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**Datasheet for the decision
of 8 November 2023**

Case Number: T 1258/22 - 3.3.09

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Language of the proceedings: EN

Title of invention:

METHOD TO CONVERT INSECTS OR WORMS INTO NUTRIENT STREAMS

Patent Proprietor:

Bühler AG

Opponent:

Ynsect

Headword:

Conversion of insects into nutrients/YNSECT

Relevant legal provisions:

EPC Art. 56, 123(2)

Keyword:

Main request: added subject-matter - (yes)

Auxiliary request: added subject-matter - (no)

Auxiliary request: inventive step - (yes)

Decisions cited:

Catchword:



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Case Number: T 1258/22 - 3.3.09

D E C I S I O N
of Technical Board of Appeal 3.3.09
of 8 November 2023

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Decision under appeal: **Decision of the Opposition Division of the
European Patent Office posted on 28 March 2022
rejecting the opposition filed against European
patent No. 2953487 pursuant to Article 101(2)
EPC.**

Composition of the Board:

Chairman M. Ansorge
Members: A. Veronese
N. Obrovski

Summary of Facts and Submissions

- I. The decision concerns the appeal filed by the opponent (appellant) against the opposition division's decision rejecting the opposition filed against the European patent.
- II. With its notice of opposition the opponent had requested that the patent be revoked in its entirety on the grounds under Article 100(a) EPC in conjunction with Article 56 EPC (lack of inventive step), Article 100(b) EPC and Article 100(c) EPC.
- III. Claim 1 as granted reads:

"1. Method to convert insects or worms into nutrient streams, consisting of the steps:

- (a1) providing fresh insects or worms,*
 - (a2) reducing the insects or worms in size,*
 - (a3) obtaining a pulp from insects or worms,*
- then*
- (b) heating the pulp to a temperature of 70-100°C,*
- and then*
- (c) subjecting the heated pulp to a physical separation step thereby obtaining a fat fraction, an aqueous protein fraction and a solid-containing fraction,*
- with the proviso that the method does not comprise enzymatic treatment of the pulp, wherein the aqueous protein fraction and the solid-containing fraction are dried after step (c)."*

IV. The documents submitted during the opposition proceedings included:

D1: CN 101406486 A (and its machine-translated version into English, D1bis)

D3: T. Veldkamp et al., "Insects as a sustainable feed ingredient in pig and poultry diets - a feasibility study", Wageningen UR Livestock Research, Report 638, October 2012

D4: CN 102578361 A (and its machine-translated version into English, D4bis)

V. In its decision, the opposition division found *inter alia* that:

- Claim 1 as granted did not contain added subject-matter. Example 1 of the application as filed provided a basis for the feature "fresh insects or worms". All the steps of the claimed method were disclosed in the application.
- The replacement of the wording "comprising" with "consisting of" restricted claim 1 without creating new subject-matter. Claim 5 as filed demonstrated that the physical separation step was not limited to one step, but could include different sub-steps.
- The claimed subject-matter involved an inventive step starting from either D1 or D3 as the closest prior art.

VI. With its reply to the statement setting out the grounds of appeal the proprietor (respondent) filed a set of claims as an auxiliary request. In this claim request, claim 1 was limited to "black soldier fly larvae".

VII. Claim 1 of the auxiliary request reads:

"1. Method to convert black soldier fly larvae into nutrient streams, consisting of the steps:

- (a1) providing fresh black soldier fly larvae,*
- (a2) reducing the black soldier fly larvae in size,*
- (a3) obtaining a pulp from black soldier fly larvae, then*
- (b) heating the pulp to a temperature of 70-100°C, and then*
- (c) subjecting the heated pulp to a physical separation step thereby obtaining a fat fraction, an aqueous protein fraction and a solid-containing fraction, with the proviso that the method does not comprise enzymatic treatment of the pulp, wherein the aqueous protein fraction and the solid-containing fraction are dried after step (c)."*

VIII. The appellant's arguments, where relevant to the decision, can be summarised as follows:

- Claim 1 as granted contained added subject-matter because the application as filed did not disclose "fresh insects or worms". Example 1 of the application was limited to fresh black soldier fly larvae and could not be generalised.
- Claim 1 of the auxiliary request contained added subject-matter because the replacement of the wording "comprising" with "consisting of" had no basis in the application as filed. The claimed physical separation step consisted of a single step, not sub-steps. The methods described in the examples of the patent were not covered by the

amended claim 1, because they encompassed additional steps that were not claimed.

