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**Datasheet for the decision
of 6 December 2022**

Case Number: T 2108/19 - 3.3.09

Application Number: 10702358.2

Publication Number: 2381797

IPC: A23K20/158, A23K50/70,
A23K50/75, A23K50/30, A23K50/80

Language of the proceedings: EN

Title of invention:

ANIMAL FEED ADDITIVE AND ANIMAL FEED COMPRISING ALKYL ESTERS
OF MEDIUM CHAIN FATTY ACIDS, AND THEIR USE IN ANIMAL FEED

Patent Proprietor:

Nutreco Nederland B.V.

Opponent:

Nutrition Sciences N.V.

Headword:

Animal feed additive/NUTRECO

Relevant legal provisions:

EPC Art. 53(c), 56, 83, 84, 100(a), 123(2)
RPBA Art. 12(4)
RPBA 2020 Art. 13(2)

Keyword:

Late-filed evidence - submitted with the statement of grounds of appeal - could have been filed in first instance proceedings (no)

Amendments - added subject-matter (no)

Sufficiency of disclosure - (yes)

Grounds for opposition - fresh ground for opposition (yes)

Inventive step - main request (yes)

Amendment after summons - taken into account (no)

Decisions cited:

G 0010/91



Beschwerdekammern

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Case Number: T 2108/19 - 3.3.09

D E C I S I O N
of Technical Board of Appeal 3.3.09
of 6 December 2022

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Decision under appeal: **Interlocutory decision of the Opposition
Division of the European Patent Office posted on
10 May 2019 concerning maintenance of the
European Patent No. 2381797 in amended form.**

Composition of the Board:

Chairman A. Haderlein
Members: F. Rinaldi
N. Obrovski

Summary of Facts and Submissions

- I. This decision concerns the appeals filed by the patent proprietor and the opponent against the interlocutory decision of the opposition division that the European patent as amended met the requirements of the EPC.
- II. In the following, the parties will be referred to by their party position before the opposition division.
- III. In its notice of opposition, the opponent had requested that the patent be revoked based on Article 100(a) (lack of novelty and lack of inventive step), 100(b) and 100(c) EPC.
- IV. In this decision, the documents referred to are:
- D1: WO 2006/002927 A2
- D9: WO 01/97791 A2
- D9b: US 2004/0116523 A1
- D24: Experimental data of patent proprietor (filed on 10 May 2018): Antimicrobial activity of MCFAs and alkyl esters of MCFAs
- D25: W.O. Caster *et al.*, "Dietary effects of the esters of butyric, caproic, caprylic, capric, lauric, myristic, palmitic, and stearic acids on food intake, weight gain, plasma glucose, and tissue lipid in the male white rat", *Journal of Nutrition*, 105(6), 1975, 676-87
- D29: E. Skřivanová *et al.*, "Susceptibility of *Clostridium perfringens* to C₂-C₁₈ fatty acids", *Letters in Applied Microbiology*, 41, 2005, 77-81

- D32: M. Chandrasekaran *et al.*, "Antimicrobial activity of fatty acid methyl esters of some members of Chenopodiaceae", *Zeitschrift für Naturforschung*, 63c, 2008, 331-6
- D35: "Experimental data - susceptibility of *Clostridium perfringens* and *E. coli* towards MCFA alkyl esters" (opponent's experimental data, filed on 3 February 2020)
- D36: M.W. Stutz *et al.*, "Effects of diet and antimicrobials on growth, feed efficiency, intestinal *Clostridium perfringens*, and ileal weight of broiler chicks", *Poultry Science*, 63, 1984, 2036-42

D9 is the publication of an international application filed under the PCT in French. D9b is the US patent application based on this international application. On appeal, the parties used D9 and D9b interchangeably.

- V. In the decision under appeal, the opposition division decided, among other things, that auxiliary request 1 filed at the oral proceedings lacked inventive step.
- VI. With its statement setting out the grounds of appeal, the patent proprietor filed a main request and four auxiliary requests. The main request is identical to auxiliary request 1 dealt with in the decision under appeal.
- VII. The opponent filed several documents, including D29 and D32, together with its statement setting out the grounds of appeal. With its reply to the patent proprietor's statement setting out the grounds of appeal, the opponent filed documents D35 and D36. Furthermore, it raised further objections by letter

dated 6 October 2022, i.e. after notification of the summons to oral proceedings.

