UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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ALBAUGH, LLC,

Petitioner,

v.

BASF SE,

Patent Owner.

_____

Case: PGR2026-00026

U.S. Patent No. 12,305,206

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PETITION FOR POST GRANT REVIEW

Table of Contents

I. INTRODUCTION 1

A. Claim 1 is Anticipated by Long (Ground 1) 4

B. Claims 1-6 are Obvious Over Long Either Alone (Ground 2) or in View of the L-Glufosinate Synthesis References (Ground 3) 6

1. Independent Claim 1 6

2. Dependent Claims 2-6 9

II. BACKGROUND 11

III. SUMMARY OF THE CHALLENGED PATENT 14

A. The '206 Patent 14

B. Prosecution History 19

1. Provisional Applications and Express Abandonments 21

2. Application No. 15/445,254 ("the '254 application") 22

3. Application No. 15/787,448 ("the '448 application") 24

4. Application No. 16/287,290 ("the '290 application") 25

5. Application No. 16/997,133 ("the '133 application") 25

6. Application No. 17/530,018 ("the '018 application") 26

7. Application No. 18/179,136 ("the '136 application") 31

8. U.S. Application No. 18/435,340 ("the '340 application") ... 31

IV. REQUIREMENT FOR PGR 36

A. Grounds for Standing 36

B. Identification of Challenge 36

V. PERSON OF ORINARY SKILL IN THE ART ("POSITA") 37

VI. CLAIM CONSTRUCTION 38

A. "comprising" 38

B. "L-glufosinate ammonium in an amount from 10-30% by weight of the formulation and D-glufosinate, wherein the formulation has greater than about 90% L-glufosinate compared to the sum of the D-glufosinate and the L-glufosinate present in the formulation" 42

C. "one or more additional components selected from the group consisting of . . ." 42

D. "water as the balance of the formulation" 44

VII. KEY PRIOR ART 45

A. Long (Ex.1005) 45

B. Ruhland (Ex.1030) 49

C. The L-Glufosinate Synthesis References 51

1. Schulz (Ex.1006) 51

2. Zeiss (Ex.1007) 52

3. Grabley (Ex.1008) 54

4. Nakanishi (Ex.1009) 55

5. Minowa (Ex.1010) 57

6. Knorr (Ex.1011) 58

VIII. EFFECTIVE FILING DATE: FEBRUARY 28, 2017 59

IX. GROUNDS FOR POST-GRANT REVIEW 61

A. Ground 1 (35 U.S.C. §102(a)): Claim 1 is Anticipated by Long 61

1. "L-glufosinate ammonium in an amount from 10-30% by weight of the formulation and D-glufosinate, wherein the

formulation has greater than about 90% L-glufosinate compared to the sum of the D-glufosinate and the L-glufosinate present in the formulation" 62

2. "one or more additional components selected from . . ." 69

3. "water as the balance of the formulation" 75

4. Examiner Error 75

B. Grounds 2 and 3 (35 U.S.C. §103): Claims 1-6 are Obvious Over Long, Either Alone (Ground 2) or in View of the "L-Glufosinate Synthesis References" (Ground 3) 79

1. Claim 1 79

2. Dependent Claims 2-6 90

X. CONCLUSION 94

XI. MANDATORY NOTICES 95

A. Real Party-In-Interest Under 37 C.F.R. §42.8(b)(1) 95

B. Related Matters Under 37 C.F.R. §42.8(b)(2) 95

C. Lead and Back-Up Counsel Under 37 C.F.R. §42.8(b)(3) 95

D. Service Information 96

E. Payment Of Fees – 37 C.F.R. §42.203 96

TABLE OF AUTHORITIES

CASES

Advanced Bionics, LLC v. MED-EL Elektromedizinische Geräte GmbH, Case IPR2019-01469, Paper 6 (P.T.A.B. Feb. 13, 2020)..... 75-76, 77

Anthony Inc. v. Control Tec, LLC, IPR2025-00559, Paper 12 (Director July 16, 2025) 1

Becton, Dickinson & Co. v. B. Braun Melsungen AG, IPR2017-01586, Paper 8 (PTAB Dec. 15, 2017).....76

Ecto World, LLC v. RAI Strategic Holdings, Inc. IPR2024-01280, Paper 13 (May 19, 2025) 76

Graham v. John Deere Co. of Kansas City, 383 U.S. 1, 86 S.Ct. 684 (1966) 81

In re Baxter Travenol Labs., 952 F.2d 388 (Fed. Cir. 1991)……...86

In re Bhagat, 726 Fed. App'x 772 (Fed. Cir. 2018)..... 68-69

In re Donohue, 766 F.2d 531 (Fed. Cir. 1985) 6, 66-67

In re Grasselli, 713 F.2d 731 (Fed. Cir. 1983) 89

In re Huai-Hung Kao, 639 F.3d 1057 (Fed. Cir. 2011) 84

In re Peterson, 315 F.3d 1325 (Fed. Cir. 2003).....89, 93

In re Susi, 440 F.2d 442 (CCPA 1971).....64

In re Wiggins, 488 F.2d 538 (CCPA 1973) 4, 79

IXI IP, LLC v. Samsung Elecs. Co., 903 F.3d 1257 (Fed. Cir. 2018) 83

KSR Int'l Co. v. Teleflex Inc., 550 U.S. 398 (2007) 81

Merck & Co. v. Biocraft Labs., Inc. 874 F.2d 804 (Fed. Cir. 1989), cert. denied, 493 U.S. 975 (1989) 63

Ormco Corp. v. Align Technology, Inc., 463 F.3d 1299 (Fed. Cir. 2006) 87

Pfizer, Inc. v. Apotex, Inc., 480 F.3d 1348 (Fed. Cir. 2007).....83

Rambus Inc. v. Rea, 731 F.3d 1248 (Fed. Cir. 2013).....86

Realtime Data, LLC v. Iancu, 912 F.3d 1368 (Fed. Cir. 2019).....6, 80

Sanofi-Synthelabo v. Apotex, Inc., 550 F.3d 1075 (Fed. Cir. 2008) 83

Upsher-Smith Labs. v. Pamlab, LLC, 412 F.3d 1319 (Fed. Cir. 2005) 64

STATUTES

35 U.S.C. §102 .....passim

35 U.S.C. §103 .....passim

35 U.S.C. §120 60

OTHER AUTHORITIES

MPEP § 2117.....42

MPEP §2111.03.....39

MPEP §2123.....63

MPEP §2131.01.....6, 66

MPEP §2131.04.....4, 79

MPEP §2144.05.....11, 94

MPEP §2145.....84, 86

MPEP §716.02(d) 89

TREATISES

Goldstein et al., "*Prima Facie* Lack of Novelty: When Prior Art Ranges Give Rise to Rebuttable Anticipation," AIPLA QJ, 53(2): 277-324, 296 (Spring 2025).....68

