,*
   wherein the protective colloid is selected from polymers and copolymers containing acrylic acid monomer units, under the proviso that said microcapsules are not *microcapsules having an average particle diameter of 1-100 micrometers consisting of a core consisting of a thiocarbamate herbicide dissolved in a water immiscible organic solvent and a melamine-formaldehyde resin shell containing a protective colloid selected from ~~styrene-maleic anhydride copolymers and~~ acrylamide-acrylic acid copolymers.*

2. *Microcapsules according to claim 1 where the herbicide is a thiocarbamate or an acetamide.*

3. *A process for forming the microcapsules of claim 1 consisting of the following steps:*

a) *dissolving the herbicide in a water-immiscible organic solvent;*

b) *forming an aqueous solution of a pre-polymer of the aminoplast resin shell material and a protective colloid;*
   wherein the protective colloid is selected from polymers and copolymers containing acrylic acid monomer units,

c) *mixing the herbicide solution from step a) with the aqueous solution from step*

b) *with rapid stirring to form an emulsion of droplets of the herbicide solution in the aqueous solution;*

d) *adjusting the pH of the emulsion to a value between 3 and 4 to polymerise and precipitate the shell material around the droplets ; and*

e) *separating the microcapsules,* wherein said process does not form *microcapsules of an average particle diameter of 1 to 100 micrometers consisting of core solutions of thiocarbamate herbicides encapsulated in a shell consisting of a melamine-formaldehyde aminoplast resin and a protective colloid selected from ~~styrene-maleic anhydride copolymers and~~ acrylamide-acrylic acid copolymers.*

4. *The use of the microcapsules of claims 1 or 2 as controlled-release herbicides.*

REPLY

EUROPEAN PATENT OFFICE
D-80298 MUNICH
GERMANY

Registered mail March 08, 2006

EP XX XXX XXX.X

Dear Sirs,

Further to the Communication dated XX.XX.XX, Applicant respectfully requests further examination of the present application on the basis of the enclosed claims, taking into account the following comments :

1. Amendments Art. 123(2) EPC
   Clarity Art. 84 EPC

All amendments are based on the application as filed, or are allowable under Art. 123(2) EPC in view of the current case law:

New claim	Basis in the originally filed application:
1	- claim 1 - p. 3, l. 22-23 - "Disclaimer" see below.
2	- Claim 2
3	- Claim 3 - p. 3, l. 22-23 - "Disclaimer" see below.
4	- Claim 4

Amendments to claim 1

a) limitation to specific protective colloids.

This amendment is believed to comply with the requirements of Art. 123(2) EPC, since « polymers and copolymers containing acrylic acid monomer units » are mentioned at page 3, l. 22-23. This passage may certainly be preceded by more specific disclosures of particular acrylic-acid (co)-polymers, but from the wording of p. 3, l. 22-23, the skilled person would directly and unambiguously, derive that this statement refers to acrylic acid (co)-polymers in general. There is no hint whatsoever that would lead the skilled-person to believe that this only applies to the above-mentioned (p. 3, l. 20-21) specific polymers.

The general disclosure (p. 3, l. 22-23) provides support for the generic limitation to "polymers and copolymers containing acrylic acid monomer units".

b) Disclaimer

The disclaimer introduced in the wording of claim 1 has no support in the originally filed application.
However, that does not render the amendment automatically non-allowable under Art. 123(2) EPC (see G1/03, G2/03, head note I)

The disclaimer excludes:
"microcapsules having an average particle diameter of 1-100 µm consisting of a core consisting of a thiocarbamate herbicide dissolved in a water immersible organic solvent and a melamine-formaldehyde resin shell containing a protected colloid selected from acrylamide-acrylic acid copolymers" (thereafter, "Disclaimer")

This disclaimer is allowable under Art. 123(2) EPC in accordance with G1/03 – G2/03, headnotes I.1 and I.2.

* Novelty is restored against D2 which is state of the art under Art. 54(3)(4) EPC

- D2 is state of the art Art. 54(3)(4) EPC
- D2 discloses “Disclaimer” (see D2, claim 2)

This passage really corresponds to the whole disclosure of D2

(see : p. 13, l. 10 microcapsule
p. 13, l. 1 thiocarbamate
p 13, l. 11 1-100 µm
p 13, l. 10 melamine formaldehyde resin shell
p 13, l. 16 water immiscible solvent
p 13, l. 19-20 protective colloid acrylamide-acrylic acid copolymer.

