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**Datasheet for the decision  
of 19 September 2023**

**Case Number:** T 3030/19 - 3.3.02

**Application Number:** 12170826.7

**Publication Number:** 2671450

**IPC:** A01N59/16, A61K33/38, B22F1/00,  
B22F9/24, B82Y5/00

**Language of the proceedings:** EN

**Title of invention:**

Method for preparing nanoparticles, nanoparticles obtained  
thereby and use thereof

**Applicant:**

King Saud University

**Headword:**

KING SAUD UNIVERSITY / METAL NANOPARTICLES PREPARED BY EXTRACT  
FROM ALGA

**Relevant legal provisions:**

EPC Art. 56

**Keyword:**

Inventive step - (no)

**Decisions cited:**

T 0012/07, T 1968/08

**Catchword:**



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Case Number: T 3030/19 - 3.3.02

**D E C I S I O N**  
**of Technical Board of Appeal 3.3.02**  
**of 19 September 2023**

**Appellant:** King Saud University  
(Applicant) P.O. Box 800  
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**Representative:** Goddar, Heinz J.  
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**Decision under appeal:** **Decision of the Examining Division of the  
European Patent Office posted on 9 July 2019  
refusing European patent application No.  
12170826.7 pursuant to Article 97(2) EPC.**

**Composition of the Board:**

**Chairman** M. O. Müller  
**Members:** M. Maremonti  
R. Romandini

## Summary of Facts and Submissions

- I. The appeal lodged by the applicant ("appellant") lies from the decision of the examining division to refuse European patent application No. 12 170 826.7.
- II. During examination proceedings, the appellant filed sets of claims of a main request and auxiliary requests 1 and 2. The main request and auxiliary request 1 contained an identical claim 1. Auxiliary request 2 contained a single claim reading as follows, the amendments to claim 1 of both the main request and auxiliary request 1 having been highlighted by the board:

*"1. Method for preparing nanoparticles, comprising the steps:*

- (a) providing an extract from at least one alga;*
- (b) adding at least one nanoparticle precursor to the extract;*
- (c) mixing the nanoparticle precursor and the extract to obtain nanoparticles stabilized by at least parts of the constituents of the extract, wherein the alga is selected from the group consisting of *Laurencia sp.* and/or *Scinaia pseudocrispa*,*

***wherein the extract is an organic extract, preferably is a chlorinated hydrocarbonic and/or alcoholic extract, more preferably a chloroformic and/or ethanolic extract;***

***wherein the nanoparticle precursor is an inorganic metal salt and/or an inorganic acid containing a metal;***

***wherein the nanoparticles are metal nanoparticles;***

**wherein the nanoparticles are silver and/or gold nanoparticles;**

**wherein the nanoparticle precursor is chloroauric acid and/or silver nitrate."**

III. The following documents, *inter alia*, were referred to during examination proceedings:

- D1: Rajesh *et al.*, "Biosynthesis of silver nanoparticles using *Ulva fasciata* (Delile) ethyl acetate extract and its activity against *Xanthomonas campestris* pv. *malvacearum*", *Journal of Biopesticides*, 5 (Supplementary), 2012, pages 119 to 128, XP55036759.
- D2: Sahayaraj and Rajesh, "Bionanoparticles: synthesis and antimicrobial applications" in: "Science against microbial pathogens: communicating current research and technological advances", A. Mendez-Vilas (ed.), 2011, pages 228 to 244, XP55036760.
- D3: Shukla *et al.*, "Synthesis and characterization of agar-based silver nanoparticles and nanocomposite film with antibacterial applications", *Bioresource Technology*, vol. 107, 2012, pages 295 to 300, XP55036765.
- D4: Vivek *et al.*, "Biogenic Silver Nanoparticles by *Gelidiella acerosa* Extract and their Antifungal Effects", *Avicenna Journal of Medical Biotechnology*, vol. 3, 2011, pages 143 to 148, XP55036774.

IV. The examining division came, *inter alia*, to the following conclusion:

- The subject-matter of claim 1 of auxiliary request 2 did not involve an inventive step when starting from D1 as the closest prior art.
- V. In its statement of grounds of appeal, the appellant contested the reasoning of the examining division and submitted, *inter alia*, that the claimed subject-matter involved an inventive step.
- VI. The appellant was summoned to oral proceedings as per its request.
- VII. In preparation for the oral proceedings, the board issued a communication under Article 15(1) RPBA 2020, in which it expressed, *inter alia*, the preliminary opinion that the subject-matter of the respective claim 1 of each of the appellant's claim requests did not involve an inventive step starting from document D1 as the closest prior art.
- VIII. No reply was received.
- IX. Oral proceedings before the board were held on 19 September 2023 by videoconference in the presence of the appellant. At the oral proceedings, the appellant did not contest the board's preliminary opinion on lack of inventive step of the subject-matter of all the claim requests.
- X. Final requests relevant to the decision  
  
The appellant requested that the appealed decision be set aside and that a patent be granted on the basis of the claims of the main request. Alternatively, it requested that a patent be granted on the basis of the claims of one of auxiliary requests 1 or 2. All the claim requests were filed with the statement of grounds of appeal and are identical to the claim requests underlying the appealed decision.