- The subject-matter of claim 1 as granted and of the auxiliary request did not involve an inventive step over the method for fractionating insects described in section 4.2 of D3, the closest prior art, either alone or in combination with D4 or common general knowledge. It did not involve an inventive step over D1 in combination with D3 either.

IX. The respondent's arguments can be summarised as follows:

- Claim 1 as granted did not contain added subject-matter. The term "fresh insects or worms" was based on the examples, which described the use of fresh black soldier fly larvae. Other parts of the application demonstrated that the examples reflected the more general teaching that fresh insects and worms had to be used to carry out the invention.
- The replacement of the wording "comprising" with "consisting of" did not create new subject-matter; the sequence of steps in claim 1 as granted was based on claim 1, on pages 3 to 5 and on the examples as filed. Each step could comprise further sub-steps.
- The subject-matter of the auxiliary request involved an inventive step starting from D3 as the closest prior art. D3 mentioned "broadly defined processing steps", but not in the claimed sequence. The heating step was performed before, rather than after, the grinding step. Its temperature was not

indicated. Furthermore, according to D3 the drying step was performed on the entirety of the insect meal, not on its fractions. The claimed subject-matter also involved an inventive step over D1 in combination with D3.

The requests

- X. The appellant requested that the decision be set aside and that the patent be revoked in its entirety.

- XI. The respondent requested that the appeal be dismissed or, alternatively, that the patent be maintained on the basis of the auxiliary request filed with the reply to the statement setting out the grounds of appeal.

Reasons for the Decision

Main request (claims as granted)

- 1. *Basis for the amendments*
 - 1.1 The board shares the appellant's view that the addition of the word "fresh" to characterise the insects or worms in claim 1 creates originally undisclosed subject-matter.

 - 1.2 In the field of nutritional products the term "fresh" typically identifies a product which is not spoiled and has not been subjected to preservation steps, such as freezing, heating, tinning, etc. The skilled person would understand that "fresh insects or worms" used to produce nutritional products are insects or worms which are not spoiled and/or have not been subjected to such

preservation steps. This is irrespective of whether they are alive or have been slaughtered.

- 1.3 The word "fresh" is only mentioned once in the application as filed, namely in example 1, which describes a method involving the use of "fresh larvae of black soldier fly". Apparently, these larvae were also used in example 2.
- 1.4 However, these examples do not provide a basis for qualifying any insect or worm disclosed in the application as filed as "fresh".
- 1.5 The respondent argued that the method in example 1 followed the general procedures for processing insects or worms which were described on page 4, lines 1 to 9 of the application as filed. Therefore, the skilled person would have understood that the use of "fresh animals is a general idea of the invention and not a mere example, and applies to any insects or worms to be used".
- 1.6 It further drew attention to:
 - page 3, lines 11 and 12, which discloses "insects in any development stage, such as adult insects, insect larvae and insect pupae",
 - page 2, lines 3 and 4, which states that it was "not known to fully utilise insects or worms and to convert them into several nutritional streams",
 - page 2, lines 9-14, which refers to a method producing "nutrients that are not contaminated with toxic substances",

- page 2, lines 15 to 17, which refers to a method which "does not require costly equipment or reagents and can be easily scaled up".