VIII. The following claims of the main request are relevant to this decision:

"1. *Animal feed suitable for feeding mammals, birds and fish, comprising an alkyl ester of a fatty acid, wherein said fatty acid has a chain length of 5-12 carbon atoms and said alkyl is methyl, ethyl, propyl, butyl or a combination thereof, and wherein the dosage of said ester in said animal feed is 50 ppm by weight or higher, based on the total weight of said animal feed, for use in decreasing the risk of Clostridium perfringens infections in an animal.*"

"11. *Animal feed suitable for feeding mammals, birds and fish, comprising one or more organic acids and an alkyl ester of a fatty acid, wherein said alkyl is methyl, ethyl, propyl, butyl or a combination thereof, wherein said fatty acid has a chain length of 5-12 carbon atoms, wherein the dosage of said ester in said animal feed is 50 ppm by weight or higher, based on the total weight of said animal feed.*"

"12. *Ingredient, premix or supplement for an animal feed suitable for feeding mammals, birds and fish, comprising an alkyl ester of a fatty acid, wherein said fatty acid has a chain length of 5-12 carbon atoms, wherein said alkyl is methyl, ethyl, propyl, butyl or a combination thereof, and wherein the dosage of said ester is 1 wt.% or higher, based on the total weight of said ingredient, premix or supplement, wherein said ingredient, premix or supplement further comprises vitamins, trace elements, minerals and organic acids.*"

"14. *Method for increasing the feed efficiency in an animal, comprising feeding a mammal, bird or fish with the animal feed as defined in any of claims 1-11 or with the ingredient, premix or supplement according to claim 12.*"

"15. *Use of an alkyl ester of a medium chain fatty acid or an alkyl ester of a medium chain fatty acid enriched product in an animal feed for the improvement of feed efficiency in an animal, wherein said fatty acid has a chain length of 5-12 carbon atoms, wherein said alkyl is methyl, ethyl, propyl, butyl or a combination thereof, and the dosage of said ester in said animal feed is 50 ppm by weight or higher, based on the total weight of said animal feed, and wherein said use is non-therapeutic.*"

"16. *Alkyl ester of a fatty acid or alkyl ester of a fatty acid enriched product for use in an animal feed for decreasing the risk of Clostridium perfringens infections in an animal, wherein said fatty acid has a chain length of 5-12 carbon atoms, wherein said alkyl is methyl, ethyl, propyl, butyl or a combination thereof, and the dosage of said ester in said animal feed is 50 ppm by weight or higher, based on the total weight of said animal feed.*"

IX. The patent proprietor's arguments relevant to the present decision can be summarised as follows:

- Documents D29 and D32 should not be admitted.
- Claims 11, 12, 14 and 15 did not involve added subject-matter.
- The invention as set out in the main request was sufficiently disclosed. This was demonstrated in the patent's examples and in D24.

- The new objection of insufficiency of disclosure was not admissible.
- The patent proprietor did not agree to the fresh ground of opposition raised under Article 53(c) EPC being examined.
- D29 was the closest prior art, not D25, D1 or D9/D9b. The patent showed that the fatty acid alkyl ester called for in the claims provided a technical effect, namely a further decrease in infections with *Clostridium perfringens* and improved zootechnical performance in animals. The claims of the main request involved an inventive step.

X. The opponent's arguments relevant to the present decision can be summarised as follows:

- Documents D29, D32, D35 and D36 were admissible. These documents were filed in reaction to amendments the patent proprietor had made at the oral proceedings before the opposition division.
- The opponent was confronted with a new interpretation of the patent's disclosure, and the claims involved an intermediate generalisation. It followed from this that claims 11, 12, 14 and 15 encompassed added subject-matter.
- The invention was insufficiently disclosed. In particular, the patent did not show that an improvement over D1 was achieved. Moreover, there was no indication that the alleged effects were credibly obtained over the entire scope of claims 11, 12, 14 and 15 and in the absence of microbial challenge. Finally, effects may not be achieved for all substances, concentrations or animals covered by the claims, as e.g. D35 showed.
- Moreover, D25 showed that feed efficiency was not achieved over the entire scope of claims 14 and 15.

