

Internal distribution code:

- (A) [-] Publication in OJ
- (B) [-] To Chairmen and Members
- (C) [-] To Chairmen
- (D) [X] No distribution

**Datasheet for the decision
of 27 May 2021**

Case Number: T 1218/18 - 3.3.02

Application Number: 15154215.6

Publication Number: 2921483

IPC: C07D233/82

Language of the proceedings: EN

Title of invention:

1,3-diiodohydantoin compound and production method thereof

Applicant:

Nippoh Chemicals Co., Ltd

Headword:

Relevant legal provisions:

EPC Art. 56

Keyword:

Inventive step

Decisions cited:

Catchword:



Beschwerdekammern
Boards of Appeal
Chambres de recours

Boards of Appeal of the
European Patent Office
Richard-Reitzner-Allee 8
85540 Haar
GERMANY
Tel. +49 (0)89 2399-0
Fax +49 (0)89 2399-4465

Case Number: T 1218/18 - 3.3.02

D E C I S I O N
of Technical Board of Appeal 3.3.02
of 27 May 2021

Appellant: Nippoh Chemicals Co., Ltd
(Applicant) 3-3, Nihonbashi-muromachi 3-chome
Chuo-ku, Tokyo 103-0022 (JP)

Representative: Elend, Almut Susanne
Venner Shipley LLP
Byron House
Cambridge Business Park
Cowley Road
Cambridge, Cambridgeshire CB4 0WZ (GB)

Decision under appeal: **Decision of the Examining Division of the
European Patent Office posted on 20 October 2017
refusing European patent application No.
15154215.6 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman P. de Heij
Members: A. Lenzen
S. Bertrand

Summary of Facts and Submissions

- I. This decision concerns the appeal filed by the applicant (appellant) against the examining division's decision (decision under appeal) to refuse European patent application no. 15 154 215.6 (application).
- II. The decision under appeal is based on sets of claims of a main request and of auxiliary requests 1 to 5, each having been filed with the appellant's letter of 18 August 2017. The examining division decided that none of these claim requests met the requirements of Article 56 EPC. In its decision, the examining division referred, *inter alia*, to the following document:
- D1 JP 2002 030072 A
- III. With its statement of grounds of appeal, the appellant filed sets of claims of a main request and an auxiliary request 1.
- IV. In preparation for the oral proceedings scheduled at the appellant's request, the board issued a communication pursuant to Article 15(1) RPBA 2020. In its communication, the board cited the following document
- D3 Virgil, Scott C. "1,3-Diiodo-5,5-dimethyl-hydantoin", Encyclopedia of Reagents for Organic Synthesis, John Wiley & Sons Ltd., 2001, pages 3841 to 3842
- and raised objections under Articles 84 and 56 EPC against the sets of claims filed with the statement of grounds of appeal.

V. By letter of 26 March 2021, the appellant filed a more recent version of D3, published in 2014. It is referred to hereinafter as "D3 (2014)". The appellant also filed the following document

D4 Orazi, O. O. et al. "N-Iodohydantoins. II. Iodinations with 1,3-Diiodo-5,5-dimethylhydantoin", J. Org. Chem. 1965, 30, pages 1101 to 1104

and sets of claims of a main request A and an auxiliary request 1A.

VI. Oral proceedings before the board were held by videoconference on 27 May 2021. The board decided to admit D3 (2014), D4 and the sets of claims of main request A and auxiliary request 1A into the proceedings. At the end of the oral proceedings, the chair announced the order of this decision.

VII. The appellant's final requests during the oral proceedings were as follows.

The appellant requested that the decision under appeal be set aside and that a patent be granted

- based on the set of claims of the main request, filed with the statement of grounds of appeal, or alternatively
- based on the set of claims of main request A, filed by letter of 26 March 2021,
- based on the set of claims of auxiliary request 1, filed with the statement of grounds of appeal, or
- based on the set of claims of auxiliary request 1A, filed by letter of 26 March 2021.

VIII. The appellant's arguments, where relevant for this decision, can be summarised as follows.

The subject-matter of claim 1 of main request A differed from the closest prior art, D3, only in that the iodine content of the 1,3-diiodohydantoin compound of formula (I) was lower. As was apparent from the experimental data in the application, this had the effect of making the compound more stable against decomposition during storage. In a later edition of D3, i.e. D3 (2014), a storage temperature of -20 °C was recommended. That temperature was significantly lower than that which was possible for a compound according to claim 1 of main request A. Providing a more stable compound by reducing its iodine content was not obvious and claim 1 of main request A therefore involved an inventive step. The same applied to the subject-matter of the main request and of auxiliary requests 1 and 1A.

