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 July 2021

Case Number: T 2324/17 - 3.3.09

Application Number: 10789086.5

Publication Number: 2482676

IPC: A23L27/30

Language of the proceedings: EN

Title of invention:
REDUCING OR ELIMINATING AFTERTASTE IN A SWEETENER USING REBAUDIOSIDE D

Patent Proprietor:
Sweet Green Fields International Co., Limited

Opponent:
Krämer, Dana

Headword:
Reducing or eliminating aftertaste in a sweetener using Rebaudioside D/SWEET GREEN FIELDS

Relevant legal provisions:
EPC Art. 54, 56

Keyword:
Novelty - multiple selection
Inventive step - main request (yes)

Decisions cited:
T 0415/11

Europäisches Patentamt
European Patent Office
Office européen des brevets

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 2324/17 - 3.3.09

D E C I S I O N
of Technical Board of Appeal 3.3.09
of 27 July 2021

Appellant: (Patent Proprietor)	Sweet Green Fields International Co., Limited 16th Floor Wing On Centre 111 Connaught Road Central Hong Kong (HK)
Representative:	Johnson, Stephen William Venner Shipley LLP Byron House Cambridge Business Park Cowley Road Cambridge CB4 0WZ (GB)
Appellant: (Opponent)	Krämer, Dana Schüleinplatz 3c 81673 München (DE)
Representative:	Vossius & Partner Patentanwälte Rechtsanwälte mbB Siebertstrasse 3 81675 München (DE)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 8 August 2017 concerning maintenance of the European Patent No. 2482676 in amended form.**

Composition of the Board:

Chairman	M. Ansorge
Members:	F. Rinaldi
	F. Blumer

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 European patent No. 2 482 676 as amended met the requirements of the EPC.

II. Both parties to the opposition proceedings appealed the decision. The parties will be referred to below by their party position before the opposition division.

III. With the notice of opposition, the opponent had requested revocation of the patent based on Article 100(a) EPC for lack of novelty and lack of inventive step.

IV. The following documents are mentioned in this decision:

D2: WO 2006/072921 A2

D5: WO 2009/086049 A2

D6: US 2008/0226802 A1

D7: B. Crammer et al., "Progress in the chemistry and properties of rebaudiosides", in: Developments in Sweeteners-3, T. H. Grenby (Ed) London: Elsevier Applied Science, 1987, 45-64

D8: Report No. NIDR-CR-85-01, A. D. Kinghorn et al., "Studies to identify, isolate, develop, and test naturally occurring noncariogenic sweeteners that may be used as dietary sucrose substitutes", College of Pharmacy, University of Illinois at

Chicago, USA, 35 pages [Chemical Abstracts (1985) 103, 86674c]

D11: M. Sharma et al., "Chemistry and *in vivo* profile of *ent*-kaurene glycosides of *Stevia rebaudiana* Bertoni — an overview", Natural Product Radiance, 8(2), March-April 2009, 181-189

D13: Experimental study 1 - addition of rebaudioside D to rebaudioside A

D14: Experimental study 2 - addition of rebaudioside D to rebaudioside B

D15: Experimental study 3 - addition of rebaudioside D to stevioside

D16: WO 2008/112872 A1

V. In the decision under appeal, the opposition division decided, among other things, that

- claim 1 of the patent as granted (main request) did not involve an inventive step and
- the patent as amended by auxiliary request 1, filed by letter dated 10 March 2016, met the requirements of the EPC.

VI. Claim 1 of the patent as granted reads:

"A method to decrease or eliminate aftertaste in a sweetener or an artificially sweetened composition, comprising the step of adding at least 0.5% rebaudioside D by weight to the sweetener or the composition."

In claim 1 of auxiliary request 1, which the opposition division held to be allowable, the sweetener is restricted to a stevia product.

VII. On appeal, the patent proprietor filed five auxiliary requests, which are not relevant for the decision.

VIII. In preparation for the oral proceedings, the board issued a communication under Article 15(1) RPBA 2020, in which it set out its preliminary opinion.

IX. Oral proceedings were held before the board on 27 July 2021.

X. Final requests:

The patent proprietor requested that the decision under appeal be set aside and that the patent be maintained as granted (main request) or on the basis of any one of the following auxiliary requests:

- auxiliary request 1 as held to be allowable by the opposition division (filed with letter dated 10 March 2016 and re-filed as auxiliary request 1 with letter dated 14 May 2018);
- auxiliary requests 2 to 4 as filed with letter dated 10 March 2016 (re-filed as auxiliary requests 2 to 4 with letter dated 14 May 2018);
- auxiliary request 5 as filed with letter dated 14 May 2018.