- Claim 14 related to a method of treatment and contravened the requirement of Article 53(c) EPC.
- The subject-matter of claims 1 to 16 lacked inventive step in view of D29, D1 or D9/D9b. In addition, the subject-matter of claims 11, 12, 14 and 15 lacked inventive step in view of D25. The technical problem was to provide alternative compositions or methods. The solution would have been obvious to the skilled person in view of the prior-art documents D1, D32 or D36.

XI. Final requests

The patent proprietor 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 auxiliary requests 1 to 4 filed with the statement setting out the grounds of appeal.

The opponent requested that the decision under appeal be set aside and that the patent be revoked.

Reasons for the Decision

1. *Patent*

The patent relates to an animal feed and a method for increasing feed efficiency and health in farming animals, including mammals, birds and fish. The animal feed comprises specified alkyl esters of a fatty acid having a chain length of 5 to 12 carbon atoms. These esters are beneficial for the control of enteric pathogens that are mainly situated in the distal

intestinal tract such as *Clostridium perfringens* (in the following also: *C. perfringens*) and *Escherichia coli* (paragraphs [0001], [0014] and [0023]).

2. *Admittance of documents*

- 2.1 The patent proprietor argued that the documents filed with the opponent's statement setting out the grounds of appeal, including documents D29 and D32, should not be admitted on appeal.
- 2.2 Under Article 12(4) RPBA 2007 everything presented by the parties in the statement setting out the grounds of appeal and the reply to it is to be taken into account by the board, unless the evidence could have been presented in the first-instance proceedings.
- 2.3 As set out in the board's communication under Article 15(1) RPBA, D29 and D32 were filed in reaction to the auxiliary requests which the patent proprietor presented only at the oral proceedings before the opposition division. In these requests, claims referring to *C. perfringens* were introduced into the proceedings for the first time.
- 2.4 Therefore D29 and D32 submitted on appeal could not have been filed earlier. There is no reason to exclude these two documents from the appeal proceedings.
- 2.5 Moreover, the opponent filed D35 and D36 with the reply to the patent proprietor's statement setting out the grounds of appeal. These documents also relate to *C. perfringens*. Analogous considerations to those for documents D29 and D32 apply. Therefore D35 and D36 were admitted into the proceedings as well.

2.6 To conclude, D29, D32, D35 and D36 are considered on appeal.

3. *Main request - amendments*

3.1 The opponent raised an objection that claims 11, 12, 14 and 15 involved added subject-matter. In the reply to the patent proprietor's statement setting out the grounds of appeal the opponent argued as follows:

- The patent proprietor explained in the statement setting out the grounds of appeal (point 2.1.2.2) that the *"evidence provided in D25 is not relevant for the assessment of the technical effect on farming animals because the laboratory rats used in D25 are not submitted to the pathogenic microorganisms like the farming animals are exposed to in an agricultural setting, and the inhibition of said microorganisms is needed to achieve a technical effect"*.
- In other words, the patent proprietor acknowledged that the technical effect of improved feed efficiency or any effect at all was only present in farming animals held in conditions encompassing microbial challenge.
- Therefore the opponent was confronted with a new interpretation of the patent's disclosure which effectively only related to microbiologically infected animals.
- However, there was no basis in the application as filed which justified such an interpretation.

3.2 The issue under scrutiny is whether claims 11, 12, 14 and 15 involve added subject-matter. Therefore the question is whether the subject-matter of these claims is directly and unambiguously disclosed to the skilled

person, using common general knowledge, in the application as filed.