REGULATIONS

37 C.F.R. § 42.200(b) 38

37 C.F.R. §42.203 96

37 C.F.R. §42.204(a) 36

37 C.F.R. §42.204(b) 36

37 C.F.R. §42.8 95

37 C.F.R. §42.8(b)(1) 95

37 C.F.R. §42.8(b)(2) 95

37 C.F.R. §42.8(b)(3) 95

LIST OF EXHIBITS

Exhibit	Description
1001	U.S. Patent No. 12,305,206 (the '206 patent.)
1002	Excerpts from the File History for U.S. Patent No. 12,305,206
1003	Declaration of Suri S. Iyer, Ph.D.
1004	Curriculum Vita of Suri S. Iyer, Ph.D.
1005	U.S. Patent No. 8,445,406 ("Long")
1006	Schulz et al., "Stereospecific Production of the Herbicide Phosphinothricin (Glufosinate) by Transamination: Isolation and Characterization of a Phosphinothricin-Specific Transaminase from *Escherichia coli*," *Applied and Environmental Microbiology*, 56: 1-6 (1990)("Schulz")
1007	Zeiss, H-J., "Enantioselective Synthesis of L-Phosphinothricin from L-Methionine and L-Glutamic Acid via L-Vinylglycine," *Tetrahedron*, 48(38):8263-70 (1992)("Zeiss")
1008	U.S. Patent No. 4,389,488 ("Grabley")
1009	U.S. Patent Appln. Publication No. 2014/0309453 A1 ("Nakanishi")
1010	U.S. Patent No. 7,772,426 ("Minowa")
1011	U.S. Patent No. 5,767,309 ("Knorr")
1012	September 14, 2020, "BASF acquires Glu-L technology from AgriMetis," https://www.basf.com/us/en/media/news-releases/2020/09/basf-acquires-glu-l-technology-from-agrimetis.html.
1013	Excerpts from the File History for U.S. Appln. No. 62/302,421
1014	Excerpts from the File History for U.S. Appln. No. 62/336,989
1015	Excerpts from the File History for U.S. Appln. No. 62/413,240
1016	Excerpts from the File History for U.S. Application No. 15/445,254
1017	U.S. Patent No. 9,834,802
1018	Excerpts from the File History for U.S. Application No. 15/787,448
1019	U.S. Patent No. 10,260,078
1020	Excerpts from the File History for U.S. Application No. 16/287,290
1021	U.S. Patent No. 10,781,465
1022	Excerpts from the File History for U.S. Application No. 16/997,133
1023	U.S. Patent No. 11,560,577
1024	Excerpts from the File History for U.S. Application No. 17/530,018
1025	U.S. Patent No. 11,905,538
1026	U.S. Patent No. 8,383,137 ("Modaressi")

1027	Excerpts from the File History for U.S. Application No. 18/179,136
1028	U.S. Patent No. 11,913,048
1029	U.S. Patent No. 10,888,095 (“Bhoge et al.”)
1030	Ruhland et al., *Environ. Biosafety Res*. 1:29–37 (2002)
1031	Federal Register, 63(88):25195-6 (1998)
1032	Zeiss, H-J., “Enantioselective Synthesis of Both Enantiomers of Phosphinothricin via Asymmetric Hydrogenation of α-Acylamido Acrylates,” *J. Org. Chem*., 56:1783-1788 (1991)

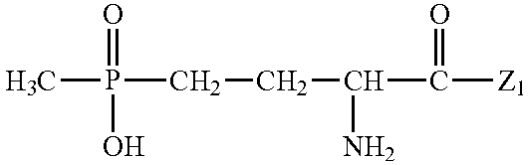
Albaugh, LLC ("Petitioner" or "Albaugh") petitions for Post-Grant Review ("PGR") of claims 1-6 ("challenged claims") of U.S. Patent No. 12,305,206 ("the '206 patent," Ex.1001) assigned to BASF SE ("Patent Owner" or "BASF").

I. INTRODUCTION

This PGR is necessary to correct ***two Examiner errors***, each of which was ***material*** to the patentability and allowance of the challenged claims. *Anthony Inc. v. Control Tec, LLC*, IPR2025-00559, Paper 12, 2 (Director July 16, 2025) ("Petitioner appears to show a material error by the Office, and it is an appropriate use of Office resources to review the potential error").

The ***Examiner's first material error*** was to capitulate and accept Patent Owner's argument that the following passage in the prior art reference Long (U.S. Patent No. 8,445,406; Ex.1005) "discloses that the glufosinate used in [Long's] aqueous herbicidal formulations is **racemic** glufosinate" (Ex.1002, 9)(emphasis in original):

(I)



Note that the compounds of formula (I) contain an asymmetric carbon atom. ***The L enantiomer has been observed to be the biologically active isomer***. The formula (I) therefore is intended to encompass ***all stereoisomers***

> and mixtures thereof, particularly the racemate, and the biologically active enantiomer in each case. Examples of active ingredients of the formula (I) include glufosinate and/or its ammonium salt such as in a racemic mixture; i.e., 2-amino-4-hydroxy(methyl)-phosphinoyl-butanoic acid and its ammonium salt, ***the L enantiomer of glufosinate and its ammonium salt*** or other salts . . . .

Ex.1005, 3 at 3:10-23 (emphasis added).

But the language above in Long is clear and declares that the herbicide can be the "***stereoisomer***," specifically calling out the "***L enantiomer of glufosinate and its ammonium salt***." *Id.* As Dr. Suri S. Iyer explains in his accompanying Declaration[1], the language in Long is unequivocal and a person of ordinary skill in the art ("POSITA") would understand that L-glufosinate ammonium can be used as the water-soluble herbicidal ingredient in Long's formulations ***as the purified L-stereoisomer*****,** and that it was a material error for the Examiner to agree that Long's formulations are limited to **racemic** glufosinate. Ex.1003, ¶¶74, 124-126.

[1] The Declaration of Suri S. Iyer, Ph.D. accompanies this Petition as Ex.1003. Dr. Iyer is the Chair of the Department of Chemistry at the University of Massachusetts, Lowell. His curriculum vitae is at Ex.1004.

The Examiner first cited to this same passage in Long in an anticipation rejection for teaching the "**L-enantiomer glufosinate**," then withdrew the rejection and accepted Patent Owner's argument that Long was limited to formulations of "**racemic** glufosinate." Ex.1002, 3-4, 18 (both emphases in original). The Examiner provided no justification for yielding to Patent Owner's argument that Long was limited to formulations of **racemic** glufosinate despite the express declaration in Long that its formulations can employ herbicides, including specifically L-glufosinate ammonium, as the stereoisomer.

The ***Examiner's second material error*** was an error of law. The Examiner committed a material error of law when he withdrew his anticipation rejection under 35 U.S.C. §102 in view of Patent Owner's submission of "unexpected results." During prosecution, in response to a separate obviousness rejection under 35 U.S.C. §103 in view of Long, Patent Owner submitted data from field tests purporting to demonstrate the unexpected result that L-glufosinate ammonium is less phytotoxic than racemic glufosinate ammonium on glufosinate-resistant soybeans. Ex.1002, 10-12. In the next Action, the Examiner issued a Notice of Allowance, withdrawing his ***anticipation*** rejection under 35 U.S.C. §102(a) and stating without explanation that the withdrawal was due, at least in part, to Patent Owner's "***Appendix A showing unexpected results***."

Claim Rejections: 35 USC § 102 (AIA)

Claims 1-6 rejected under 35 U.S.C. 102(a)(1) and 35 U.S.C. 102(a)(2) as being anticipated by Long DA., (US 8,445,406 B2, in IDS), is being withdrawn due to claim amendments, persuasive arguments and an Appendix A showing unexpected results (for details, see applicants' arguments/remarks dated 03/10/2025; pages 4-5).

Ex.1002, 3-4.

No reasonable Examiner would withdraw an anticipation rejection under 35 U.S.C. §102(a) based on a showing of unexpected results, because it would be contrary to established law and practice before the Office that unexpected results are irrelevant to anticipation. MPEP §2131.04 ("Evidence of secondary considerations, such as unexpected results or commercial success, is irrelevant to 35 U.S.C. §102 rejections and thus cannot overcome a rejection so based."), citing *In re Wiggins,* 488 F.2d 538, 543 (CCPA 1973).

A. Claim 1 is Anticipated by Long (Ground 1)

As detailed *infra* §IX.A. and as Dr. Iyer explains (Ex.1003, ¶¶122-153), Long describes and enables L-glufosinate ammonium formulations that anticipate challenged claim 1, which is reproduced below.

> **1**. A formulation comprising:
> L-glufosinate ammonium in an amount from 10-30% by weight of the formulation and D-glufosinate, wherein the formulation has greater than about 90% L-glufosinate compared to the sum of the D-glufosinate and the L-glufosinate present in the formulation;
> one or more additional components selected from the group consisting of:
> sodium alkyl ether sulfate in an amount from 10-40% by weight of the formulation;
> 1-methoxy-2-propanol in an amount from 0.5-2% by weight of the formulation;
> dipropylene glycol in an amount from 4-18% by weight of the formulation;
> alkyl polysaccharide in an amount from 4-20% by weight of the formulation; and
> water as the balance of the formulation.

