BESCHWERDEKAMMERN DES EUROPÄISCHEN PATENTAMTS | BOARDS OF APPEAL OF THE EUROPEAN PATENT OFFICE | CHAMBRES DE RECOURS DE L'OFFICE EUROPEEN DES BREVETS

**Internal distribution code:**
(A) [ ] Publication in OJ
(B) [ ] To Chairmen and Members
(C) [X] To Chairmen

# D E C I S I O N
## of 9 May 1996

**Case Number:** T 0013/93 - 3.3.4

**Application Number:** 86105115.9

**Publication Number:** 0241568

**IPC:** A01N 37/36

**Language of the proceedings:** EN

**Title of invention:**
Methods for regulating the growth of plants and growth regulant compositions

**Patentee:**
UNION OIL COMPANY OF CALIFORNIA

**Opponent:**
CPC International Inc.

**Headword:**
Plant growth regulator/UNION OIL

**Relevant legal provisions:**
EPC Art. 56, 123(2)

**Keyword:**
"Inventive step (no)"

**Decisions cited:**
G 0002/88, G 0006/88, T 0296/87, T 0208/88

**Catchword:**
-

Europäisches Patentamt | European Patent Office | Office européen des brevets

Beschwerdekammern | Boards of Appeal | Chambres de recours

**Case Number:** T 0013/93 - 3.3.4

# D E C I S I O N
## of the Technical Board of Appeal 3.3.4
## of 9 May 1996

**Appellant:** (Proprietor of the patent)
UNION OIL COMPANY OF CALIFORNIA
461 South Boylston Street
Los Angeles, CA 90017 (US)

**Representative:**
Jack, Bruce James
FORRESTER & BOEHMERT
Franz-Joseph-Strasse 38
D-80801 München (DE)

**Respondent:** (Opponent)
CPC International Inc.
International Plaza
Englewood Cliffs, New Jersey 07632 (US)

**Representative:**
Keller, Günter, Dr.
Lederer, Keller & Reiderer
Patentanwälte
Prinzregentenstrasse 16
80538 München (DE)

**Decision under appeal:** **Decision of the Opposition Division of the European Patent Office posted 30 October 1992 revoking European patent No. 0 241 568 pursuant to Article 102(1) EPC.**

**Composition of the Board:**

**Chairman:** U. M. Kinkeldey
**Members:** D. D. Harkness
S. C. Perryman

## Summary of Facts and Submissions

I. European patent application No. 86 105 115.9 relating to a method for regulating the growth of plants and growth regulant compositions was granted with 23 claims as European patent No. 0 241 568, claims 1, 11 and 12 being independent claims in respect of compositions for regulating the growth of plants (claims 1 and 11) and a method for regulating the growth of plants (claim 12). Claim 12 read as follows:

"A method for regulating the growth of plants which comprises contacting said plants with a growth regulating amount of a composition which comprises lactic acid, its anhydride or the corresponding polylactides and wherein the L-(d)-isomer of lactic acid constitutes at least 60 percent of said lactic acid."

II. A notice of opposition was filed requesting revocation of the patent under Article 100(a) to (c) EPC), in particular in the light of the documents:

(1) Tung et al, Report of the Taiwan Sugar Experiment Station, No. 41, June 1966,

(7) Arnold Finck, Fertilizers and Fertilization, Verlag Chemie, pages 172 to 173, 1982.

III. During the course of the opposition the patentee abandoned the claims relating to compositions, and requested maintenance of the patent on the basis of a set of amended claims directed to methods of stimulating the growth or productivity of plants.

IV. The patent was revoked by a decision dated 30 October 1992 for lack of inventive step because document (1) was considered to disclose treatment of sugar cane plants with a racemic lactic acid mixture showing plant growth regulation activity. The skilled person was well aware that lactic acid occurred as two optical isomers, and the isomers were available industrially. It would be routine for the skilled person to check whether the effect disclosed in document (1) was stronger for one isomer than the other, and the skilled person would thus inevitably arrive at a composition in which the L-(d)-isomer of lactic acid constitutes 80 to 100 percent of said lactic acid as being the best to use for an increase in growth or productivity of the cane sugar plant.