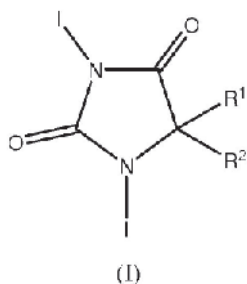
Reasons for the Decision

The claim requests before the board

1. The sets of claims of the main request and auxiliary request 1 were filed with the statement of grounds of appeal. Claim 1 of each set of claims reads as follows:

(a) Main request

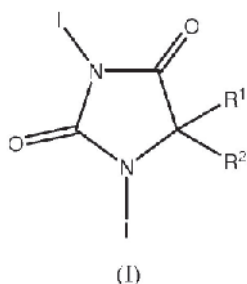
"A storage method for a 1,3-diiodohydantoin compound represented by chemical formula (I):



wherein R1 and R2 are each independently a hydrogen atom or a C1-C6 alkyl group, in which the content of released I₂ is 0.2% by mass or less, and content of water is 1% by mass or less, which comprises a step to store the 1,3-diiodohydantoin compound under a temperature condition of 5 °C or lower."

(b) Auxiliary request 1

"A storage method for a composition consisting essentially of a 1,3-diiodohydantoin compound represented by chemical formula (I):



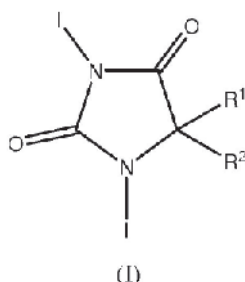
wherein R1 and R2 are each independently a hydrogen atom or a C1-C6 alkyl group, 0.2% by mass or less of released I₂, and 1% by mass or less of water, which comprises a step to store the composition under a temperature condition of 5 °C or lower."

2. In its communication pursuant to Article 15(1) RPBA 2020, for the very first time in the proceedings,

the board raised clarity objections against claim 1 of each of these requests because the meaning of the feature "**released I₂**" (emphasis added) was not clear and because a method was lacking for determining the iodine content. In order to address these clarity objections, the appellant filed sets of claims of a main request A and an auxiliary request 1A by letter of 26 March 2021. The wording of claim 1 of these requests is as follows:

- (c) Main request A (struck-through and bold text representing deletions and additions, respectively, compared with claim 1 of the main request):

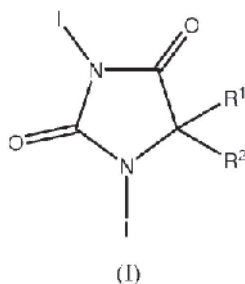
"A storage method for a 1,3-diiodohydantoin compound represented by chemical formula (I):



wherein R1 and R2 are each independently a hydrogen atom or a C1-C6 alkyl group, in which the content of **released I₂** is 0.2% by mass or less, and **the content of water is 1% by mass or less, wherein the content of I₂ is determined by heating a sample at 60 °C for 2 hours under atmospheric pressure and measuring the decrease in mass, wherein the storage method which** comprises a step to store the 1,3-diiodohydantoin compound under a temperature condition of 5 °C or lower."

- (d) Auxiliary request 1A (struck-through and bold text representing deletions and additions, respectively, compared with claim 1 of auxiliary request 1):

"A storage method for a composition consisting essentially of a 1,3-diiodohydantoin compound represented by chemical formula (I):



*wherein R1 and R2 are each independently a hydrogen atom or a C1-C6 alkyl group, 0.2% by mass or less of ~~released~~ I₂, and 1% by mass or less of water, **wherein the content of I₂ is determined by heating a sample at 60 °C for 2 hours under atmospheric pressure and measuring the decrease in mass, wherein the storage method** ~~which~~ comprises a step to store the composition under a temperature condition of 5 °C or lower."*

3. Since main request A and auxiliary request A were filed to address an objection raised for the very first time in the board's communication pursuant to Article 15(1) RPBA 2020 and because the amendments made clearly overcame these objections, the board decided to admit these requests into the proceedings (Article 13(2) RPBA 2020).
4. It follows from the previous points that the amendments made in main request A and auxiliary request 1A render

the claimed subject-matter clear and that the main request and auxiliary request 1, insofar as they can be understood, effectively relate to the same subject-matter as that of main request A and auxiliary request 1A, respectively. Therefore, in the following, the main request and main request A will be assessed at the same time. The same applies to auxiliary request 1 and auxiliary request 1A.