The opponent requested that the decision under appeal be set aside and that European patent No. 2 482 676 be revoked.

XI. The parties' arguments relevant to the present decision can be summarised as follows:

Patent proprietor:

- Claim 1 was novel over D5, D6 and D16. Several selections had to be made within these documents in order to arrive at the subject-matter of claim 1.
- Claim 1 involved an inventive step. D2 was the closest prior art. The technical effect of reducing bitter aftertaste had been shown in the patent and in D13 to D15. There was no evidence showing that the effect was not obtained over the entire scope of claim 1. Neither D8 nor D11 suggested the solution set out in claim 1.

Opponent:

- Claim 1 was not novel over D5, D6 and D16. To arrive at the subject-matter of claim 1, only one selection was needed (i.e. choose rebaudioside D).
- Claim 1 lacked inventive step. D2 was the closest prior art. The technical effect of reducing bitter aftertaste was not achieved. The opposition division was correct in deciding that the effect was not obtained over the scope of claim 1. D8 and D11 described advantageous properties of rebaudioside D and rendered the subject-matter of claim 1 obvious.

Reasons for the Decision

1. In paragraph [0011], the patent addresses masking, decreasing or eliminating bitterness, in particular a bitter aftertaste, in a sweet composition. This is achieved by adding an increased amount, relative to the given composition, of rebaudioside D.

2. *Main request (patent as granted) - novelty*

2.1 In the decision under appeal, the opposition division concluded that the subject-matter of claim 1 was novel.

2.2 The opponent contested this part of the decision and argued that claim 1 lacked novelty over D5, D6 and D16.

2.3 Novelty over D5

2.3.1 D5 (which is prior art according to Article 54(3) EPC) relates to "synergistic sweetening compositions that include sucralose and purified extracts of stevia" (paragraph [0002]). The purified extract of stevia may

- be selected from the group consisting of rebaudioside A, rebaudioside B, rebaudioside C, rebaudioside D, rebaudioside E, dulcoside A, dulcoside B, and combinations thereof (paragraph [0007]); or
- have a low level of rebaudiosides and dulcosides, e.g. less than about 50% of the stevia extract includes rebaudiosides and dulcosides, most preferably less than about 1% (paragraph [0022]).

In the examples of D5, the stevia extract is purified rebaudioside A or a low rebaudioside and dulcoside extract (paragraph [0046]).

2.3.2 As set out in Case Law of the Boards of Appeal of the EPO, 9th edition, 2019, Chapter I.C.4.1, paragraph four, "it is a prerequisite for the acceptance of lack of novelty that the claimed subject-matter is 'directly and unambiguously derivable from the prior art'. In other words, it has to be 'beyond doubt – not merely probable – that the claimed subject-matter was directly and unambiguously disclosed in a patent document'".

2.3.3 D5 discloses that the purified extract of stevia may be selected from, or include, rebaudioside D (paragraphs [0007] and [0018]). However, there is no direct and unambiguous disclosure in D5 to add a specific minimum amount of this substance to a sweetener.

2.3.4 The opponent argued that the amount of rebaudioside D to be added could be calculated based on the disclosure of paragraph [0008] of D5, which reads:

"In another embodiment, the sweetening composition comprises sucralose and a purified extract of stevia wherein the sweetness contribution ratio of sucralose and the purified stevia extract is about 90:10 to about 10:90, respectively."

2.3.5 However, this paragraph sets out yet another embodiment of the invention disclosed in D5 and does not describe a mandatory feature of the invention. Moreover, neither this paragraph nor any other part of D5 defines what the sweetness contribution ratio of the purified extract of stevia is.

2.3.6 The opponent presented calculations which are based on two assumptions:

- the sweetness contribution ratio must be interpreted as the "sweetening intensity", which is described in D5
- the sweetness of rebaudioside D was known to be equal to that of rebaudioside A.

However, there is no basis for these assumptions in D5. More specifically, there is no information in D5 defining the sweetness contribution ratio and how to establish the sweetness contribution ratio of a purified extract of stevia, let alone one which is selected from or includes rebaudioside D.

2.3.7 Furthermore, D5 also discloses that the extracts of stevia may be purified to various possible degrees of purity (paragraph [0019]). This further blurs the disclosure concerning the amount of specific substances (e.g. rebaudioside D) within the extract of stevia.