Ex.1001, 22 at 33:17-33.

As detailed *infra* §IX.A., the formulations described in Long meet each of the limitations of the genus of formulations recited in challenged claim 1.

Claim 1		**Long (Ex.1005)**
10-30% L-glufosinate ammonium (>90% L-enantiomer)		3 at 3:10-23, 3:24-28; 4-5 at Examples
one or more additional components selected from	10-40% w/w sodium alkyl ether sulfate	3 at 3:35-54; 4-5 at Examples
	0.5-2% w/w 1-methoxy-2-propanol	3 at 3:55–4:20; 4-5 at Examples
	4-18% w/w dipropylene glycol	
	4-20% w/w alkyl polysaccharide	3-4 at 4:21–5:4, 4-5 at Examples
water as the balance of the formulation		4 at 5:5-8, 4-5 at Examples

As Dr. Iyer explains, Long enables the preparation of purified L-glufosinate ammonium ("greater than about 90% L-glufosinate compared to the sum of the D-glufosinate and the L-glufosinate"), since a POSITA would have been aware of multiple prior art references describing the preparation of L-glufosinate (including its ammonium salt) having greater than 90% L-enantiomer purity as recited in claim 1. Ex.1003, ¶¶84-103, 127-130, *infra* §VII.C., discussion of Schulz (Ex.1006), Zeiss (Ex.1007), Grabley (Ex.1008), Nakanishi (Ex.1009), Minowa (Ex.1010), and Knorr (Ex.1011)("***the L-Glufosinate Synthesis References***"). The L-Glufosinate Synthesis References are applied here in an anticipation by Long to show that the public was in possession of methods of making and purifying L-glufosinate ammonium at the purity recited in the challenged claims. MPEP §2131.01; *In re Donohue*, 766 F.2d 531 (Fed. Cir. 1985)(additional prior art references cited in an anticipation to show that the ability to make a claimed compound was in the public's possession before applicant's invention).

B. Claims 1-6 are Obvious Over Long Either Alone (Ground 2) or in View of the L-Glufosinate Synthesis References (Ground 3)

1. Independent Claim 1

a. Long Alone

Long by itself renders challenged claim 1 invalid for failing to satisfy the nonobviousness requirement of 35 U.S.C. §103 for the same reasons it anticipates claim 1. *Realtime Data, LLC v. Iancu*, 912 F.3d 1368 (Fed. Cir. 2019)("[I]t is well

settled that a disclosure that anticipates under §102 also renders the claim invalid under §103, for anticipation is the epitome of obviousness."). As Dr. Iyer explains, based on Long alone, a POSITA would have been motivated to make and use L-glufosinate ammonium formulations having "one or more" of the "additional components" within the purity and weight percentages recited in claim 1, and would have had a reasonable expectation of success in preparing purified L-glufosinate ammonium formulations within the scope of challenged claim 1. Ex.1003, ¶¶155-156; *infra* §IX.B.

b. Long in View of the L-Glufosinate Synthesis References

i. Motivation and Expectation of Success

Challenged claim 1 is obvious over Long in view of the L-Glufosinate Synthesis References. Dr. Iyer explains that Long would have motivated a POSITA to pursue formulations of purified L-glufosinate ammonium, since Long expressly describes it as the "biologically active isomer" for use in Long's formulations. Ex.1003, ¶¶161-162; *infra*, §IX.B.1. Based on the teachings of Long, a POSITA would have been motivated to prepare purified L-glufosinate ammonium and would have looked to one or more of the L-Glufosinate Synthesis References for methods of preparing purified L-glufosinate ammonium. *Id.*

A POSITA following the teachings of Long would have had a reasonable expectation of success in preparing formulations for application to crops by using

purified L-glufosinate ammonium prepared according to one or more of the methods described in the Glufosinate Synthesis References, and specifically for L-glufosinate ammonium at the greater than 90% isomeric purity level recited in challenged claim 1. *Id.* ¶¶163-166.

ii. No Unexpected Results

During prosecution, Patent Owner submitted data from field tests comparing racemic glufosinate ammonium (GA) and L-glufosinate ammonium (LGA) ***in identical formulations*** and observed their relative phytotoxicity to glufosinate-tolerant soybeans at various concentrations (i.e., 300 g/ha, 600 g/ha, and 1200 g/ha)." Ex.1002, 10-12. Patent Owner alleged that its field test data shows that "the claimed herbicidal formulation recited in claim 1 has unexpected results." *Id*. According to Patent Owner, "the L-glufosinate surprisingly resulted in less phytotoxicity to the soybeans when comparing the same amount of racemic glufosinate (i.e., LGA 300 vs. GA 300, etc.) and when comparing the same amounts of L-glufosinate i.e., LGA 300 vs. GA 600 or LGA 600 vs. GA 1200)." *Id.*

Even if Patent Owner's data was credible, it would be irrelevant to the obviousness of challenged formulation claim 1. As Dr. Iyer explains, (a) the field test compared phytotoxicity in ***two undefined and identical formulations***, and any observed differences in phytotoxicity in the field tests would have been due to the

inherent phytotoxicity of L-glufosinate ammonium (LGA) and racemic glufosinate ammonium (GA) on glufosinate-tolerant soybeans and not due to the ***formulation*** recited in challenged claim 1, and (b) the field test data is for a single (undefined) formulation applied on two varieties of glufosinate-tolerant soybeans and is not commensurate in scope with the unlimited use of the genus of formulations comprising the "one or more additional components" and ranges of concentrations recited in challenged claim 1. Ex.1003, ¶¶167-178; *infra*, §IX.B.1.b.iv.

2. Dependent Claims 2-6

As Dr. Iyer explains, dependent claims 2-6 recite nothing more than specific weight percentages for specific formulation components that would be arrived at by the routine optimization of the same formulation components described in Long. Ex.1003, ¶¶179, 184-189; *infra* §IX.B.2. For the same reasons as claim 1, dependent claims 2-6 are obvious over Long, either alone or in combination with one or more of the L-Glufosinate Synthesis References, when considering the routine optimization of a POSITA.

Dependent claims 2-6 recite formulations having purified L-glufosinate ammonium, "additional components," and water, at specific weight percentages. Claim 2 is representative and reproduced below.

> **2**. The formulation of claim **1**, wherein the L-glufosinate composition comprises L-glufosinate ammonium in an amount of 12.25% by weight of the formulation; and wherein the one or more additional components comprise sodium alkyl ether sulfate in an amount of 31.6% by weight of the formulation; 1-methoxy-2-propanol in an amount of 1% by weight of the formulation; dipropylene glycol in an amount of 8.6% by weight of the formulation; alkyl polysaccharide in an amount of 9.8% by weight of the formulation; and water in an amount of 36.75% by weight of the formulation.

Ex.1001, 22.

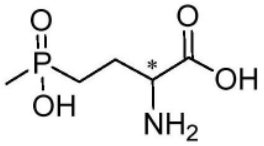
As Dr. Iyer explains, following the teachings of Long it would have been only a matter of routine optimization for a POSITA to adjust the ratios of active herbicide and formulation components to arrive at the specific weight percentages recited in dependent claims 2-6. Ex.1003, ¶¶184-189.

First, the weight percentages recited in dependent claims 2-6 are all within the ranges disclosed in Long. *Id*., ¶185. Second, as Dr. Iyer explains, a POSITA would be motivated to adjust the ratios of formulation components in Long's Examples to account for the use of half the amount of herbicide, since twice as much racemic glufosinate is necessary to deliver the same amount of purified L-glufosinate. *Id*., ¶¶186-188. Third, Patent Owner's specification does not allege that there is any criticality to the specific weight percentages recited in dependent claims 2-6. Id., ¶189. Finally, Patent Owner does not allege that its field test data alleging "unexpected results" for claim 1 was also relevant to, or the same scope as, any of claims 2-6. *Id.* "Generally differences in concentration or temperature

will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical." MPEP §2144.05.