V. The Appellant filed a notice of appeal, paid the fees and submitted a statement of grounds, with a main request and six auxiliary requests. At the oral proceedings that took place on 17 November 1995 the Appellant withdrew the existing requests and submitted instead a slightly revised main request and three auxiliary requests.

Claim 1 of each of the main request and the first auxiliary requests read as follows:

"A method for regulating the growth of plants to stimulate the growth or productivity of said plants which comprises contacting said plants with a growth regulating amount of a composition comprising lactic acid, its anhydride or the corresponding polylactides, wherein the L-(d)-isomer of lactic acid constitutes 80 to 100 percent of said lactic acid."

The first auxiliary request differed from the main request only in that certain dependent claims appearing in the latter were omitted.

Claim 1 of the second auxiliary request read as follows:

"A method for regulating the growth of plants to stimulate the growth or productivity of said plants which comprises applying *to the foliage* of said plants a growth regulating amount of a plant growth regulant composition comprising lactic acid, its anhydride or the corresponding polylactides, wherein the L-(d)-isomer of lactic acid constitutes 80 to 100 percent of said lactic acid."

Claim 1 of the third auxiliary request reads as follows:

"A method for regulating the growth of plants to stimulate the growth or productivity of said plants which comprises applying *to the foliage* of said plants a growth regulating amount of composition comprising *self-esterification products* of lactic acid, wherein the L-(d)-isomer of lactic acid constitutes 80 to 100 percent of said lactic acid."

The differences between the claims 1 of the second and third auxiliary requests on the one hand, and that of claim 1 of the main request on the other hand, appear in italics.

VI. The Appellant's arguments submitted in writing and at the oral proceedings can be summarized as follows:

The description of the invention made it clear that a method which involved plant growth regulating ("PGR") activity had been described and that such an activity was an essential technical feature of the invention.

According to document (7) "...growth regulators are organic active agents intervening in the biochemical metabolic processes of plants and thus causing chemical and morphological changes." Such effects were exemplified in the patent description.

The disclosure in document (1) did not refer to PGR activity at all and none of the acids tested were known to have any such activity. Document (1) did not represent any kind of test for a PGR as the ratio of growth increase for both plant tops and roots was the same, in other words although the plant grew faster it had not changed in the way in which it grew, the racemic lactic acid had therefore not shown PGR activity. The comparisons made and described in the affidavit filed by Dr D Young during opposition proceedings were evidence that racemic lactic acid was not an active PGR compound whilst the L-(d)-lactic acid isomer in concentrations of at least 80% did show such activity. Having regard to the known properties of the four acids used in the experiments according to document (1) there was no reason to suspect that any of them would exhibit PGR activity. On the contrary the only acid having a stereo configuration, and the nearest configuration to lactic acid, namely malic acid, was known not to be a PGR compound. It was therefore not possible to say that the skilled person would have tried to use the acids of document (1) with a reasonable expectation of success and in any event said document had not disclosed the isomers of lactic acid. Had the skilled person used racemic lactic acid the same results would have been achieved as previously. In the Appellant's opinion for such an experiment to take place there needed to be at least an indication in document (1) of PGR activity which there was not, and therefore there existed no incentive to try.

The Opposition Division had regarded document (1) as the nearest prior art, but this was not correct because this citation did not refer to PGR activity and as it was the Appellant's intention to provide such a feature it was more appropriate to consider a document which specifically mentioned PGR activity. Document (1) was a choice made with hindsight.

In support of the auxiliary requests relating to foliar application of the L-(d)-lactic acid isomer the Appellant indicated that it was not predictable what effect such a method might have on plants treated in this way. There was no evidence to suggest that applications of PGR compounds to the roots of a plant necessarily had the same effect as foliar treatment.

VII. The Respondent objected that the requests were filed too late and that the subject-matter of claim 2 of the main and first auxiliary requests was not supported by the description in the patent. In his view only polylactides prepared by self-esterification were described.

It was argued that the person skilled in the art would know which properties a PGR compound would exhibit and one of these properties was to stimulate plant growth as was demonstrated by all four acids examined in document (1). The results for lactic acid were better than those for the other acids tested, thus this was an incentive to use it.