2. In its opinion, from these passages the skilled person would have understood that the insects and worms of the invention were obtained directly from cultivation, and therefore they were necessarily "fresh". Accordingly, the use of the word "fresh" to qualify the insects or worms in claim 1 did not add new subject-matter.

2.1 The respondent's arguments are not convincing.

2.2 The passages of the application as filed cited by the respondent do not directly and unambiguously teach the use of insects or worms which are "fresh" and hence not subjected to preservation steps. In particular:

- the section on page 4 describing in general terms how to process insects or worms mentions some steps, such as squashing and reduction in size, which are used in the method in example 1; however, this text passage does not prompt the skilled person to use "fresh" insects or worms; thus, this passage on page 4 cannot be used to generalise a specific teaching which can only be found in example 1,
- there is no indication that the development stages of an insect mentioned on page 3 play a role in whether the insect will be later subjected to preservation steps, such as freezing or drying,
- the expression to "fully utilise insects or worms" is used on page 2 to indicate that all nutritional fractions of the insects are used, rather than just

specific fractions, like fat or chitin, as in the prior art; this information has no bearing on whether the insects or worms are subjected to preservation steps before being processed, and

- the absence of contamination by toxic substances and the provision of a simple method which can be easily scaled up, without using costly equipment, is not an indication that preservation steps must be avoided; freezing and drying are typically used in the field of nutrition, and there is no evidence that they induce contamination by toxic substances.

- 2.3 The other parts of the application as filed do not provide direct and unambiguous disclosure of "fresh insects or worms", either.
- 2.4 In conclusion, the term "fresh" used in example 1 to characterise a specific insect, namely a "black soldier fly", in a specific development stage, namely "larvae", does not provide the basis for characterising any kind of insect and worm disclosed in the application as "fresh", including in any development stage and after slaughtering.
- 2.5 For these reasons, claim 1 of the main request contains added subject-matter, contrary to the requirements of Article 123(2) EPC.

Auxiliary request

3. Claim 1 of the auxiliary request differs from claim 1 of the main request in that the reference to a worm has been deleted and the insect is limited to "fresh black soldier fly larvae".

4. *Added subject-matter*

4.1 The limitation of the insect to "fresh black soldier fly larvae" overcomes the objection of added subject-matter discussed above when dealing with the main request. This limitation is disclosed in example 1. This was not contested by the appellant.

Replacement of "comprising" with "consisting of"

4.2 The appellant argued that the replacement of the wording "comprising" with "consisting of" in claim 1 created originally undisclosed subject-matter.

4.3 The appellant did not dispute that the application as filed disclosed a method comprising the specific steps listed in claim 1; however, it argued that a method consisting exclusively of those steps was not disclosed. In its opinion this was evident, because the methods described in paragraphs [0022], [0024] and [0039] and in the examples of the patent (and in the corresponding parts of the application as filed) included additional steps excluded by the amended claim 1. In particular, some steps were not carried out on the pulp, but rather on fractions separated from the pulp.

4.4 The appellant's arguments are not persuasive.

4.5 When reading the claims as originally filed, the skilled person would understand that the simplest manner of carrying out the claimed method is by plainly following the given instructions, i.e. carrying out the specified steps listed, and not others.

- 4.6 Moreover, the skilled person would interpret claim 1 of the auxiliary request in the context of the other claims forming part of that request. Claim 3 of the auxiliary request (corresponding to claim 5 as originally filed) states that "the physical separation encompasses decanting and centrifugation". Hence, the physical separation step in claim 1 may include further sub-steps needed to separate the three fractions defined in claim 1. Paragraph [0022] of the patent (corresponding to page 5, lines 8 to 17 of the application as filed) describes physical methods for isolating the three fractions and confirms this interpretation. This applies irrespective of whether the sub-steps, e.g. decanting and centrifugation, are carried out on the pulp or on a fraction obtained from the pulp, which is further subjected to fractionation.
- 4.7 Claim 3 of auxiliary request 1 corresponds to claim 5 as filed. Therefore, in the same way as the subject-matter of claim 1 of the auxiliary request must be determined in the context of claim 3 of the auxiliary request, the subject-matter of claim 1 as filed must be determined in the context of claim 5 as filed. This means that claim 1 of the auxiliary request, as interpreted above, has a basis in the application as filed.
- 4.8 With regard to the method outlined in example 1 of the description, the appellant argued that the step in which "The combined protein fraction is further separated by decanting into larvae water and solid containing fraction" does not fall under the claimed steps; however, following the aforementioned interpretation of claim 1, this step is actually an integral part of the "physical separation step" referred to in that claim.