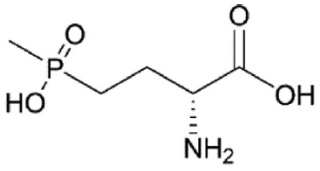
II. BACKGROUND

Glufosinate is a naturally occurring broad-spectrum herbicide and considered one of the safest herbicides from a toxicological and environmental standpoint. Ex.1001, 6 at 1:44-45. The glufosinate chemical structure includes an asymmetric carbon atom denoted * in the following diagram. Ex.1003, ¶32.

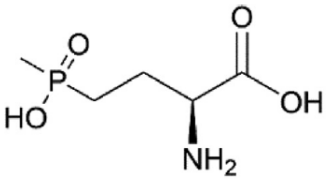


Glufosinate

Glufosinate has two stereoisomers and exists as both the D- and L-enantiomers. Ex.1003, ¶33.



D-Glufosinate



L-Glufosinate

As stated in the Background of the challenged '206 patent, it was known in the prior art that L-glufosinate is the active enantiomer and is much more potent than D-glufosinate. Ex.1001, 1:48-52.

Interest in the active L-enantiomer is reflected in the patenting and publication of chemical methods for the stereospecific preparation of L-glufosinate and its salts since at least as early as 1990. Ex.1006-Ex.1011 ("the L-Glufosinate Synthesis References"), discussed *infra* §VII.

The challenged '206 patent is entitled "Methods for Making L-Glufosinate" and discloses a two-step enzymatic synthesis process for the production of L-glufosinate, and describes the benefit of its two-step enzymatic process as a method of obtaining substantially pure L-glufosinate.

> By combining these two reactions, the proportion of L-glufosinate can be substantially increased in a racemic glufosinate mixture. Thus, provided herein are methods to obtain a composition consisting substantially of L-glufosinate. Since L-glufosinate is more potent than D-glufosinate, smaller amounts of the composition are needed to be effective as a herbicide.

Ex.1001, 3:46-54.

Despite the description (and title) of the challenged '206 patent as a "method for making L-glufosinate," the claims are not related to BASF's two-step synthesis process. Rather, the claims of the '206 patent recite formulations of L-glufosinate ammonium produced by any method so long as it has "greater than about 90% L-

glufosinate compared to the sum of the D-glufosinate and L-glufosinate present in the formulation."[2]

This Petition concerns the prior art effect of U.S. Patent No. 8,445,406 (Long)(Ex.1005). Long describes aqueous formulations having the same concentrations of (a) a water-soluble herbicide, specifically identifying the stereoisomer L-glufosinate ammonium; (b) an alkyl ether surfactant; (c) an organic solvent; and (d) an alkyl polyglucoside; as recited in the challenged claims. Ex.1005, Abstract and throughout; Ex.1003, throughout.

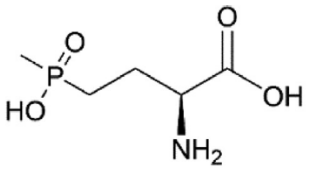
[2] Unlike the challenged '206 patent, other U.S. patents in the same family have issued with claims specific to BASF's two-step enzymatic process for preparing L-glufosinate described in the specification (U.S. Patent Nos. 9,834,802 (Ex.1017); 10,781,465 (Ex.1021); 11,560,577 (Ex.1023); 11,905,538 (Ex.1025); and 11,913,048 (Ex.1028)) or compositions comprising the intermediate ("PPO") in that process (U.S. Patent No. 10,26,078; Ex.1019). See *infra*, III.B., for a discussion of the family history of the '206 patent.

III. SUMMARY OF THE CHALLENGED PATENT

A. The ’206 Patent

U.S. Patent No. 12,305,206 (“the ’206 patent”)(Ex.1001) was issued on May 20, 2025 and will expire on February 28, 2037. BASF SE (“Patent Owner”) owns the ’206 patent, according to assignment documents recorded with the U.S. Patent and Trademark Office (“PTO”), and as indicated on the front page of the ’206 patent. Ex.1001, 1.

The ’206 patent is entitled “Methods for Making L-Glufosinate” and describes the preparation and use of the herbicide L-glufosinate and its salts.



L-Glufosinate

The ’206 patent specification describes a two-step enzymatic synthesis process for preparing L-glufosinate, in which “the proportion of L-glufosinate . . . can be substantially increased.” Ex.1001, 1 at Abstract.

The two-step process is summarized as follows in the ’206 patent:

> The first step of the process involves the oxidative deamination of D-glufosinate to PPO (2-oxo-4-(hydroxy (methyl)phosphinoyl)butyric acid). The second step

> involves the specific amination of PPO to L-glufosinate, using an amine group from one or more amine donors.

Id., 6 at 1:63-67.

The challenged ’206 patent acknowledges that other methods of obtaining L-glufosinate with high enantiomeric purity were known in the prior art and can be used to prepare L-glufosinate salts for use in the invention.

> Other salts of L-glufosinate are known in the art. U.S. Pat. Nos. 5,767,309 [Knorr; Ex.1011] and 5,869,668 teach the use of chiral alkaloid bases to form diastereomeric salts with racemic glufosinate. Purification is achieved because the salt of L-glufosinate precipitates from solution in much larger quantity than the corresponding salt of D-glufosinate. Therefore this method could be used with the present invention to obtain L-glufosinate with high enantiomeric excess, if desired.

Id., 12 at 13:11-18. The ’206 patent incorporates by reference Knorr (Ex.1011), one of the L-Glufosinate Synthesis References relied on in this Petition. *Id.*, 20 at 30:56-63.

The ’206 patent describes aqueous formulations comprising L-glufosinate ammonium and “***one or more*** additional components” selected from a list of four

"components:" sodium alkyl ether sulfate, l-methoxy-2-propanol, dipropylene glycol, and alkyl polysaccharide.

> Also described herein are formulations. The formulations comprise L-glufosinate ammonium in an amount from 10-30% by weight of the formulation; ***one or more additional components*** selected from the group consisting of sodium alkyl ether sulfate in an amount from 10-40% by weight of the formulation; l-methoxy-2-propanol in an amount from 0.5-2% by weight of the formulation; dipropylene glycol in an amount from 4-18% by weight of the formulation; and alkyl polysaccharide in an amount from 4-20% by weight of the formulation; and water as the balance of the formulation.

Id., 7 at 4:14-24 (emphasis added).

The '206 patent also describes particular aqueous formulations of L-glufosinate ammonium having specific weight percentages of L-glufosinate ammonium, the "other components," and water.

> Optionally, the formulation comprises L-glufosinate ammonium in an amount of 12.25% by weight of the formulation; sodium alkyl ether sulfate in an amount of

> 15.8% by weight of the formulation; l-methoxy-2-propanol in an amount of 0.5% by weight of the formulation; dipropylene glycol in an amount of 4.3% by weight of the formulation; alkyl polysaccharide in an amount of 4.9% by weight of the formulation; and water in an amount of 62.25% by weight of the formulation.

Id., 7 at 4:41-49.

In addition to L-glufosinate, the ’206 patent describes that the formulations can include residual amounts of D-glufosinate and “PPO” (2-oxo-4-(hydroxy (methyl)phosphinoyl)butyric acid), an intermediate in Patent Owner’s two-step enzymatic synthesis process. *Id.*, 13 at 15:3-8.

The ’206 patent describes that the formulations can include “***carriers (e.g., diluents and/or solvents), and other components***.”

> Optionally, one or more additional components can be added to the composition to produce a formulated herbicidal composition. Such formulated compositions can include L-glufosinate, ***carriers (e.g., diluents and/or solvents), and other components***.

Id., 13 at 15:23-27 (emphasis added).