Since the results shown in table 2 of document (1) indicated that lactic acid encouraged growth at low concentrations and inhibited it at higher concentrations it appeared that lactic acid was not a simple nutrient and as the experiments of document (1) were of a hydroponic nature a chelator would not have had any effect. In this event there appeared to be the

possibility that lactic acid possessed PGR activity and it was therefore obvious to test it. The next step would be to separate the isomers in the conventional way and to determine which of them exhibited PGR activity.

The Respondent referred to the description in the patent at column 7 lines 57 to 62 which in his view indicated that a 50-50 isomer mixture in the racemic lactic acid may show PGR activity and if this was the case it was obvious to test for it.

There was no inventive merit in applying the PGR by the foliar method as this represented a conventional method of application and did not always lead to results different from those of other methods of application. The treatment of soil or of plant leaves represented the only practical alternatives which were obvious to a skilled person.

It was not permissible to start from a document other than document (1) when assessing inventive step as the well known indoleacetic acid was a fructo-hormone which occurred naturally in plants and since it was the object of the application to provide a non-hormone PGR compound it was appropriate to use document (1) as starting point. This document was in the Respondents opinion relevant as it indicated a possible PGR activity for lactic acid having regard to the different effects obtained with the low and high concentrations of lactic acid when applied to sugar cane plants.

VIII. The Appellant requested that the decision under appeal be set aside and that the patent be maintained on the basis of the main request or one of the first, second or third auxiliary requests submitted at the oral proceedings on 17 November 1995.

The Respondents requested that the appeal be dismissed.

## Reasons for the Decision

1. The appeal is admissible.

2. *Admissibility of new requests*

Objection was raised to the late filing of the new requests. However as these requests involved only very minor and easily understandable changes to the requests already on file in the appeal, the changes raised no difficulties, and the new requests were fewer in number than the old ones, the Board decided to admit them.

*Main Request*

*Admissibility of amendments*

*Article 123(2) EPC*

3. The respondents were understood to argue that a method for stimulating the growth or productivity of plants which comprises contacting said plants with a productivity stimulating amount of a plant growth regulant composition comprising *polylactides*, which method was specifically the subject of claim 2 of the main request, was not disclosed in the application as originally filed, and so a request containing such a claim was not allowable under Article 123(2) EPC. In fact polylactides are also specifically mentioned in Claim 1, so this objection would also apply to claim 1.

4. The examples in the application as filed and patent as published all refer to aqueous solutions of lactic acid. For growth stimulating activity the highest concentration used is $10^{-3}$ molar lactic acid, concentrations above this are used only for growth inhibition. The relevant passage, found at column 8, lines 8 to 44 of the patent as published reads:

"It has also been found that L-lactic anhydride and polylactides of the L-isomer (self esterification products of lactic acid) are active plant growth regulants and are as active as monomolecular L-lactic acid. All of these compounds exhibit regulant activities at very low concentrations, e.g., of $10^{-10}$ molar and less. Lactic anhydride and higher polylactides form from monomolecular lactic acid at lactic acid concentrations of about 50 percent or greater in water. Both lactic anhydride and polylactides revert to monomolecular lactic acid upon dilution with water to concentrations below 50 percent. The active form of the growth regulant in the plants may be monomolecular L-lactic acid or polylactides of L-lactic acid of varying molecular weight. The polylactides could form on the foliage of treated vegetation (even when monomolecular lactic acid is applied in relatively dilute solutions) upon evaporation of water from the applied solution. The polylactides, if applied as such or formed on the plant foliage, probably hydrolyse within the plant (upon exposure to water) to form monomolecular lactic acid. Similarly, compounds which, in a plant environment, are converted to L-lactic acid or the anhydride or polylactides of L-lactic acid, are also effective for introducing the active growth regulant into treated plants. Whatever the active species actually is, I have found that monomolecular L-lactic acid and the anhydride and higher polylactides of L-lactic acid exhibit growth regulant activity when contacted with plants.

Accordingly, when employed to describe the various aspects of this invention, the term L-lactic acid is intended to incorporate the anhydride and higher polylactides of L-lactic acid and compounds which convert to L-lactic acid or its anhydride or polylactides when applied to plants, as well as L-lactic acid itself."