4.9 Example 2 describes a variant of the claimed process in which the larvae water and the solid-containing fractions are combined and then spray dried. Even if it were assumed, as argued by the appellant, that this process does not fall under the claimed subject-matter, this would, as such, not call the aforementioned interpretation of claim 1 into question. The same applies to paragraph [0039] of the patent, which mentions the possibility of extracting chitin from the solid-containing fraction.

4.10 For these reasons, it is concluded that claim 1 of the auxiliary request does not contain added subject-matter (Article 123(2) EPC).

5. *Inventive step*

The claimed invention

5.1 The invention claimed in the auxiliary request relates to a method for converting black soldier fly larvae into different nutrient fractions containing fat, proteins and other solid materials. These fractions can be used to prepare foods or feed products. The method involves a physical separation step which provides a fat fraction, an aqueous protein fraction (comprising soluble proteins) and a solid-containing fraction comprising solid materials, such as insoluble proteins and chitin.

Closest prior art

5.2 D3 is a report from the University of Wageningen discussing whether it is feasible to use insects for producing feed ingredients for pigs and poultry. D3

discusses the potential advantages of using insects including, *inter alia*, black soldier fly, on a large scale, as protein sources, as an alternative to animals sources; see sections 1, 2.1 and 2.2. Furthermore, D3 describes methods which could potentially be used to process the insects and to obtain ingredients suitable for use in the feed industry; see sections 2.4, 4, 4.2.

- 5.3 Sections 4.1 and 4.2 of D3 discuss some options for rearing insects and for processing and fractionating insect constituents; see in particular section 4.2, with the heading "Fractionation of insects". One of the suggested methods involves the steps of drying, heating, reducing the insect size (by grinding) and fractionation. The fractionation step provides a fat fraction, a soluble protein fraction and an insoluble protein fraction; see section 4.2, figure 6, part II, of D3. It is said that the soluble protein fraction could be used in the food industry, and the insoluble fraction in the feed industry; see section 4.2, page 18, second paragraph.
- 5.4 Since the aim of the process in D3 is identical to that claimed, and the processing steps are similar, this document is considered the closest prior art.
- 5.5 The opponent considered D1 as an alternative starting point for assessing inventive step. D1 relates to the preparation of a liquid for oral use which can be used e.g. as an anticancer, antiviral and antibacterial agent. The liquid is obtained by combining two extracts from mature fly maggots which contain antibacterial peptides and chitosan, respectively; however, since the aim of the invention described in D1 is unrelated (obtaining a therapeutic agent, instead of nutritional fractions), the processing steps are substantially

different, and the separation of a fat fraction is not even mentioned, this document cannot be considered the closest prior art.

Distinguishing features

5.6 The claimed method differs from that disclosed in section 4.2 of D3 in that it requires the following steps to be carried out, in the claimed order:

- heating at 70-100°C,
- physical separation to obtain a fat fraction, an aqueous protein fraction and a solid-containing fraction,
- drying the aqueous protein fraction and the solid-containing fraction obtained after separation, and
- furthermore using a black soldier fly larvae (this is not mentioned in section 4.2).

Technical effect and underlying problem

5.7 There is no evidence that the features distinguishing the claimed method from the process suggested in D3 are associated with any particular technical effect. Therefore, the underlying problem is to provide an alternative method for converting insects into nutrient streams.