The ’206 patent describes that its aqueous L-glufosinate ammonium formulations can include:

- surfactants from 10-40% by weight, notably sodium alkyl ether sulfate (SLES) surfactants (*Id.*, 13 at 15:37-41);
- solvent combinations, including the combination of 1-methoxy-2-propanol and dipropylene glycol, in amounts of 0.5-2% and 4-18% by weight, respectively (*Id.*, 13 at 15:56–16:2);
- humectants, specifically alkyl polysaccharides, in amounts form 4-20% by weight (*Id.*, 13 at 16:7-14);
- diluents, including water and “other aqueous components” (*Id.*, 13 at 16:24-28; and
- other “components” as described in U.S. Pat. Nos. 4,692,181 and 5,258,358, both of which are incorporated by reference (*Id.*, 14 at 17:13-16).

The ’206 patent states that the compositions can also contain other “additaments,” including other “phytotoxicants,” “plant growth regulants,” and “pesticides.”

> Compositions described herein can also contain other additaments, for example, fertilizers, phytotoxicants and plant growth regulants, pesticides, and the like used as

> adjuvants or in combination with any of the above-described adjuvants. The compositions described herein can also be admixed with the other materials, e.g., fertilizers, other phytotoxicants, etc., and applied in a single application.

Id., 14 at 18:7-13.

The ’206 patent includes Examples describing its two-step enzymatic synthesis process for preparing L-glufosinate enantiomer (*Id.*, 17-21), but it does not include any examples of L-glufosinate ammonium aqueous formulations such as those recited in the challenged claims.

B. Prosecution History

The ’206 patent issued on May 20, 2025, from Appln. No. 18/435,340 (“the ’340 application;” Ex.1002) filed on February 7, 2024, which is the seventh non-provisional application in a chain of applications beginning with three U.S. provisional applications filed in 2016.

The following Table shows the chain of applications leading to the ’206 patent. As the Table indicates, and as discussed below, there was a break in

continuity when Patent Owner's predecessor, AgriMetis LLC ("AgriMetis"),[3] filed Express Abandonments for each of its three provisional applications in January 2017, prior to filing its first non-provisional application No. 15/445,254 on February 28, 2017.

Application No.	**Filing Date**
62/302,421 Express Abandonment **January 26, 2017**	March 2, 2016
62/336,989 Express Abandonment **January 26, 2017**	May 16, 2016
62/413,240 Express Abandonment **January 30, 2017**	October 26, 2016
Break in Continuity	
15/445,254 (Pat. No. 9,834,802)	**February 28, 2017**
15/787,448 (Pat. No. 10,260,078)	October 18, 2017
16/287,290 (Pat. No. 10,781,465)	February 27, 2019
16/997,133 (Pat. No. 11,560,577)	August 19, 2020
17/530,018 (Pat. No. 11,905,538)	November 18, 2021
18/179,135 (Pat. No. 11,913,048)	March 6, 2023
18/435,340 (Pat. No. 12,305,206)	February 7, 2024

[3] On September 14, 2020, Patent Owner BASF SE announced that it was acquiring AgriMetis LLC's "Glu-L" technology directed to purified L-glufosinate. Ex.1012.

1. Provisional Applications and Express Abandonments

As shown in the Table above, Patent Owner's predecessor, AgriMetis, abandoned each of its three provisional applications in January 2017.

i. Provisional Appln. No. 62/302,421

The named inventors, Brian Michael Green and Michelle Lorraine Gradley, filed U.S. provisional application No. 62/302,421 ("the '421 provisional") on March 2, 2016. Ex.1013, 5.

AgriMetis, LLC ("AgriMetis") identified itself as the assignee and applicant on January 26, 2017 and filed an Express Abandonment of the '421 provisional application. *Id*., 2-4. On January 27, 2017 the PTO issued a Notice of Abandonment. *Id*., 1.

ii. Provisional Appln. No. 62/336,989

The named inventors, Brian Michael Green and Michelle Lorraine Gradley, filed U.S. provisional application No. 62/336,989 ("the '989 provisional") on May 16, 2016. Ex.1014, 5.

AgriMetis identified itself as the assignee and applicant on January 26, 2017 and filed an Express Abandonment of the '989 provisional application. *Id*., 2-4. On January 27, 2017 the PTO issued a Notice of Abandonment. *Id*., 1.

iii. Provisional Patent Appln. No. 62/413,240

The named inventors, Brian Michael Green and Michelle Lorraine Gradley, filed U.S. provisional application No. 62/413,240 ("the '240 provisional") on October 26, 2016. Ex.1015, 8.

AgriMetis's identified itself as the assignee and applicant on January 30, 2017 and filed an Express Abandonment of the '240 provisional application. *Id.*, 2-7. On February 6, 2017 the PTO issued a Notice of Abandonment. *Id.*, 1.

2. Application No. 15/445,254 ("the '254 application")

AgriMetis filed U.S. Application No. 15/445,254 ("the '254 application") on February 28, 2017. Despite having filed Express Abandonments for each of its three provisional applications in January 2017, AgriMetis indicated in its Application Data Sheet that it was entitled to the priority filing date of each of its previously abandoned provisional applications. Ex.1016, 22-23.

AgriMetis submitted a set of twenty (20) claims along with the '254 application (*Id.*, 18-21), and decided to pursue claims 1-11 directed to the disclosed two-step enzymatic synthesis process for making L-glufosinate. AgriMetis did not pursue its claims 12-20 directed to formulations comprising L-glufosinate ammonium, including original claim 14 (reproduced below) which recited a formulation comprising L-glufosinate ammonium and the same "one or more additional components" recited in challenged claim 1 of the '206 patent.

14. A formulation, comprising:

L-glufosinate ammonium in an amount from 10-30% by weight of the formulation;

one or more additional components selected from the group consisting of sodium alkyl ether sulfate in an amount from 10-40% by weight of the formulation; 1-methoxy-2-propanol in an amount from 0.5-2% by weight of the formulation; dipropylene glycol in an amount from 0-18% by weight of the formulation; and alkyl polysaccharide in an amount from 3-20% by weight of the formulation; and

water as the balance of the formulation.

Id., 19.

During prosecution of the '254 application, the Examiner cited to Shulz et al., *Applied and Environ. Microbio.*, 56:1-6 (1990)(Shulz; Ex.1006), one of the "L-Glufosinate Synthesis References" relied on in this Petition, for the teaching of a method of using a transaminase enzyme to convert PPO to L-glufosinate. *Id.*, 13-14. Patent Owner agreed that Shulz taught the enzymatic production of L-glufosinate from PPO and that the transaminase enzyme used in Shulz could be used to produce L-glufosinate in the second step of Patent Owner's process. *Id.*, 6.

The '254 application issued as U.S. Patent No. 9,834,802 indicating priority to each of AgriMetis's three previously-abandoned provisional applications and with claims directed to the two-step enzymatic synthesis process for making L-glufosinate. Ex.1017, 1, 23-24.

3. Application No. 15/787,448 ("the '448 application")

AgriMetis filed U.S. Application No. 15/787,448 ("the '448 application") on October 18, 2017, as a Continuation of the '254 application. Ex.1018. AgriMetis again indicated its entitlement to the priority filing date of its three provisional applications, despite having filed Express Abandonments for each of its three provisional applications in January 2017 before it filed the '254 application on February 28, 2017. *Id*., 18.

During prosecution of the '448 application, the Examiner cited to U.S. Patent No. 5,767,309 (Knorr; Ex.1011), one of the "L-Glufosinate Synthesis References" relied on in this Petition, for the teaching of a method of obtaining L-glufosinate in greater than 99.5% purity. Ex.1018, 12. In response, Patent Owner did not dispute that Knorr teaches a method of obtaining L-glufosinate salts by selective crystallization, and distinguished Knorr on the basis that Knorr's compositions did not also contain PPO as recited in the pending claims of the '448 application. *Id.*, 5.

The '448 application issued as U.S. Patent No. 10,260,078 with claims directed to compositions comprising PPO and L-glufosinate, and with priority to AgriMetis's three abandoned provisional applications. Ex.1019, 1, 23-24.