5. Plant growth regulation covers both plant growth stimulation and plant growth inhibition. Whereas the claims now are limited to plant growth stimulation, the above passage makes no reference to using polylactides specifically for plant growth stimulation as opposed to plant growth inhibition. Taken together with the examples however the skilled person would deduce that at a plant growth stimulating concentration as mentioned in the examples, it would make no difference whether the solution was made up from lactic acid, anhydride or polylactide, as these would all be hydrolysed to lactic acid. Taken in this sense it is possible to apply a composition comprising polylactides of L-lactic acid to produce growth stimulation, and this is how the Board interprets the use of polylactides in the claims, and on this basis finds Article 123(2) EPC satisfied.

6. *Article 123(3)*

The new main request does not on the interpretation given in point 5 above contravene Article 123(3) EPC as it falls wholly within the scope of Claim 1 as granted.

7. *Novelty, (Article 54 EPC)*

Novelty was not challenged.

*Inventive step (Article 56 EPC)*

*Closest prior art*

8. Document (1) relates *inter alia* to contacting plants, specifically sugar cane plants, with lactic acid and thereby achieving a growth different from that obtained for control sugar cane plants. It thus appears to the Board an appropriate starting point in the prior art for considering inventive step, and the Board considers no other document more relevant.

9. Document (1) does not state what the lactic acid used was. Lactic acid is well known to occur in two optically active forms, and both the racemic form and the L-(d)-isomer of lactic acid were commercially available. In an earlier decision (T 296/87, EPO OJ 1990, 195) a Board of Appeal in a comparable factual situation considered that disclosure of a racemate does not destroy the novelty of a claim directed to one of the two optical isomers of which the prior art racemate was made up. Here too, the Board finds that the presence only of an unspecific reference to "lactic acid" means that document (1) provides no clear and unambiguous disclosure of the feature of claim 1 that the L-(d)-isomer of lactic acid constitutes 80 to 100 percent of said lactic acid.

10. Document (1) further discloses that the application of a concentration of lactic acid of $10^{-4}$ N (see page 4, paragraph 4) produces a statistically significant increase in the weight of a sugar plant of more than 50% compared to a control plant to which no lactic acid has

been applied. It is also stated that a concentration of lactic acid $10^{-3}$ N (see page 4, paragraph 4) produces a reduction in growth, though this reduction is stated not to be statistically significant. That the stimulation effect is stated to be statistically significant, whereas the inhibition effect is stated not to be statistically significant, does not mean that the reported inhibition effect can be totally disregarded, but rather that in the absence of further experiments which lead to a statistically significant result some caution is called for in making predictions. Certainly at this higher concentration, in contrast to the lower concentration, no statistically significant growth stimulation effect was observed. Though the term "plant growth regulator" is not used in document (1), the Board considers that the results reported tell the skilled reader that lactic acid acts as a plant growth regulator for sugar cane, and informs him of a concentration at which a statistically significant amount of growth stimulation can be obtained. The Board cannot accept that plant growth regulating activity of lactic acid disclosed in document (1) is somehow excluded by the way that the term "plant growth regulator" is used in the claims and the description of the patent in suit. The results of applying lactic acid reported in document (1) accord exactly with what Figures 1 and 2 of the patent in suit show for a plant growth regulant. The specification at column 8, lines 45 to 49 suggests that the L-(d)-isomer is 10 to 100 times as active as the D-(l)-isomer and at column 6, lines 2 to 6 specifically mentions the grasses (to which sugar cane belongs) as being plants whose growth can be stimulated. The results show the skilled reader something different to what would be expected from a nutrient. It appears that the lactic acid must have operated on some physiological

mechanism of the plant to increase its growth. The Board here agrees with the Respondent's position that higher concentrations of a substance should show an enhanced effect for a nutrient, whereas the opposite is reported for lactic acid in document (1).

11. In view of the fact that the claim does not relate to any particular concentrations as being necessary to ensure growth stimulation, but identifying these is left to the skilled reader, and from the examples in the patent appear exactly of the same order as the lactic acid producing growth stimulation in document (1), the submission by the Appellant that the concentrations mentioned in document (1) for growth stimulation are too high for a plant growth regulator is not convincing.