Main request and main request A

5. Claim 1 of these requests essentially relates to a storage method for a 1,3-diiodohydantoin compound of formula (I) wherein this compound has certain maximum contents of iodine and water and wherein it is stored at 5 °C or lower.

6. In the decision under appeal, the examining division started from D1 as the closest prior art. This document discloses a method for preparing 1,3-diiodohydantoin compounds. In its statement of grounds of appeal, the appellant criticised this choice essentially because D1 was not aimed at and did not disclose a method for storing the 1,3-diiodohydantoin compounds disclosed therein. In order to address the appellant's criticism, in its communication pursuant to Article 15(1) RPBA 2020 the board cited D3. D3 is an excerpt from the Encyclopedia of Reagents for Organic Synthesis and relates to 1,3-diiodo-5,5-dimethylhydantoin, i.e. a compound according to formula (I) in claim 1 (R1 = R2 = Me). Contrary to D1, D3 discloses a specific method of storage (see below). In its communication, the board also set out why, starting from D3 as the closest prior art, it preliminarily considered the subject-matter of the main request and auxiliary request 1 to lack an inventive step. With its letter of 26 March 2021, the

appellant filed a more recent version of the above excerpt, namely D3 (2014), and D4. D4 is the publication that both D3 and D3 (2104) refer to for the synthesis of 1,3-diiodo-5,5-dimethylhydantoin. For the board, the filing of D3 (2014) and D4 was a fair reaction to the board's communication in which an objection was raised to the lack of inventive step over a document (D3) cited therein for the very first time. Therefore, during the oral proceedings, the board decided to admit D3 (2014) and D4 into the proceedings (Article 13(2) RPBA 2020).

7. D3 discloses that 1,3-diiodo-5,5-dimethylhydantoin, i.e. a compound according to formula (I) in claim 1 ($R_1 = R_2 = \text{Me}$), should be "*store[d] under nitrogen at 0 °C and protect[ed] from light and moisture to avoid decomposition*". Therefore, D3 relates to a method for storing a compound according to claim 1 and may be considered as the closest prior art. This was not contested by the appellant.
8. For the synthesis of 1,3-diiodo-5,5-dimethylhydantoin, D3 refers to D4. In D4, this compound is synthesised and then dried at 60 °C under vacuum.

In this context, the appellant pointed to comparative example 1 of the application. Therein, it was shown that the iodine content increased significantly when 1,3-diiodo-5,5-dimethylhydantoin was treated under conditions (40 to 70 °C under a reduced pressure of 2,700 to 5,300 Pa) comparable to those in D3/D4 (60 °C under vacuum). Therefore, it had to be acknowledged that the iodine content of 1,3-diiodo-5,5-dimethylhydantoin as disclosed in D3/D4 had to be higher than that provided for in claim 1. Furthermore, the 1,3-diiodo-5,5-dimethylhydantoin of D3/D4 was

dried. Therefore, it was likely to have a similar low water content as that provided for in claim 1. Based on these considerations, the appellant argued during the oral proceedings that the subject-matter of claim 1 was distinguished from D3 only in that the iodine content of the compounds of formula (I) was lower (namely 0.2% by mass or less in claim 1 vs. > 2% by mass in D3/D4).

In favour of the appellant, it is assumed below that this is correct.

9. Technical effect linked to the lower iodine content

9.1 In a first line of argument, the appellant relied on the data in the application. In comparative example 1, 5,5-dimethyl-1,3-diiodohydantoin with an iodine content of 2% by mass or more and a water content of 8% by mass was obtained. Its storage at 5 °C was accompanied by a further release of iodine (page 20, lines 10 to 15). In example 2 of the application, 5,5-dimethyl-1,3-diiodohydantoin with an iodine content of 0.2% by mass or less and a water content of 5% by mass was obtained. Its storage at 5 °C was not accompanied by a further release of iodine (page 19, lines 20 to 25). Since the compound in comparative example 1 and that in example 2 had significantly different iodine contents, their comparison was relevant and it showed that the lower iodine content of the compound in example 2 was linked to a higher stability against decomposition during storage.