4. Application No. 16/287,290 ("the '290 application")

AgriMetis filed U.S. Application No. 16/287,290 ("the '290 application") on February 27, 2019, as a Continuation of the '448 application. Ex.1020. AgriMetis again indicated its entitlement to the priority filing date of its three abandoned provisional applications on its Application Data Sheet, despite having filed Express Abandonments for each of those applications and destroying continuity as discussed *supra*. *Id*., 10.

The '290 application issued as U.S. Patent No. 10,781,465 with claims directed to Patent Owner's two-step enzymatic synthesis process for making L-glufosinate. Ex.1021.

5. Application No. 16/997,133 ("the '133 application")

AgriMetis filed U.S. Application No. 16/997,133 ("the '133 application") on August 19, 2020, as a Continuation of the '290 application. Ex.1022, 5. AgriMetis continued to indicate its entitlement to the priority filing date of its three abandoned provisional applications on its Application Data Sheet (*Id*., 6), despite having filed Express Abandonments for each of those applications and destroying continuity as discussed *supra*.

The '133 application issued as U.S. Patent No. 11,560,577 with claims directed to Patent Owner's two-step enzymatic synthesis process for preparing L-glufosinate ammonium. Ex.1023.

6. Application No. 17/530,018 ("the '018 application")

Patent Owner filed U.S. Application No. 17/530,018 ("the '018 application") on November 18, 2021, as a Continuation of the '133 application. Ex.1024. Patent Owner continued to indicate its entitlement to the priority filing date of its three abandoned provisional applications on its Application Data Sheet, despite having filed Express Abandonments for each of those applications and destroying continuity as discussed *supra*. *Id*., 24, 31.

The '018 application issued as U.S. Patent No. 11,905,538 ("the '538 patent") with claims to formulations comprising L-glufosinate ammonium prepared by Patent Owner's two-step enzymatic process. Ex.1025. Dependent claim 8 of the '538 patent recited a formulation comprising L-glufosinate ammonium and the same "***one or more additional components***," in the same weight percentages, as recited in claim 1 of the challenged '206 patent.

> **8**. The formulation of claim **1**, wherein said L-glufosinate composition comprises L-glufosinate ammonium in an amount from 10-30% by weight of the formulation; and wherein said adjuvant comprises one or more additional components selected from the group consisting of sodium alkyl ether sulfate in an amount from 10-40% by weight of the formulation; 1-methoxy-2-propanol in an amount from 0.5-2% by weight of the formulation; dipropylene glycol in an amount from 4-18% by weight of the formulation; and alkyl polysaccharide in an amount from 4-20% by weight of the formulation; and water as the balance of the formulation.

Id., 26. Dependent claims 9-14 of the '583 patent mirror the specific compositions recited in dependent claims 2-6 of the challenged '206 patent. *Id.*

a. Office Action of March 16, 2023

In an Office Action dated March 16, 2023, the Examiner applied the same prior art reference relied on here by Petitioner, "Long" (U.S. Patent No. 8,445,406)(Ex.1005), against the claims for anticipation under 35 U.S.C. §102(a)(1) and for obviousness under 35 U.S.C. §103. Ex.1024, 14-23.

Based on the recited transitional phrase "***comprising***," the Examiner construed the formulation limitations of the claims as "open-ended," and "inclusive of additional unrecited elements."

> The rejected claims are deemed to be "Product by Process" claims and the product is already disclosed in the prior art and no patentable weight is given to the process by which the product is made and claims use open-ended transitional term "comprising" which is inclusive of additional, unrecited elements.

Id., 19.

Using this "open-ended" construction, the Examiner found that the following disclosure in Long described "**L-enantiomer glufosinate** and its salt," and anticipated the formulation limitations of the claims.

> Long DA., (US 8,445, 406 B2) disclose stable concentrated herbicidal composition comprising surfactant alkyl ether sulfate (Abstract; and entire document); L-enantiomer glufosinate and its salt (col. 2, lines, 39-67; col. 3, lines 10-23) in an amount 20%-35% (col. 3, lines 24-34); surfactant alkyl ether sulfate (col. 3, lines 35-54); said composition further comprising organic solvent such as methanol, ethanol, propanol, … ethylene glycol (col. 3, lines 55-67 to col. 5, lines 1-35; Examples 1 to 9, Table, col. 6; Examples 10 to 12, col. 7-8; Table Examples 13-14, col. 9-10).

Id., 19.

The Examiner also rejected formulation claims 8-14 under 35 U.S.C. §103 as obvious over Long in view of Modaressi (U.S. Patent No. 8,383,137; Ex.1026). Ex.1024, 20-22. In the Examiner's view Long described L-glufosinate enantiomer formulations and each of the formulation limitations as applied in the anticipation rejection, except that Long failed to describe the selection of a polysaccharide humectant or to include a disclosure of L-glufosinate ammonium in an amount of 10-30% by weight of the formulation.

> The disclosure of Long DA., (US 8,445, 406 B2) as applied to claims 1-4, 6-7 and 16-17 is described above in 35 U.S.C. 102(a)(1) and 35 U.S.C. 102(a)(2) rejection above. However, Long DA., is silent regarding wherein said polysaccharide humectant is selected from group consisting of at least one of alkyl polysaccharides, pentoses, high fructose corn syrup, sorbitol, and molasses (as in claim 5); and wherein said L-glufosinate composition comprises L-glufosinate ammonium in an amount from 10-30% by weight of the formulation… (as in claims 8-15).

Id., 20.

The Examiner stated that Long discloses "**L-enantiomer glufosinate** and its salt" and relied on the secondary reference Modaressi for the teaching of a specific L-glufosinate formulation used for field trials having an L-glufosinate concentration of 37.4% by weight of the formulation,

> Regarding claims 8-15, the following references teach the structural and functional elements of the instant invention: Long DA., (US 8,445, 406 B2) disclose L-enantiomer glufosinate and its salt (col. 2, lines, 39-67; col. 3, lines 10-23) in an amount 20%-35% (col. 3, lines 24-34) and Modaressi et al., (US 8,383, 137) also teach herbicidal compositions wherein the active herbicide concentration at ~37.4% and application of said herbicide in field trials (see col. 7, lines 30-67).

Id., 21.

b. Amendment and Response of September 18, 2023

On September 18, 2023, Patent Owner filed an Amendment and Response, in which it argued that "Long discloses that the glufosinate used in the aqueous herbicidal formulation is **racemic** glufosinate," which differs from the 90% purified L-glufosinate recited in the claims. *Id.*, 10 (emphasis in original).

Patent Owner also provided the Examiner with an Appendix, purporting to show unexpected results of the claimed formulation.

> As shown in Appendix A, tests were carried out using racemic glufosinate and L-glufosinate to determine the phytotoxicity to glufosinate-tolerant soybean at various concentrations (i.e., 300 g/ha, 600 g/ha, and 1200 g/ha). As shown, the L-glufosinate surprisingly resulted in less phytotoxicity to the soybeans than the same amount of racemic glufosinate (i.e., LGA 300 vs. GA 300, etc.) and when comparing the same amounts of L-glufosinate (i.e., LGA 300 vs. GA 600 or LGA 600 vs. GA 1200).

Id., 12.

Patent Owner's field tests compared the toxicity of L-glufosinate (LGA) and racemic glufosinate (GA) in a single formulation containing SLES at "adjuvant ratios typically used in commercial Glufosinate formulations." *Id.*, 13. Patent Owner presented the following results of its visual crop injury assessment (i.e., % crop injury compared to an untreated control) made 7 days after treatment.

Table 2e: Ratings of herbicidal activity (phytotoxicity) in an greenhouse experiment against the above mentioned glufosinate tolerant soybeans (GLXMA) after a single post-emergence treatments with racemate glufosinate-ammonium (GA) and L-glufosinate-ammonium (LGA) rated 7 DAA.