12. The Appellant has submitted results showing that on a different plant to sugar cane, the racemate at some low concentrations produces stimulation of the order of 20% (equal to that reported in the patent) whereas at different low concentrations inhibition is observed. The results are stated by the Appellant to show no statistically significant stimulation of growth by the racemate. However, the Board can only conclude that not enough experiments were made for the results to have any statistical significance, and that no conclusions of relevance to the present proceedings can be drawn from these results. The Board thus finds that document (1) shows the skilled reader a plant growth regulant effect, certainly for sugar cane.

13. *Problem to be solved*

In relation to document (1), the problem that can be recognized is optimizing the composition of lactic acid when contacting sugar cane plants, such contacting being one of the possible applications covered by claim 1, with a growth or productivity stimulating amount of a plant growth composition of lactic acid.

14. As now claimed the person skilled in the art is told to use at least 80% L-(d)-lactic acid. It is plausible that the problem of optimization has been solved.

15. *Inventive step*

The Board considers that the skilled person who has read document (1) with the information that the application of lactic acid will stimulate growth of sugar cane, and wishes to find out optimum conditions for this in practice, would, as a matter of routine, include testing the effect of both the racemate and the substantially pure L-(d)-isomer of Lactic acid, both of which were commercially available, on both roots and on the foliage of growing plants in order to collect information on precisely what compositions at what stages of growth produced optimum results. It appears to the Board that for sugar cane the skilled person would in an obvious manner starting from document (1) arrive at the conclusion that the area covered by Claim 1 produced optimum results.

16. The Board would emphasize that the correct approach to inventive step is not sure predictability of success drawn from given information in the prior art, but rather whether it would be obvious to try with a reasonable expectation of success. By way of balance, the Boards of Appeal have not required patentees to show

with examples that there is certainty of success for everything claimed, but rather the Boards are prepared to make assumptions that this is so on the basis of evidence showing that success is plausible.

17. That document (1) also mentions three other acids which show growth stimulating effects (as well as others which do not), even though the appellant has stated, on the basis of undisclosed evidence, that these are not plant growth regulators, cannot alter the relevance of the disclosure of a plant growth stimulating effect of lactic acid on sugar cane. This was the substance disclosed in document (1) as having the greatest stimulating effect, and is also one readily available commercially. It was thus the obvious candidate to select and the information in document (1) that considerable growth stimulation, of the order of 70% (and thus rather greater than in many examples of the patent) was achieved would instil in the skilled person a reasonable expectation of success.

18. Nor is the Appellant assisted by decisions G 2/88 (EPO OJ 1990, 93) and G 6/88 (EPO OJ 1990, 114, 93), to the effect that a claim to the use of a known compound for a particular purpose, which is based on a technical effect which is described in the patent, should be interpreted as including that technical effect as a functional technical feature, and is accordingly not open to objection under Article 54(1) EPC provided that such technical feature has not previously been made available to the public. These decisions relate to findings as to novelty, which can here be already recognized on other grounds over document (1) (see point 9 above) than the view put forward by the Appellant that this document does not disclose any effect of plant growth stimulation by a plant growth regulating composition, a view not shared by the Board as stated in points 10 to 12 above.

19. In marked contrast to the situation dealt with in case T 208/88 (EPO OJ 1992, 022) in which the referring Board of Appeal applied the answer given in G 6/88 (loc. cit.), document (1) here discloses the effect of stimulating the growth or productivity of plants which is claimed, at least for sugar cane plants. Whether the mechanism by which this operates in sugar cane plants is such that lactic acid would also cause it to operate as a plant growth regulator for other plants is not stated in document (1), but the question of mechanism only becomes relevant if the skilled person has to consider whether the effect disclosed for sugar cane plants might occur in other plants. As all sets of claims put forward cover use on sugar cane to produce plant growth stimulation, which was disclosed as the effect that can be achieved in document (1), there is no reason for the Board to consider whether other plant growth regulating effects in relation to other plants can also obviously be derived from document (1) or not. For a claim to be valid none of the applications covered by it must be obvious.