- 3.3 The wording of claims 11, 12, 14 and 15 as such is directly and unambiguously derivable from the application as filed. This is uncontested.
- 3.4 The opponent's argument is rather that the interpretation of these claims has changed, namely that improved feed efficiency is present in farming animals held in conditions encompassing microbial challenge.
- 3.5 However, this is not an issue relevant for assessing whether subject-matter has been added. Furthermore, even if the issue were relevant, the contested interpretation would be straightforward to the skilled person and also directly and unambiguously derivable from the application as filed. The application as filed is directed to farming animals, discusses the absorption of alkyl esters of medium chain fatty acids (also referred to as MCFAs) and investigates their effects on pathogens affecting the animals (application as filed, passage bridging pages 4 and 5, and examples). In short, the skilled person would directly and unambiguously understand that the application as filed relates to improved feed efficiency in farming animals, which are typically held in conditions that encompass microbial challenge.
- 3.6 At the oral proceedings, the opponent argued that example 5, an example of the patent and the application as filed in which feed efficiency is investigated, was carried out with animals infected with *C. perfringens*. Based on this, claims 11, 12, 14 and 15 involved an unallowable generalisation.

3.7 This argument constitutes a departure from the argument provided at the beginning of the appeal proceedings. More precisely, it is even in contradiction to the opponent's original objections. While according to the original argument there was no basis for interpreting the claims as relating to conditions encompassing microbial challenge, the later argument was that the claim could not be generalised to applications *not* involving such conditions.

3.8 Nevertheless, as already explained above, the subject-matter of claims 11, 12, 14 and 15 - not restricted to conditions encompassing microbial challenge - is directly and unambiguously derivable for the skilled person from the application as filed. In particular, claim 13 of the application as filed is directed to a "[m]ethod for increasing the feed efficiency" and claim 14 to the "[u]se of an alkyl ester or an alkyl ester enriched product in the preparation of a feed supplement for the improvement of feed efficiency". These two claims of the application as filed are not restricted to conditions encompassing microbial challenge.

3.9 To conclude, the subject-matter of claims 11, 12, 14 and 15 of the main request does not involve added subject-matter (Article 123(2) EPC).

4. *Main request - sufficiency of disclosure*

4.1 According to the opponent, the invention as set out in the main request was insufficiently disclosed.

4.2 As to claims 1, 13 and 16, the opponent understood the patent's invention to be that "by using alkyl esters of fatty acids instead of free fatty acids, the risk of

Clostridium perfringens infections can allegedly be further decreased" (statement setting out the grounds of appeal, page 5). This meant that an improvement over the prior art was obtained. However, the patent did not demonstrate that such an improvement was achieved over D1.

4.3 In this context, the opponent also referred to its experimental tests in D35. In these tests, the activity against *C. perfringens* and *Escherichia coli* of some fatty acids and their alkyl esters is compared. The tests are carried out in suspensions, made with feed and water, that are inoculated with the pathogenic strains. The results show that the free fatty acids exhibit a higher antimicrobial effect than their respective alkyl esters.

4.4 However, the point that the opponent is addressing is not an issue of insufficiency of disclosure.

4.4.1 Claim 1 only requires that the composition described in the patent be suitable for decreasing the risk of *C. perfringens* in animals compared with no treatment at all. In particular, the term "decreasing" in claim 1 does not define or call for a decrease with respect to a specific control component.

4.4.2 Indeed, example 1 of the patent in suit shows that several alkyl esters of fatty acids having a chain length of 8, 10 or 12 carbon atoms inhibit *C. perfringens* compared with a treatment in the absence of an additional component, i.e. the control. Example 2 demonstrates that a mixture of an alkyl ester of dodecanoic acid with organic acids does the same. On the basis of these results alone, there appears to be no issue of insufficiency of disclosure.

4.4.3 Moreover, even D35 confirms that some effect against *C. perfringens* is achieved with all the substances tested, which means the fatty acid alkyl esters that were examined as well. Indeed, in its reply to the patent proprietor's statement setting out the grounds of appeal (page 4), the opponent stated the following:

"It is clear from the experimental data presented in D35, that all substances to some extent exhibit an antimicrobial effect towards Clostridium perfringens ..."

4.4.4 Thus the opponent's objection directed to claims 1, 13 and 16 is not convincing.

4.5 The opponent also argued that the invention set out in claims 11, 12, 14 and 15 had insufficient disclosure. In its view, there was no "indication that the alleged effects are plausible over the entire scope of the claims 11, 12, 14 and 15, i.e. without microbial challenge" (reply to the patent proprietor's statement setting out the grounds of appeal, page 5).