Field crop	LGA 300 g/ha	GA 300 g/ha	LGA 600 g/ha	GA 600 g/ha	LGA 1200 g/ha	GA 1200 g/ha
GLXMA (CZ1660)	0	5	10	15	10	40
GLXMA (CZ3519)	5	10	10	35	15	70
average	**2.5**	**7.5**	**10**	**25**	**12.5**	**55**

Id.

According to Patent Owner, "the L-glufosinate surprisingly resulted in less phytotoxicity to the soybeans than the same amount of racemic glufosinate (i.e., LGA 300 vs. GA 300, etc.) and when comparing the same amounts of L-glufosinate i.e., LGA 300 vs. GA 600 or LGA 600 vs. GA 1200)." *Id.*, 12

On October 16, 2023, the Examiner issued a Notice of Allowance in view of Patent Owner's claim amendments and "persuasive arguments." *Id.*, 1, 4.

7. Application No. 18/179,136 ("the '136 application")

Patent Owner filed U.S. Application No. 18/179,136 ("the '136 application") on March 6, 2023, as a Continuation of the '018 application. Ex.1027. Patent Owner continued to indicate its entitlement to the priority filing date of its three abandoned provisional applications on its Application Data Sheet, despite having filed Express Abandonments for each of those applications and destroying continuity as discussed *supra*. *Id.*, 5, 13.

The '136 application issued as U.S. Patent No. 11,913,048 with claims directed to Patent Owner's two-step enzymatic process for preparing L-glufosinate ammonium. Ex.1028.

8. U.S. Application No. 18/435,340 ("the '340 application")

Patent Owner filed U.S. Application No. 18/435,340 ("the '340 application") on February 7, 2024, as a Continuation of the '136 application. Ex.1002. The '340 application issued as the '206 patent (Ex.1001), the challenged patent in this Petition.

In its Application Data Sheet filed with the '340 application, Patent Owner again claimed that it was entitled to the benefit of the filing date for each of its

expressly abandoned provisional applications, which is reflected on the Official Filing Receipt. Ex.1002, 22, 29-30.

Patent Owner filed 6 claims with the '340 application. Independent claim 1 as originally filed is reproduced below.

> 1. A formulation comprising:
>
> L-glufosinate ammonium in an amount from 10-30% by weight of the formulation;
>
> one or more additional components selected from the group consisting of:
>
> sodium alkyl ether sulfate in an amount from 10-40% by weight of the formulation;
>
> 1-methoxy-2-propanol in an amount from 0.5-2% by weight of the formulation;
>
> dipropylene glycol in an amount from 4-18% by weight of the formulation;
>
> alkyl polysaccharide in an amount from 4-20% by weight of the formulation; and
>
> water as the balance of the formulation.

Id., 25.

a. Office Action of October 10, 2024

In an Office Action dated October 10, 2024, the Examiner without explanation or recognition of the express abandonments of the three provisional applications in January 2017, acknowledged Patent Owner's claim for priority to its provisional applications. *Id.*, 15.

The Examiner rejected formulation claims 1-6 as anticipated by Long, again construing the claims as "open-ended," and "inclusive of additional unrecited elements," based on the recited transitional phrase "***comprising***." *Id.*, 17-18. The

Examiner cited the following disclosure in Long, again stating that Long discloses the "**L-enantiomer glufosinate** and its salt" (emphasis in original).

> Long DA., (US 8,445, 406 B2, in IDS) disclose stable concentrated herbicidal composition comprising surfactant alkyl ether sulfate (Abstract; and entire document); L-enantiomer glufosinate and its salt in an amount 20%-35% (Abstract; col. 1, Summary of the invention; col. 2, lines, 39-67; col. 3, lines 10-34); surfactant alkyl ether sulfate in an amount 3-35% by weight (col. 3, lines 35-54); said composition further comprising organic solvent such dipropylene glycol in an amount 1-20% by weight (col. 3, lines 55-67 to col. 4, lines 1-20); alkyl polysaccharide/alkyl polyglucoside in an amount 1-15% by weight (Abstract; col. 4, lines 21-67 to col. 5, lines 1-19). Also see Examples 1 to 9, Table, col. 6; Examples 10 to 12, col. 7-8; Table Examples 13-14, col. 9-10; claims and entire document.

Id., 18.

The Examiner also rejected each of claims 1-6 as obvious over Long in view of U.S. Patent No. 10,888,095 (Bhoge et al.; Ex.1029). According to the Examiner, Long "is silent regarding wherein ***one or more*** additional components selected from the group consisting of … 1-methoxy-2-propoanol in an amount from 0.5-2% by weight of the formulation," and that it would have been obvious to modify the teachings of Long and employ 1-methoxy-2-propanol as taught by Boghe et al. *Id.*, 19-20.

b. Amendment and Response of March 10, 2025

On March 10, 2025, Patent Owner filed an Amendment and Response in which it amended claim 1 to recite that the L-glufosinate must be "greater than about 90% L-isomer compared to the sum of the D-glufosinate and the L-glufosinate present in the composition," the same limitation previously added by amendment in the '018 application (discussed above).

> 1. (Currently amended) A formulation comprising:
>
> L-glufosinate ammonium in an amount from 10-30% by weight of the formulation and D-glufosinate, wherein the formulation has greater than about 90% L-glufosinate compared to the sum of the D-glufosinate and the L-glufosinate present in the formulation;
>
> one or more additional components selected from the group consisting of:
>
> sodium alkyl ether sulfate in an amount from 10-40% by weight of the formulation;
>
> 1-methoxy-2-propanol in an amount from 0.5-2% by weight of the formulation;
>
> dipropylene glycol in an amount from 4-18% by weight of the formulation;
>
> alkyl polysaccharide in an amount from 4-20% by weight of the formulation; and
>
> water as the balance of the formulation.

Id., 7.

Patent Owner again (as before for the '018 application) argued that "Long discloses that the glufosinate used in the aqueous herbicidal formulation is **racemic** glufosinate" and therefore did not anticipate the "greater than about 90%" limitation recited in the amended claims. *Id.*, 9-10 (emphasis in original).

> As indicated above, claim 1 has been amended to recite that "the formulation has greater than about 90% L-glufosinate compared to the sum of the D-glufosinate and the L-glufosinate present in the formulation."
>
> Thus, the recited L-glufosinate composition in amended claim 1 is **not** racemic glufosinate.

Id.

Regarding the Examiner's obviousness rejection, Patent Owner again submitted its Appendix A data from its field tests (*Id*., 12) and argued (as it had argued in the '018 application discussed above) that its formulations demonstrate the unexpected result that L-glufosinate ammonium is less phytotoxic than racemic glufosinate ammonium. *Id.*, 10.

c. Notice of Allowance

On April 3, 2025, the Examiner issued a Notice of Allowance, indicating his withdrawal of the anticipation rejection under 35 U.S.C. §102(a) in view of Patent Owner's "claim amendments, persuasive arguments and an Appendix A showing unexpected results."

> ***Claim Rejections: 35 USC § 102 (AIA)***
> Claims 1-6 rejected under 35 U.S.C. 102(a)(1) and 35 U.S.C. 102(a)(2) as being anticipated by Long DA., (US 8,445,406 B2, in IDS), is being withdrawn due to claim amendments, persuasive arguments and an Appendix A showing unexpected results (for details, see applicants' arguments/remarks dated 03/10/2025; pages 4-5).

Id., 3-4.

IV. REQUIREMENT FOR PGR

A. Grounds for Standing

Pursuant to 37 C.F.R. §42.204(a), Petitioner certifies that the '206 patent is available for PGR and that Petitioner is not barred or estopped from requesting PGR challenging claims 1-6.

B. Identification of Challenge

Pursuant to 37 C.F.R. §42.204(b), Petitioner requests Post Grant Review and cancellation of the Challenged Claims on the grounds set forth below.

Ground	Challenged Claims	35 U.S.C.	Reference(s)/Basis
1	1	§102	Long (Ex.1005)
2	1-6	§103	Long (Ex.1005)
3	1-6	§103	Long (Ex.1005) in view of one or more of the L-Glufosinate Synthesis References[4]

Petitioner submits a Declaration from Dr. Suri S. Iyer (Ex.1003) in support of the Grounds set forth in this Petition.