2.3.8 Thus, there is no unambiguous disclosure in D5 of a method which involves the step of adding at least 0.5% rebaudioside D by weight to the sweetener. In other words, D5 does not disclose the combination of (i) adding rebaudioside D and (ii) the specific minimum amount set out in claim 1.

2.3.9 Thus, the subject-matter of claim 1 is novel over D5.

2.4 Novelty over D6

2.4.1 D6 relates to a beverage product which includes at least one steviol glycoside, e.g. rebaudiosides such as

rebaudioside A, and a berry component. The berry component can be, for example, berry seed oil (paragraph [0006]).

2.4.2 Claim 18 of D6 discloses rebaudioside D (in a list of five possible rebaudiosides), a berry component and an artificial sweetener. However, D6 does not directly and unambiguously disclose that rebaudioside D is added to the artificial sweetener and that a specific minimum amount of it is added. The combination of (i) adding rebaudioside D and (ii) the specific minimum amount set out in claim 1 is not disclosed in D6. In this respect, the situation is very similar to that set out above in the context of D5 (point 2.3).

2.4.3 Paragraph [0021] of D6 specifies that "steviol glycoside(s) is present in at least certain exemplary embodiments in an amount of from about 0.1% to about 20% by weight of the beverage, typically from about 6% to about 16% by weight, depending upon the desired level of sweetness for the beverage".

However, it can be derived from this passage that there is no mandatory minimum amount of steviol glycoside(s). In some embodiments, the total amount of steviol glycosides can be as low as 0.1% by weight of the beverage composition. Moreover, the amount depends on the desired sweetness. Here, it has to be taken into account that the composition of claim 18, to which the opponent referred, already includes an artificial sweetener, which itself contributes to providing the desired sweetness.

2.4.4 Thus, there is no direct and unambiguous disclosure in D6 of a method which involves the step of adding at least 0.5% rebaudioside D by weight to the sweetener.

2.4.5 To conclude, the subject-matter of claim 1 is novel over D6.

2.5 Novelty over D16

2.5.1 D16 claims priority from D6 and its disclosure is largely identical to that of D6. Claim 1 of D16 is directed to a beverage product comprising rebaudioside A and a specified berry component. As explained above in point 2.4.1, rebaudioside A is a steviol glycoside and a sweetener. According to claim 2, this beverage product may further comprise a steviol glycoside selected from a group which includes rebaudioside D.

2.5.2 As is the case with D6, however, D16 does not directly and unambiguously disclose the step of adding rebaudioside D to the sweetener, i.e. rebaudioside A, and that a specific minimum amount of it is added. The combination of (i) adding rebaudioside D and (ii) the specific minimum amount set out in claim 1 is not disclosed in D16. The disclosure of paragraph [0025] of D16 does not differ from that of paragraph [0021] of D6 (see point 2.4.3). Therefore, according to D16, the total amount of steviol glycosides (rebaudioside A and, if selected, rebaudioside D) can be, for example, as low as 0.1% by weight of the beverage composition.

2.5.3 For essentially the same reasons as given for D6, the subject-matter of claim 1 is also novel over D16.

2.6 In summary, none of documents D5, D6 and D16 discloses the step of adding at least 0.5% rebaudioside D by weight to the sweetener. In view of this, it is not necessary to discuss whether the term "to decrease or

eliminate aftertaste" of claim 1 constitutes a further distinguishing feature.

2.7 Therefore, the subject-matter of claim 1 is novel over D5, D6 and D16. The same applies to dependent claim 2.

3. *Main request (patent as granted) - inventive step*

3.1 In the decision under appeal, the opposition division concluded that the subject-matter of claim 1 of the patent as granted lacked inventive step. It reasoned, in point 3.6 of the decision, that it was implausible that the alleged technical effect (to reduce bitter aftertaste) could be observed in combination with non-steviol glycoside sweeteners, particularly those with completely different chemical structures such as protein-based sweeteners (e.g. thaumatin). In its view, in accordance with T 415/11, the burden of proof was shifted to the patent proprietor to show that a technical effect was provided in combination with non-steviol glycoside sweeteners.

Nevertheless, the opposition division considered that claim 1 of auxiliary request 1, in which the sweetener was restricted to a stevia product, involved an inventive step in view of D2 as the closest prior art.

3.1.1 The opponent agreed with the opposition division's decision regarding the claims as granted (main request).

3.1.2 The patent proprietor contested the opposition division's decision regarding the main request. It argued that the patent and D13 to D15 demonstrated that the addition of rebaudioside D decreases aftertaste

arising from sweeteners and that the opponent had filed no evidence to disprove this technical effect.