4.6 This objection is not convincing either. Some experiments in the patent (e.g. examples 4 and 6) have been carried out on farmed animals which, however, have not been challenged (i.e. inoculated) with *C. perfringens*. These experiments also demonstrate improved feed efficiency.

4.7 Finally, the opponent alleged that effects may not be achieved for all substances, concentrations or animals covered by the claims.

4.7.1 However, these allegations are speculative and to a large extent not based on verifiable facts. In the absence of evidence to the contrary, there is no reason to believe that the effects described in the patent will not be achieved with some specific fatty acid alkyl esters, at some concentrations or with particular animals.

4.7.2 In addition, the following observations are made.

4.7.3 The patent's example 1 shows that several fatty acid alkyl esters, at several concentrations, inhibit *C. perfringens* under *in vitro* test conditions.

4.7.4 The patent shows effects (reduced microbiological counts; reduced diarrhoea; increased weight gain per day) for mammals such as piglets (examples 6 and 7) and for birds, such as broilers (examples 4 and 5).

4.7.5 Example 3 of the patent and the experimental results in D24 relate to experiments *in vivo*. These demonstrate that the absorption of several fatty acid alkyl esters in the animal body is delayed. Thus the conclusion in the patent (paragraph [0023]) that the ability of these substances to express their bioactivity in the small intestine

"may also be beneficial for the control of important potential enteric pathogens that are mainly situated in the distal intestinal tract"

is credible.

4.8 In summary, the invention as set out in the claims of the main request is disclosed in a manner sufficiently

clear and complete for it to be carried out by a person skilled in the art (Article 83 EPC).

5. *Admittance of a new objection under Article 83 EPC*

5.1 In its letter dated 6 October 2022, the opponent raised a further objection of insufficiency of disclosure concerning claims 14 and 15.

5.2 It argued that these claims were directed to feed efficiency. However, the skilled person would learn from D25 that "*[f]eeding of the esters of butyric, caprylic, lauric, and palmitic acids ... had no significant effect on food intake or body weight gain*" (page 681, left column). In view of this, it concluded that claims 14 and 15 were insufficiently disclosed over the entire scope of the claims.

5.3 However, this objection was raised for the first time after notification of the summons to oral proceedings. This specific objection had not been raised earlier on appeal, be it in the opponent's statement setting out the grounds of appeal or in the reply to the patent proprietor's statement setting out the grounds of appeal. In particular, the cited passage was not mentioned in conjunction with an objection of insufficiency of disclosure of claims 14 and 15.

5.4 Therefore the objection constitutes an amendment to the opponent's appeal case made after notification of the summons to oral proceedings. The board is not aware of any exceptional circumstances justifying raising the objection at this stage of the proceedings. In conclusion, the objection is not considered on appeal (Article 13(2) RPBA 2020).

6. *Admittance of a fresh ground of opposition*

6.1 In its letter dated 6 October 2022, the opponent argued that claim 14 related to a method of treatment and contravened the requirement of Article 53(c) EPC.

6.2 It was uncontested that the objection under Article 53(c) constituted a fresh ground for opposition. The patent proprietor did not agree to the introduction of the fresh ground for opposition.

6.3 Therefore this ground may not be dealt with in substance in the decision (G 10/91, Headnote 3 and Reasons 18).

7. *Main request - inventive step starting from D29*

7.1 The opponent further argued that the subject-matter of claims 1 to 16 lacked inventive step starting from any one of D29, D1 or D9/D9b as the closest prior art. Furthermore, in its view, D25 was the closest prior art for the subject-matter of claims 11, 12, 14 and 15.

7.2 Selection of the closest prior art

7.2.1 In the decision under appeal, the opposition division considered D25 the closest prior art for the subject-matter of claims 11, 12, 14 and 15. It concluded that these claims lacked inventive step.