In the board's view, this conclusion cannot be drawn if only

- because the compound in comparative example 1 not only has a higher iodine content (2% vs. 0.2%) but

- also a higher water content (8% vs. 5% respectively) than that in example 2, and
- because the appellant itself acknowledged that water has a detrimental effect on the stability against decomposition during storage of compounds according to formula (I) in claim 1 (statement of grounds of appeal, points 2.18 and 2.19).

The different behaviour between the compound in comparative example 1 and that in example 2 may therefore be solely due to their different water contents and is not necessarily related to the different iodine content.

- 9.2 In a second line of argument, the appellant referred to D3 (2014), i.e. an edition of D3 published 13 years later. With respect to the synthesis of the 1,3-diiodo-5,5-dimethylhydantoin disclosed therein, both D3 (2014) and D3 referred to D4. Both D3 (2014) and D3 thus related to the same compound. The later-published D3 (2014) recommended a significantly lower storage temperature of -20 °C (vs. 0 °C in D3; see above). As could be seen from the examples in the application, a compound according to claim 1 was stable when stored at 5 °C. Therefore, the storage temperature for the compounds of formula (I) in claim 1 could be some 25 °C higher than that in D3 (2014). It followed that the lower iodine content of the compounds of formula (I) in claim 1 was associated with a higher stability against decomposition during storage.

The board does not find this convincing. As the appellant correctly stated, because of their reference to D4, both D3 and D3 (2014) relate to the same compound with the same content of impurities and in particular with the same iodine content. If the

recommendation of different storage temperatures in D3 (0 °C) and D3 (2014) (-20 °C) should have any technical relevance at all, then it is only that different criteria were applied for the stability assessment in each case as the stability of the compound was obviously the same in 2001 as in 2014. Overall, therefore, D3 and D3 (2014) give a temperature range of 0 to -20 °C at which 1,3-diiodo-5,5-dimethylhydantoin, with a higher iodine content than provided for in claim 1, is "stable". Since this temperature range is very close to the temperature at which a compound according to claim 1 has been shown to be stable in the application (5 °C), and since it cannot be assumed with certainty that the stability of 1,3-diiodo-5,5-dimethylhydantoin in the present application and in D3/D3(2014) was assessed according to the same criteria, no meaningful conclusion can be drawn from the recommended storage temperature of -20 °C in D3 (2014). It cannot be accepted as evidence that 1,3-diiodo-5,5-dimethylhydantoin, with an iodine content as provided for in claim 1, must be more stable than that with a higher iodine content.

10. It follows that there is no technical effect associated with the distinguishing feature. The objective technical problem is therefore to provide an alternative storage method.

11. Faced with this objective technical problem, the skilled person would not have had to apply inventive skill in order to provide a storage method according to claim 1 if only for the reason that they would merely have had to increase the purity of the compound disclosed in D3 by removing iodine from it. Increasing the purity of a compound by applying well-known purification methods, however, falls well within the

customary practice of the skilled person. Therefore, the subject-matter of claim 1 of the main request and of main request A does not involve an inventive step and these requests are not allowable.

Auxiliary request 1 and auxiliary request 1A

12. Claim 1 of auxiliary request 1 differs from that of the main request in that it relates to a storage method for a composition consisting essentially of a 1,3-diiodohydantoin compound of formula (I) and no longer to a storage method for the compound. Otherwise both storage methods are identical in that they require (i) the compound/composition to have the same levels of iodine and water and (ii) a step to store the compound/composition under a temperature condition of 5 °C or lower.

The appellant has not provided any reasoning why auxiliary request 1 would overcome the inventive-step objection. The appellant only indicated that the arguments put forward in respect of main request A would also apply to the other requests before the board. As these arguments cannot be accepted as set out above, it must be concluded that the subject-matter of auxiliary request 1 does not involve an inventive step either. Auxiliary request 1 is therefore not allowable.

As can be seen from the wording of each claim 1, the difference between claim 1 of auxiliary request 1A and that of main request A is the same as that between claim 1 of auxiliary request 1 and that of the main request. The reasoning above therefore also applies to auxiliary request 1A. It is not allowable either.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:



N. Maslin

P. de Heij

Decision electronically authenticated