Further disclosure in D2 (e.g. Solvent = kerosene at page 13, l. 34; or choice of thiocarbamate herbicide at page 14, l. 26) are not relevant to the disclaimer, as the wording thereof is more “generic”, and already excludes the other disclosures from D2.

Introducing the “disclaimer” thus also allows to restore novelty against the generic sub-disclosure of claim 2 of D2, but also against the rest of the disclosure in the description of D2.

* Disclaimer does not remove more than necessary

In the wording “Disclaimer”, the phrase corresponding to “styrene-maleic anhydride copolymer” is absent.

This is because styrene-maleic anhydride copolymers need not be excluded.

Due to another limitation (protective colloid selected from polymers and copolymers containing acrylic acid monomer units), there is no need to remove styrene-maleic anhydride copolymers. (they are now “positively” excluded, by the choice of (co)polymers of acrylic acid as protective colloids.

Moreover, the way "Disclaimer" is phrased, it only excludes the following "combination" of features:

- thiocarbamate herbicide +
- melamine-formaldehyde resin +
- acrylamide-acrylic acid copolymer as protective colloid.

Thus, within the scope of new claim 1, we can still have other herbicides (other than thiocarbamate) in combination with melamine-formaldehyde and acrylamide-acrylic acid, for example.

The disclaimer excludes thus the exact disclosure of D2, nothing more, and nothing less. (see G1/03, G2/03, head note II.2)

It is thus submitted that the present disclaimer does not remove more than necessary to restore novelty over D2.

It is further submitted that the disclaimer:

- is not relevant for inventive step (delimitation over D2 which is state of the art under Art 54(3) (4) EPC) – see also below.
- is not relevant for assessing sufficiency of disclosure
- meets the requirements of clarity and conciseness under Art. 84 EPC.

* Conclusion on the disclaimer

This disclaimer meets all the requirements set forth in G1/03 and G2/03.

It is hence submitted that the corresponding amendment is allowable under Art. 123(2) EPC.

Amendments to claim 3

The same reasoning as above applies to claim 3.

Again, the disclaimer restores novelty against D2.

The wording of claim 3 requires this disclaimer, in order to exclude specifically the process with the steps as disclosed in D2.

Again, it is the specific combination

- thiocarbamate
- melamine
- acrylamide-acrylic acid

is excluded from the scope of the claim.

(without this precision it could be that the claim be construed as leading to the disclaimed capsules, since there are no further limitations in the steps themselves, and the result of the process would "not" be necessarily the microcapsules of the new claim 1).

Conclusion on amendments

All amendments comply with the requirements of Art. 123(2) EPC.

In addition, the new set of claim is believed to be clear (Art. 84 EPC), obviously unitary per se (Art. 82 EPC) and with the originally claimed invention (R. 86(4) EPC).

2. Novelty – Art. 54 EPC

2.1 Claim 1

* *Document 1 (see claims, example 2 and paragraphs [0002] and [0005] to [0007] discloses microcapsules with an aminoplast resin and protective colloid containing shell. In example 2 the average diameter was 40 micrometers and the material encapsulated was a solution of an acetamide herbicide in xylene.*

In D1, the only protective colloids specifically disclosed are:

- styrene-maleic anhydride copolymers
- PVA
- CMC
- Starches and modified starches.

D1 fails to disclose (co)polymers containing acrylic acid as a monomer.

D1 does not disclose all the feature of claim 1.

Claim 1 is hence novel over D1 (Art. 54 EPC).

* Claim 1 is also novel over D2, in view of the disclaimer as discussed above

* thus claim 1 is novel over D1 and D2

* claim 2 (dependent on claim 1) and claim 4 (use of the capsules of claim 1) are hence also novel over D1 and D2 (see GL-C-IV-9.12)

2.2 Claim 3

* Document D1 discloses a process for making microcapsules. *The process used to form the microcapsules was an in situ polymerisation process, where an amine-formaldehyde pre-polymer and the protective colloid are dissolved in the aqueous phase and the polymerization and precipitation of the shell material may be obtained by acidification to a pH of 3.5.*

D1 again fails to mention (co)polymers of acrylic acid as a protective colloid.

Thus claim 3 is novel over D1.

* Document D2: as explained above, the disclaimer was introduced to restore novelty over D2.
Thus claim 3 is novel over D2.