7.2.2 The patent relates to an animal feed that has antimicrobial and antipathogenic properties. The animals fed with it display a favourable composition of the gastrointestinal microbiota and improved feed efficiency (paragraph [0013]). In contrast, D25 relates

to a study carried out on rats to establish the effects of fatty acids and their esters on (human) health.

- 7.2.3 In view of this, there are two relevant aspects in D25 that differ from the purpose of the patent in suit.
- 7.2.4 Firstly, the animals in D25 are kept under laboratory conditions. These conditions are intrinsically less prone to (pathogenic) microbial contamination compared with the environment in which farming animals are kept, where pathogens are ubiquitous.
- 7.2.5 Secondly, in D25 the purpose of the study is to investigate fat metabolism, as table 2 confirms. The amounts of fatty acid esters used in D25 are high (1 to 2 g per 70 g of experimental diet). The fatty acid esters, and in particular ethyl dodecanoate, are used as a source of fat, i.e. a source of energy. This purpose differs from that in the patent in suit, which is to provide an additive or a supplement for improving zootechnical performance.
- 7.2.6 Therefore for these reasons alone D25 is not a suitable starting point for assessing inventive step.
- 7.2.7 It was uncontested that D29 was a suitable starting point for assessing inventive step. This document investigates the activity of fatty acids against *C. perfringens*.
- 7.2.8 D1 is more remote than D29. Although D1 relates to feed supplements comprising fatty acids, it mentions neither *C. perfringens* nor alkyl esters.
- 7.2.9 D9/D9b is even more remote than D1. This document relates to the use of fatty acids with 4 to 10 carbon

atoms to prevent Gram-negative bacterial infections, in particular Salmonella infections, both in animals and in humans.

7.2.10 To conclude, the closest prior art is D29.

7.3 Disclosure of D29 and distinguishing feature

7.3.1 D29 describes the use of fatty acids with 2 to 18 carbon atoms for inhibiting *C. perfringens*. The result is that dodecanoic acid has the highest antimicrobial activity (table 1). Moreover, D29 describes the use of fatty acids or their triglycerides in an animal feed at a concentration above 50 ppm (page 81).

7.3.2 The subject-matter of claims 1, 11, 12, 14, 15 and 16 differs from D29 at least in that the methyl, ethyl, propyl or butyl esters of the fatty acid are used rather than free fatty acids or their triglycerides.

7.3.3 As will be explained in the following, on the basis of this distinguishing feature alone the claimed subject-matter involves an inventive step over the closest prior art D29. Therefore there is no reason to identify further distinguishing features for the individual claims under scrutiny.

7.4 Technical effect and problem to be solved

7.4.1 It is in dispute what problem the distinguishing feature common to all the claims of the main request solves over the entire scope of the claims.

7.4.2 According to the patent proprietor, the fatty acid alkyl esters make it possible to further decrease the

risk of *C. perfringens* infections and improve zootechnical performance in animals.

7.4.3 The evidence corroborating this is as follows:

- In example 4 (table 1) of the patent *C. perfringens* counts in broilers receiving feed supplemented with 1000 ppm dodecanoic acid ethyl ester (i.e. ethyl dodecanoate) or free dodecanoic acid are examined. Two groups of broilers are observed, one group is (deliberately) inoculated with *C. perfringens* ("challenged") and the other one not ("non-challenged"). In both groups, the count of *C. perfringens* is lower in broilers supplemented with ethyl dodecanoate. The results also show that *C. perfringens* is ubiquitous in animal farming because it can be identified even in broilers not inoculated with it.
- The patent's example 5 (table 2) shows that supplementation of a broiler's feed with ethyl dodecanoate improves the weight gain per day, the feed intake per day and, to a lesser extent, the feed conversion ratio of broilers infected with *C. perfringens* compared with supplementation with free dodecanoic acid. These results show that the feed efficiency is improved under conditions typically found in animal farming.
- The patent's example 6 (table 3) demonstrates that supplementation of a piglet's feed with ethyl dodecanoate decreases the rate of diarrhoea in weaned piglets compared with supplementation with free dodecanoic acid. This provides further evidence that there is an increase in the feed efficiency in animals. In this example, the animals

have not been inoculated with pathogenic microorganisms.