3.2 The closest prior art

3.2.1 At the oral proceedings before the board, both parties agreed that D2 is the closest prior art. In the written appeal proceedings, however, the opponent had only mentioned D7 as the closest prior art and it was used to attack inventive step of auxiliary request 1, not the main request.

3.2.2 As already explained in the board's communication, D7 is not the closest prior art. D7 discusses properties of individual rebaudiosides, not of mixtures thereof. Moreover, there is no information in D7 concerning taste properties of rebaudioside D or how to reduce aftertaste. In addition, no arguments were provided by the opponent regarding why D7 might qualify as an appropriate closest prior art document and why the opposition division erred in its conclusion when considering D2 as the closest prior art.

3.2.3 As set out in point 1 above, the patent in suit addresses a method to mask, decrease (i.e. reduce) or eliminate bitterness in a sweet composition. Similarly, D2 relates to a method of masking the bitter aftertaste of stevia extract using maltol; on combining maltol with stevia extract in sweetener compositions, the bitter aftertaste is masked to acceptable limits. Very small quantities of maltol are required in order to obtain this effect (paragraphs [10] and [24]).

3.2.4 Accordingly, the question of inventive step is to be assessed starting from D2 as closest prior art.

3.2.5 The parties also agreed that claim 1 differs from D2 in the step of adding at least 0.5% rebaudioside D by weight to the sweetener.

3.3 Starting from D2, the technical problem is to provide a (further) method for masking, reducing or eliminating bitter aftertaste of a sweetener.

3.4 An issue in dispute was whether the technical problem was solved.

3.4.1 The patent's experimental section describes among other things sensoric experiments comparing a composition which includes purified rebaudioside A (and no rebaudioside D) with a composition based on a combination of rebaudioside A and D in a weight ratio of 98:2. The results show that the composition which includes rebaudioside A and D does not have a bitter aftertaste (paragraph [0069]).

3.4.2 During opposition proceedings, the patent proprietor filed further experimental evidence to demonstrate the technical effect, namely D13 to D15.

In the experimental tests, samples are prepared in which an increasing amount of rebaudioside D is added to a constant amount of sweetener (D13: rebaudioside A; D14: rebaudioside B; D15: stevioside). In each test, the samples are formulated to contain

- only the sweetener (first sample),
- a weight ratio of sweetener to rebaudioside D of 99.5 to 0.5 (second sample),
- a weight ratio of sweetener to rebaudioside D of 99 to 1 (third sample).

Further samples contain even higher amounts of rebaudioside D.

In the tests, the samples are assessed by a trained panel of 8 assessors. Each assessor assigns an individual aftertaste score to each sample, and these scores are shown in D13 to D15. Moreover, for each sample, an average aftertaste score is calculated using the individual aftertaste scores.

3.4.3 When assessing inventive step (of auxiliary request 1), the opposition division concluded that "irrespective of whether the results at lower concentrations are statistically insignificant or not, the experimental results in the contested patent and D13-D15 show a definite trend of a reduction in aftertaste with increasing REBD [rebaudioside D - note by board] concentration" (decision under appeal, point 5.4).

The board agrees with this analysis. Based on the results of the average aftertaste score shown in D13 to D15, the conclusion is that adding rebaudioside D in low concentrations to a sweetener reduces the bitter aftertaste of the sweetener. This is the only possible outcome when evaluating the results of the average aftertaste score.

3.4.4 In its statement setting out the grounds of appeal, the opponent objected that the patent proprietor's experimental evidence was not statistically relevant. To support this claim, the opponent presented calculations based on the aftertaste score of the first three samples of D13.

However, the opponent's arguments are not convincing. As the patent proprietor explained, in preparing its

calculations, the opponent did not take into account the dependent nature of the assessors' aftertaste scores: in D13, each assessor assigned an individual aftertaste score to the first, the second and the third sample, and this made the scores dependent variables.

Consequently, the board agrees that the opponent's calculations are based on a wrong assumption and the use of an incorrect formula that is not suitable to assess the statistical significance of dependent variables. Therefore, the opponent's argument that the results in D13 to D15 are not statistically relevant is not tenable and does not succeed.

3.4.5 A further issue in dispute was whether the technical problem was solved over the scope of the claim. As set out above, the opposition division held it implausible that the technical effect could be observed in combination with non-steviol glycoside sweeteners and referred to T 415/11.