20. Claim 1 thus lacks inventive step, and the main request cannot be allowed.

21. *First auxiliary request*

Claim 1 of the first auxiliary request is the same as Claim 1 of the main request, and is not allowable for the reasons stated above when discussing the latter. Accordingly the first auxiliary request cannot be allowed.

22. *Second auxiliary request*

*Admissibility (Article 123 EPC)*

It was stated in the application as filed on page 19, lines 9 to 11 that "The L-(d)-lactic acid-containing composition can be applied to the foliage and/or to the roots of the treated plants." Further on page 19, lines 27 to 30 it was stated that "Significant improvements in foliage development on non-fruit bearing plants, such as grasses and timber crops, can be accomplished at any time during the growth stage..". Corresponding passages appear in the text of the patent as granted at column 11, lines 52 to 54, and column 12 lines 7 to 10, respectively. Also examples 6, 7, and 10 to 18 in the text as originally filed (corresponding to the same numbered examples in the text of the granted patent) relate to foliar applications producing growth stimulation. The introduction into Claim 1 of the limitation "applying to the foliage" does not involve the introduction of any subject matter which extends beyond the content of the application as filed, and so the requirement of Article 123(2) EPC is met.

23. The introduction of this limitation restricts the scope of the claim to a more limited area within the scope of claim 1 as granted, and thus the requirement of Article 123(3) is met.

24. *Novelty*

Novelty of this amended claim has not been challenged, and the Board sees no reason to doubt it.

25. *Inventive step (Article 56 EPC)*

On the basis of the reasoning for lack of inventive step of claim 1 of the main request stated in points 13 to 20 above, also claim 1 of this second auxiliary request lacks inventive step over document (1), as the only additional requirement "applying to foliage" is a matter that the skilled person will as a matter of routine investigate when optimizing the suggestion of document (1), as already stated in point 15 above. Thus the second auxiliary request must be refused.

*26. Third auxiliary request*

*Admissibility (Article 123 EPC)*

26. Claim 1 of this request differs from claim 1 of the main request by the feature "applying to foliage" (as did claim 1 of the second auxiliary request) and further by the feature that it is self-esterification products of lactic acid that are applied. In the context of this patent, these self-esterification products are simply the polylactides referred to elsewhere in the specification (see the discussion in point 4 above and the passage cited therein). As explained in point 5 above the Board can only take the reference to polylactides (i.e. self-esterification products) being applied to the foliage in the context of growth stimulation, as meaning that dilute solutions of these are made up and applied to the foliage to stimulate growth. If the Board had interpreted the claim to require that composition be such that the polylactide in that form contact the plant, there would be no basis for

such a claim in the application as originally filed, as the skilled man would have concluded from the text as originally filed that the concentration at which the lactic acid is in self-esterified form would cause only growth inhibition and not growth stimulation.

27. This view is based on the patent specification (column 5, lines 33 to 40) stating that "The methods of this invention involve either stimulation or retarding growth of plants (depending upon the dosage rate of the growth regulating composition employed)..." and further by the examples (see e.g. examples 19 to 22) which show evidence of exactly what must be concluded from the teaching of document (1) that lactic acid, when applied in higher concentration has a damaging effect.

28. On this view of the meaning of applying self-esterification products to foliage claim 1 of the third auxiliary request is admissible under Article 123 EPC.

29. *Novelty (Article 54 EPC)*

Novelty of this claim 1 has not been challenged.

30. *Inventive step (Article 56 EPC)*

As for claim 1 of the main request, the closest prior art is seen as document (1), and the problem is seen the same as that already stated in point 13 above, optimization here also including the problem of how to make up the starting material. As it was well known that concentrated lactic acid formed self-esterification products, which would reconvert to lactic acid on dilution with water, it would be routine for the skilled man to make up the plant growth stimulating solution from a more concentrated form in which the lactic acid was present as self-esterification product. While the

Board considers that this aspect of the optimization problem is solved by the patent, it cannot regard the solution claimed as inventive. The third auxiliary request must thus also be rejected.

**Order**

**For these reasons it is decided that:**

The appeal is dismissed.

The Registrar:

L. McGarry

The Chairwoman:

U. Kinkeldey