- In example 3 (figure 3) of the patent, broilers are fed with two feeds, supplemented either with 1000 ppm of ethyl dodecanoate or free dodecanoic acid. In broilers fed with the former supplement, the level of fatty acid in the jejunum (in the form of the alkyl ester) is higher than in the group receiving the free dodecanoate. This shows that the absorption of the fatty acid alkyl esters is delayed.
- Moreover, the additional tests in D24 confirm the results in example 3 of the patent, with different fatty acids. D24 shows that the administration of ethyl esters of octanoic and decanoic acid results in a higher concentration of these fatty acids in the jejunum, compared with administration of the respective free fatty acids.

7.4.4 These results jointly confirm that the fatty acid alkyl ester

"will be able to express its bioactivity as far as the distal small intestinal tract, e.g. the distal end of the small intestines, which is crucial for modulating the local microbiota, resulting in improved efficiency of nutrient utilization (feed efficiency)" (patent, paragraph [0023]).

7.4.5 Against this background, the opponent's argument that the only technical problem solved was providing an alternative is not persuasive.

- 7.4.6 The opponent supported its arguments with reference to the test results in D35. This document relates to experimental data that the opponent prepared. As already pointed out above (point 4.3), the tests show that some of the alkyl esters called for in claim 1 do not exhibit as strong an antimicrobial activity towards *C. perfringens* as the respective free fatty acids.
- 7.4.7 It is observed that these results differ from the results shown in the patent's figure 2. The latter demonstrate that at low concentrations ethyl dodecanoate performs better against *C. perfringens* than free dodecanoic acid. It is also noted that tests of both parties were seemingly carried out under similar conditions.
- 7.4.8 However, the reason for the difference between the results of the opponent's and the patent proprietor's tests need not be investigated. In the present case there is evidence obtained on animals treated with the components called for in the claims and control components (patent, examples 3 to 7; D24). These tests, carried out on animals, must be given more weight than the opponent's test in D35 and the test set out in example 2 of the patent, as the latter tests were carried out *in vitro*, under laboratory conditions. At best, they can be seen to mimic some very restricted *in vivo* conditions (e.g. the pH used).
- 7.4.9 Therefore the technical problem solved is to provide a composition for use in decreasing the risk of *C. perfringens* infections and improving zootechnical performance in animals.

7.5 Non-obviousness of the solution

7.5.1 The solution, i.e. to provide alkyl esters of fatty acids having 5 to 12 carbon atoms, is not suggested in the art. There is no teaching in the prior art that these esters improve the zootechnical performance, including providing delayed absorption of the esters and controlling enteric pathogens such as *C. perfringens*.

7.5.2 In particular, none of the documents the opponent cited in combination with D29, namely D1, D32 and D36, suggest the subject-matter claimed.

7.5.3 D1 discloses the use of medium chain fatty acids, possibly converted into amides, esters and glycerides, for inhibiting the growth of microbial pathogens. However, D1 does not differentiate between the free fatty acids and their derivatives in terms of effect achieved. Furthermore, neither the alkyl groups called for in claim 1 nor *C. perfringens* are mentioned in D1. More importantly, there is no disclosure that the esters provide improved zootechnical performance.

7.5.4 In D32, the antimicrobial activity of different fatty acid methyl ester components was tested on some members of Chenopodiaceae. However, these components were not tested on *C. perfringens*. Furthermore, there is no comparison between the methyl ester and the free fatty acid in D32. Therefore there is nothing in D32 that would teach the skilled person that an alkyl ester of a medium chain fatty acid results in a greater antimicrobial effect compared with the free fatty acid.

7.5.5 The opponent cited D36 to show that the correlation between reduction of infections with *C. perfringens*

infection and improved feed efficiency was well-known in the art. However, knowledge of this general principle does not render the subject-matter claimed obvious. The merit of the invention is that the fatty acid alkyl esters called for in claim 1 provide an improved effect in inhibiting *C. perfringens*. There is no piece of prior art disclosing or suggesting that this would be achieved.