However, on this point, the opposition division's reasoning is not persuasive.

In the case underlying the cited decision (T 415/11), the competent board had to decide whether a claim relating to a lyophilised composition containing sucrose, a specified buffer and unconjugated meningococcus C (MenC) immunogen (i.e. protein-free MenC polysaccharides) involved an inventive step. The contested point was whether the inclusion of sucrose and the buffer prevented aggregation upon lyophilisation. In the competent board's opinion, the patent itself and the cited prior art only supported the conclusion that aggregation during lyophilisation occurred with protein (Reasons for the decision,

points 37 and 42 to 45.1). Thus, in the case underlying the cited decision, the problem of aggregation did not arise with protein-free MenC polysaccharides.

In the present case, the situation is different. Here, the point is not that the problem of bitter aftertaste does not occur with sweeteners. There is no evidence (e.g. from a teaching in the prior art) that the problem of bitter aftertaste arises solely with steviol glycosides either. Moreover, as set out above, the technical effect of reducing bitter aftertaste is demonstrated in the patent and confirmed by experimental tests with several steviol glycoside sweeteners (D13 to D15). The opponent's argument that the effect would not be observed for other sweeteners is a mere allegation. There is no evidence, let alone a scientific publication or experimental evidence, which would support the opponent's allegation.

3.4.6 At the oral proceedings, for the first time on appeal, the opponent made the allegation that it was inconceivable that the technical problem was solved when at least 0.5% rebaudioside D by weight was added to the artificially sweetened composition. In its view, the amount of rebaudioside D, when based on the artificially sweetened composition and not the sweetener, was very high.

However, there is no evidence for the opponent's allegation that the effect is not achieved when at least 0.5% rebaudioside D by weight is added to the artificially sweetened composition, i.e. when the amount of rebaudioside D is rather high compared to the case where at least 0.5% rebaudioside D is added based on the sweetener. Thus, there is no reason to believe that the effect is not obtained.

3.4.7 Therefore, in view of the above, the board concludes that the technical problem can be considered solved over the scope of claim 1.

3.5 Obviousness

3.5.1 The opponent argued that the subject-matter of claim 1 was obvious. It argued that the skilled person starting from D2 would

- replace maltol because it masked aftertaste to an acceptable limit only,
- select a suitable substance from within the stevia extract because such a substance would not need to be declared on the ingredient list,
- be prompted to consult D11 or D8, which both rendered the claimed subject-matter obvious.

3.5.2 However, the teaching of D2 is to add a further substance to the stevia extract in order to mask the bitter aftertaste of the stevia extract. There is simply no pointer to look for a solution to the technical problem within the stevia extract itself, which D2 acknowledges to have a bitter aftertaste. Quite in contrast, looking for a solution within the components of the stevia extract itself may already be regarded as indicative of inventive merit.

3.5.3 Even if the skilled person were to turn to D8 or D11, these documents would not have provided assistance to the skilled person.

3.5.4 Turning firstly to D11, this document discloses that isolated rebaudioside D has a better quality of taste compared to isolated rebaudioside A. However, there is

no disclosure in this document of the taste quality of combinations of rebaudiosides. There is no indication that the aftertaste of a sweetener may be modified or even improved by adding rebaudioside D.

3.5.5 As for D8, the situation is similar. Table 8 shows the sensoric properties of some steviol glycoside sweeteners (including rebaudioside A, B, C and D and dulcoside A), namely: sweetness intensity, sweetness pleasantness, off-taste intensity, off-taste pleasantness, aftertaste intensity, aftertaste pleasantness, bitterness. While rebaudioside D has low scores in aftertaste intensity and bitterness, other rebaudiosides perform better when it comes to other properties (e.g. aftertaste pleasantness). Furthermore, there is no disclosure in D8 of the taste quality of combinations of rebaudiosides. What is more, there is nothing in D8 to suggest that the aftertaste of a sweetener may be modified or even improved by adding rebaudioside D.

3.5.6 To conclude, the solution to the technical problem, i.e. to add at least 0.5% rebaudioside D by weight to the sweetener, is not suggested in the cited prior art.

3.6 Therefore, the subject-matter of claim 1 involves an inventive step. The same applies to dependent claim 2.

4. Since the main request is allowable, it is not necessary to discuss auxiliary requests 1 to 5.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The patent is maintained as granted.

The Registrar: The Chairman:

A. Nielsen-Hannerup M. Ansorge

Decision electronically authenticated