Non-obviousness of the claimed solution

5.8 The appellant noted that paragraph 4.1 of D3 suggests subjecting the insect pulp to a heat treatment in order to prevent enzymatic browning. Furthermore, it noted

that D4 teaches that maggot enzymes are inactivated at a temperature of 90 to 95°C. Therefore, in its opinion, the skilled person would have been prompted to heat the pulp of the insects at the claimed temperature.

- 5.9 This argument is not persuasive. First, paragraph 4.1 of D3 foresees heating of an insect pulp to prevent enzymatic browning. This means that heating must be carried out before and not after grinding, i.e. before the step in which the pulp is reduced in size according to claim 1. Furthermore, this heating step is foreseen in a method for preparing a meal of whole insects, not of fractionated ingredients.
- 5.10 The method described in section 4.2 of D3, which relates to the preparation of streams of individual nutrients, also foresees a heating step; however, again, the heating precedes the grinding step instead of following it; see the list of processing steps in figure 6, method II. It is reasonable to assume that the heating step, in the same way as that described in section 4.1, is for preventing browning and that, for this reason, it must be performed before grinding.
- 5.11 It is also worth noting that paragraphs [0020] and [0021] of the patent teach that the insect pulp is heated at a temperature of 60 to 100°C to liquefy the fats. This allows them to be isolated from the heated pulp by physical separation steps.
- 5.12 Figure 6 of D3 and the sections of 4.2 relating to this figure do not teach the relevance of liquefying the fats at high temperatures, let alone for converting them into a form which can be isolated by physical separation from a heated pulp mass. In fact, section 4.2 of D3 proposes fat separation by solvent

extraction, rather than by physical separation; see page 17, last paragraph.

- 5.13 The appellant noted that in paragraph 4.2 on page 17 a method used in the fish industry is mentioned, in which fat is extracted by cooking to coagulate the protein, followed by pressing; however, this passing reference is very generic and it is not apparent how this can be applied to a process for fractionating insects. It is not apparent what is being defatted, e.g. whether it is the pulp obtained by grinding an entire fish or tissue or a protein fraction obtained from it. It is therefore not possible to establish whether, as in the claimed method, fats and proteins are physically separated from a heated pulp. The temperature is not mentioned either.
- 5.14 Section 4.2 of D3 does not mention the step of drying both the aqueous and solid-containing fractions either. In fact, it mentions drying the entirety of the pulp before defatting it by solvent extraction (see page 17, last paragraph). Page 19 refers to "feed powders", but the term "feed" is used in D3 to define the fraction obtained from the insoluble rather than the soluble protein fraction; see paragraph 2 on the preceding page.
- 5.15 Furthermore, it is observed that the teaching of D3 is overall very generic and rather speculative. This is evident even just from its title, which reads: "Insects as a sustainable feed ingredient in pig and poultry diets - a feasibility study" (emphasis added by the board). D3 elaborates on prospective methods for rearing insects and for developing foods and feed products from insects; however, D3 does not describe any specific method in detail. The method in figure 6

in section 4.2 had not yet been implemented in practice when D3 was published.

5.16 Finally, even assuming that the skilled person would have decided to implement the method described in figure 6 of D3, by additionally applying the extraction method used in the fish industry mentioned on page 17 they would have ended up with a method including steps such as cleaning, drying and heating before physical separation, which are excluded by claim 1.

5.17 For these reasons it is concluded that D3, alone or in combination with D4, does not prompt the skilled person to arrive at the method defined in claim 1. Consequently, the subject-matter of claim 1 and of the dependent claims, which is more limited in scope, involves an inventive step in view of D3 as the closest prior art.

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 with the following claims and a description to be adapted thereto:
 - claims 1 to 5 of the auxiliary request filed with the reply to the statement of grounds of appeal.

The Registrar:

The Chairman:



H. Jenney

M. Ansorge

Decision electronically authenticated