7.5.6 Thus the claimed subject-matter involves an inventive step when starting from D29 as the closest prior art.

8. *Main request - inventive step starting from D25*

8.1 For the sake of completeness, inventive step starting from D25 is also assessed. This is the prior-art document which the opposition considered closest to the subject-matter of claims 11, 12, 14 and 15.

8.2 D25 investigates aspects such as food intake, feed efficiency and weight gain in an animal (i.e. a rat). This is mentioned in the document's abstract. On page 681, left column, the following is disclosed:

"Feeding of the esters of butyric, caprylic, lauric, and palmitic acids (referred to in later discussions as the 4-8-12-16 group) had no significant effect on food intake or body weight gain. The feeding of the esters of caproic, capric, myristic, and stearic acids (later referred to as the 6-10-14-18 group) produced increases in food intake and even greater increases, proportionately, in body weight gain".

8.3 In the test set-up used in D25, butyric, caproic, caprylic and capric acids (i.e. the fatty acids having 4, 6, 8 or 10 carbon atoms) are fed as triglyceride

esters, whereas lauric, myristic, palmitic and stearic acids (i.e. the fatty acids having 12, 14, 16 or 18 carbon atoms) are fed as ethyl esters.

8.4 Staying within the teaching of D25, the considerations that follow from this document are as follows:

8.4.1 The only composition investigated in D25 that includes a fatty acid alkyl ester according to the invention is the first composition, which includes lauric acid in the form of ethyl laurate (i.e. ethyl dodecanoate). This composition "had no significant effect on food intake or body weight gain".

8.4.2 In contrast, the second composition does not include fatty acid alkyl esters according to the invention. This composition "produced increases in food intake and even greater increases, proportionately, in body weight gain". In other words, the second composition can be seen to display increased feed efficiency.

8.4.3 If the skilled person were to consider the teaching of D25 in order to solve the problem of providing an animal feed which increases feed efficiency, they would do so starting from the second composition of D25. This composition includes caproic and capric acids (i.e. fatty acids with 6 and 10 carbon atoms) as triglycerides, and myristic and stearic acids (i.e. fatty acids with 14 and 18 carbon atoms) as ethyl esters.

8.4.4 The skilled person would have had no motivation to use the fatty acid alkyl esters disclosed in claims 11, 12, 14 and 15, i.e. a fatty acid with a chain length of 5 to 12 carbon atoms and the alkyl being methyl, ethyl, propyl or butyl. In particular, they would not have

provided the caproic and capric acids of the second composition in the form of the ethyl esters.

- 8.4.5 Although D25 suggests that ethyl esters may be used instead of triglycerides, this is taught only in a restricted context which involves specific fatty acids:

"In the case of laurate and higher molecular weight acids, the ethyl esters (rather than the triglycerides) were used to minimize any digestion and absorption problems that might have been associated with the use of the higher triglycerides" (page 686, left column).

- 8.4.6 Therefore in D25 there is no teaching to improve feed efficiency with ethyl esters of fatty acids other than myristic and stearic acid ethyl esters.

- 8.5 To conclude, even if D25 were considered the closest prior art for assessing inventive step of claims 11, 12, 14 and 15, the skilled person would not have arrived at the subject-matter described in these claims. Therefore the subject-matter of these claims also involves an inventive step when starting from D25 as the closest prior art.

9. *Main request - conclusion on inventive step*

- 9.1 To conclude, the subject-matter of claims 1, 11, 12, 14, 15 and 16 would not have been obvious to the skilled person in view of the prior art.

- 9.2 In other words, the subject-matter of the claims of the main request involves an inventive step (Article 56 EPC).

10. *Adaptation of the description*

10.1 At the oral proceedings before the board, the patent proprietor filed an adapted description (paragraphs [0001] to [0052]).

10.2 The opponent did not raise any objection to the adapted description (Article 84 EPC), nor did the board identify anything that required a further adaptation.

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 as amended in the following version:
 - claims 1-16 in accordance with the main request filed with the patent proprietor's statement setting out the grounds of appeal
 - description paragraphs [0001] to [0052] as filed during the oral proceedings before the board
 - drawings figures 1-3 of the patent specification.

The Registrar:

The Chair:



M. Schalow

A. Haderlein

Decision electronically authenticated