XI. As regards the appellant's submissions, reference is made to the reasons for the decision set out below.

## **Reasons for the Decision**

Auxiliary request 2 - claim 1 - inventive step under Article 56 EPC

1. Closest prior art

1.1 The examining division indicated, *inter alia*, document D1 or document D2 (appealed decision, page 5, point 2.2; page 6, point 3.2) as the closest prior art for the claimed subject-matter. The appellant argued inventive step in view of D2 as the most relevant state of the art.

1.2 The board considers that D1 or D2 may equally be chosen as the starting point for assessing inventive step. In particular, D1 (abstract; page 120, right-hand column; page 124, left-hand column) discloses a method for preparing silver nanoparticles comprising mixing an ethyl acetate extract from the marine alga *Ulva fasciata* with silver nitrate as nanoparticle precursor. The nanoparticles produced are stabilised by the constituents of the extract, in particular palmitic acid.

1.3 The selection of D1 as the closest prior art was communicated to the appellant in the communication issued by the board in preparation for the oral proceedings. This choice was not contested by the appellant at the oral proceedings.

2. Distinguishing feature

It was not disputed by the appellant at the oral proceedings that the method of claim 1 of auxiliary request 2 differs from the above disclosure in D1 only

in that an extract from a different alga is used for preparing the silver nanoparticles, namely from *Laurencia sp.* or *Scinaia pseudocrispa*.

3. Objective technical problem

3.1 The appellant argued in writing that the claimed method allowed nanoparticles to be prepared in various forms and sizes in a cheaper and simpler way with decreased time of preparation. Thus the appellant formulated the objective technical problem as the provision of a method for preparing nanoparticles in a cheaper and simpler way which required decreased time of preparation, the nanoparticles produced having various forms and sizes.

3.2 However, according to the problem-solution approach, the objective technical problem has to be formulated on the basis of the technical effect(s), if any, deriving from the features distinguishing the claimed invention from the closest prior art.

3.3 No comparison is available between the claimed method and the method known from D1 which might have established a technical effect of the distinguishing feature mentioned above. Moreover, as set out previously, the method known from D1 comprises the same steps as the method defined in claim 1 of auxiliary request 2. Therefore it must be assumed that there is no difference in terms of the method's costs, preparation time, shape and size of the nanoparticles produced.

3.4 Since no technical effect derives from the use of a different alga, the objective technical problem has to be seen as the provision of an alternative method for preparing nanoparticles. This formulation, communicated to the appellant in the communication issued by the



board in preparation for the oral proceedings, was not contested by the appellant at the oral proceedings.

4. Obviousness of the claimed solution

4.1 As a solution to this technical problem, claim 1 of auxiliary request 2 proposes the use of *Laurencia sp.* and/or *Scinaia pseudocrispa* for preparing the algal extract.

4.2 The appellant argued in writing that, even assuming the absence of a technical effect of the distinguishing feature, this solution would not have been obvious. None of the prior-art documents disclosed or suggested the use of the claimed algae. Thus there was no prompt or pointer to the use of these algae in the context of nanoparticle preparation. Therefore the skilled person could theoretically have tried these algae but clearly would not have done so. According to the well-established could/would approach, an inventive step had to be acknowledged.

4.3 This argument is not convincing.

All the documents D1 to D4 (D1: *loc. cit.*; D2: abstract, page 233, points 4.2 and 4.3, page 237, table 2; D3: abstract, page 296, point 2.1, page 297, point 3.1; D4: abstract, page 2 under "*Materials and Methods*", page 3 under "*FTIR analysis*", page 4) teach the skilled person that various algae are suitable for preparing an extract used to produce silver nanoparticles. Therefore, when looking for a solution to the technical problem posed, the skilled person would have considered any available alga as being suitable for preparing the extract needed to produce silver nanoparticles. The appellant did not dispute that *Laurencia sp.* and *Scinaia pseudocrispa* as mentioned in claim 1 of auxiliary request 2 are algae known to the skilled person. Therefore these algae

would have been selected without involving any inventive activity. In other terms, the solution provided in claim 1 of auxiliary request 2 is just one of several, all equivalent, possibilities for solving the above-mentioned objective technical problem, and no pointer to the specific algae recited in claim 1 is required for the skilled person to select one of them. The "could/would approach" does not apply in the current case, where the objective technical problem is merely the provision of an alternative method for preparing nanoparticles (see e.g. T 12/07, point 4.1.6 of the reasons, and T 1968/08, point 5.5 of the reasons).

5. It follows that the subject-matter of claim 1 of auxiliary request 2 does not involve an inventive step within the meaning of Article 56 EPC. As a consequence, auxiliary request 2 is not allowable.

Main request and auxiliary request 1 - claim 1 - inventive step under Article 56 EPC

6. Both the main request and auxiliary request 1 contain the same independent method claim 1, which is broader than claim 1 of auxiliary request 2 (see point II above).

It follows that the same observations by the board on the lack of inventive step of the subject-matter of claim 1 of auxiliary request 2 apply *mutatis mutandis* to the subject-matter of claim 1 of both the main request and auxiliary request 1. Therefore neither the main request nor auxiliary request 1 is allowable.

Conclusion

7. None of the appellant's claim requests is allowable under Article 56 EPC.

**Order**

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

The appeal is dismissed.

The Registrar:

The Chairman:



M. Schalow

M. O. Müller

Decision electronically authenticated