3. Inventive step – Art. 56 EPC

3.1 Claim 1

The subject-matter of claim 1 involves an inventive step, as demonstrated by the problem solution approach below (GL-C-IV-9.8).

* D1 is regarded as the closest prior art, since it relates to the same technical field as the invention, namely micro-encapsulation with applications to pre-emergence herbicides (D1, page 3, l. 5).

* Moreover D1 has many features in common with claim 1, namely:
- microparticles
- diameter (p. 3, l. 26)
- acetamide herbicide (p. 3, l. 19)
- water immiscible solvent (xylene, p. 3, l. 10)

- aminoplast resin shell (p. 3, ex. 1)
- protective colloid.

* Further, D1 is the only document of the state of the art under Art. 54(2) EPC.

* Thus, D1 is the most promising starting point (GL, C-IV-9.8.1)

* The contents of D1 are summarized above.

* The difference between D1 and claim 1 is the fact that claim 1 involves (co)polymers of acrylic acid as protective colloid, whereas D1 makes use of other polymers (see D1, page 2, lines 24-26)

* This difference results in microcapsules with a particularly narrow size distribution and a particularly uniform shell porosity. (see application page 3, lines 26-27).

This is a combination of properties which ensures that the capsules release the herbicide at a predictable and controlled rate. (see application page 1, lines 20-21)

* Therefore, the objective technical problem to be solved by the invention is the provision of improved microcapsules which allow a herbicide release at a predictable and controlled rate.

* Problem is solved by present claim 1.

* From D1, the skilled person would not consider the solution obvious.

* There is no hint in D1 that substituting starch or PVA (or other mentioned protective colloids) by (co)polymers of acrylic acid could lead to such improvement.

* in D1:
- there is no mention of (co)polymers of acrylic acid
- there is no mention of ways to improve the release rate.

* Therefore, from D1, and without further hint, there is nothing that would prompt the skilled person to replace starch by polyacrylic acid to improve the control rate of release.

* Lacking any indication, the skilled person would not arrive at the solution as claimed in an obvious fashion.

* Hence, the s-m of claim 1 is not obvious over the state of the art, and thus involves an inventive step (Art. 56 EPC).

* Claims 2 an 4 are thus also inventive (GL-C-IV-9.12).

3.2 Claim 3

- D1 is the closest prior art (D1 discloses in claim1):

A process for forming microcapsules, which includes the steps of:

a) *forming an organic core solution* with herbicide [0007], [0012] *and separately an aqueous solution of an amine-formaldehyde pre-polymer for the shell material and a protective colloid;*
b) *mixing the two solutions and emulsifying the admixture to form fine droplets containing the core material;*
c) *polymerizing and precipitating the shell material by acidifying the emulsion to a pH of 3.2 to 4.5 using a water-soluble acid and heating the emulsion to a temperature of 40-60°C; and*
d) *separating the resultant microcapsules from the remaining liquid.*

- D1 also relates to the same technical field (microcapsules for herbicides)
- D1 has most features in common with claim 3 as indicated above
- D1 is the only document state of the art under Art. 54(2) EPC.

D1 is thus the most promising starting point (GL-C-IV-9.8.1).

* Again: the difference between claim 3 and D1 is that the protective colloid is selected from (co)polymers of acrylic acid, instead of other polymers in D1.

* This difference results in a narrow size distribution for the particles, and a uniform shell porosity (see application page 3, lines 26-27), in turn conferring improved release properties in term of predictability and control of the release rate of herbicide (see application page 1, lines 20-21).

* Therefore, the objective technical problem to be solved by claim 3 is the provision of an improved process leading to microcapsules with improved release property of the herbicide.

* The problem is solved by present claim 3.

* However, just as pointed out above for claim 1 the skilled person lacks any direction for arriving at the solution.

* Willing to solve the technical problem, and starting from D1, the skilled person would not arrive at the claimed solution.

* Hence, claim 3 is not obvious, and thus involves an inventive step (Art. 56 EPC).

3.3 Remark

Disclaimer was ignored to assess inventive step, in accordance with G1/03.

4. Concluding remarks

Applicant believes to have addressed all issues raised in the Communication.
Applicant will gladly furnish adapted description upon request.
Respectfully submitted

[signature representative]

Encl. - Amended claims (3p)
- Form 1037