[4] Schulz (Ex.1006), Zeiss (Ex.1007), Grabley (Ex.1008), Nakanishi (Ex.1009), Minowa (Ex.1010) and Knorr (Ex.1011).

V. PERSON OF ORINARY SKILL IN THE ART ("POSITA")

For the subject matter of the claims of the challenged patent, a POSITA would be a multidisciplinary team that included a person with an advanced degree in a discipline such as chemistry, organic chemistry, formulation science, pharmaceutics including molecular pharmaceutics, pesticides and formulation technology, and the like, and five years of practical experience, or the equivalent. Ex.1003, ¶¶29-30.

The POSITA would be familiar with prior art methods for synthesizing, purifying, and formulating organic molecules having biological activity, including organic compounds having an asymmetric center and the enantiomers and racemic mixtures of those compounds. *Id.* The POSITA would be familiar with formulations of organic bioactive compounds, such as herbicides, in racemic form and in individual enantiomer form, as well as their properties and applications. *Id.* The POSITA would be part of a research team working to develop biologically active organic molecules, such as herbicides, and attends meetings with team members typical of a team developing herbicides for commercial applications. *Id.* The POSITA would have also had access to other individuals typically involved in developing formulation products, including those involved in upstream and downstream manufacturing, analytical chemistry, packaging, and regulatory affairs. *Id.* The POSITA would have regularly attended lectures, symposia, and

conferences on formulations and applications of herbicides, and would have been familiar with the literature in the field and the research and development of other groups working in the field. *Id.*

VI. CLAIM CONSTRUCTION

The Board applies the same claim construction standard used in the Federal Courts, which requires that claims be given their "ordinary and customary meaning . . . as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent." 37 C.F.R. § 42.200(b).

Claim 1 of the '206 patent is reproduced below.

> **1**. A formulation comprising:
> L-glufosinate ammonium in an amount from 10-30% by weight of the formulation and D-glufosinate, wherein the formulation has greater than about 90% L-glufosinate compared to the sum of the D-glufosinate and the L-glufosinate present in the formulation;
> one or more additional components selected from the group consisting of:
> sodium alkyl ether sulfate in an amount from 10-40% by weight of the formulation;
> 1-methoxy-2-propanol in an amount from 0.5-2% by weight of the formulation;
> dipropylene glycol in an amount from 4-18% by weight of the formulation;
> alkyl polysaccharide in an amount from 4-20% by weight of the formulation; and
> water as the balance of the formulation.

A. "comprising"

Claim 1 uses the transitional phrase "comprising," a transitional phrase with an established construction that should be adopted here, and which signals that the

claim is "open-ended," and "inclusive of additional unrecited elements." MPEP §2111.03, and references cited therein ("The transitional term 'comprising' . . . is inclusive or open-ended and does not exclude additional, unrecited elements or method steps.").

Claim 1 recites "[a] formulation 'comprising'" the following three recited elements which are set off in claim 1 as three separate clauses:

3 Recited Elements of Claim 1 A formulation, ***comprising***
(1) L-glufosinate ammonium in an amount from 10-30% by weight and D-glufosinate, wherein the L-glufosinate ammonium is greater than 90% L-glufosinate compared to the sum of L- and D-glufosinate present in the formulation;
(2) "one or more additional components" selected from a group of four at recited weight percentages; and
(3) water

Because claim 1 uses the transitional phrase "comprising," it is "open-ended" and the claimed formulations do not exclude additional ingredients (including additional herbicidal ingredients) beyond the three recited elements.

Petitioner's proposed construction is the same construction applied by the Examiner during prosecution. As discussed above, *supra* §III.B.6. and §III.B.8.,

during prosecution of the ’206 patent (and its predecessor ’018 application), the Examiner applied an open-ended construction for claim 1 based on the use of the transitional phrase “***comprising***,” as indicated in the October 10, 2024 Office Action. Ex.1002, 17-18. Patent Owner did not challenge the Examiner’s construction or argue for a narrower or different construction.

This “open-ended” construction is consistent with the teachings of the ’206 patent specification, which describes that the formulation may also include ***diluents, solvents, and other aqueous components***.

> Optionally, one or more additional components can be added to the composition to produce a formulated herbicidal composition. Such formulated compositions can include L-glufosinate, carriers (e.g., diluents and/or solvents), and other components.

Ex.1001, 13 at 15:23-27; Ex.1003, ¶109.

As discussed above, *supra* §III.A., the ’206 patent specification describes that the formulations can include

- diluents, including water and “other aqueous components” (Ex.1001, 13 at 16:24-28); and

- other "components" as described in U.S. Pat. Nos. 4,692,181 and 5,258,358, both of which are incorporated by reference (*Id.*. 14 at 17:13-16).

The '206 patent also states that the formulations can contain other "additaments," including other "phytotoxicants," "plant growth regulants," and "pesticides."

> Compositions described herein can also contain other additaments, for example, fertilizers, phytotoxicants and plant growth regulants, pesticides, and the like used as adjuvants or in combination with any of the above-described adjuvants. The compositions described herein can also be admixed with the other materials, e.g., fertilizers, other phytotoxicants, etc., and applied in a single application.

Id., 14 at 18:7-13.

In view of the established construction for the transitional phrase "comprising," claim language, patent specification, and file history, the Board should construe claim 1 to require the three recited elements, and to be "open-ended" and "inclusive of additional unrecited elements."

B. "L-glufosinate ammonium in an amount from 10-30% by weight of the formulation and D-glufosinate, wherein the formulation has greater than about 90% L-glufosinate compared to the sum of the D-glufosinate and the L-glufosinate present in the formulation"

Claim 1 recites and requires "L-glufosinate in an amount of 10-30% by weight ***and*** D-glufosinate." By its plain language, a POSITA would understand that claim 1 requires the presence of some amount of both L-glufosinate ammonium ***and*** D-glufosinate. Ex.1003, ¶112. Claim 1 also recites that the formulation has "greater than about 90% L-glufosinate compared to the sum of the D-glufosinate and the L-glufosinate present in the formulation," which is clear on its face and, as Dr. Iyer explains, a POSITA would understand that the percentage of L-glufosinate is calculated as:

$$\frac{\text{(mass of L-glufosinate)}}{\text{(mass of L-glufosinate + mass of D-glufosinate)}} \times 100$$

Id., ¶113.

C. "one or more additional components selected from the group consisting of . . ."

Claim 1 recites that the formulation comprises "***one or more*** additional components selected from the group consisting of" four alternative members of the group. This classic Markush grouping is construed as a closed group limited to just "***one or more***" of the four recited "additional components. MPEP § 2117 and references cited therein ("Claim language defined by a Markush grouping requires selection from a closed group 'consisting of' the alternative members.").

A POSITA would understand from the claim language that the "***one or more*** additional components" limitation in claim 1 only requires the presence of any ***one*** of the four Markush members at the recited weight percentages (Ex.1003, ¶115):

- sodium alkyl ether sulfate (10-40% by weight);
- 1-methoxy-2-propanol (0.5-2% by weight)
- dipropylene glycol (4-18% by weight); or
- alkyl polysaccharide (4-20% by weight).

For example, as explained by Dr. Iyer (Ex.1003, ¶116) and shown in the chart below, any aqueous formulation comprising 10-30% by weight L-glufosinate ammonium (having greater than about 90% L-isomer as recited in claim 1) and 4-18% by weight of dipropylene glycol would be an example of a formulation within the scope of claim 1, regardless of the presence of any other ingredients.

<table>
<tr><th colspan="2">Claim 1</th><th>Example Formulation of Claim 1</th></tr>
<tr><td colspan="2">10-30% L-glufosinate ammonium (>90% L-enantiomer)</td><td>10-30% by weight of 90% L-glufosinate ammonium</td></tr>
<tr><td rowspan="4">***one*** or more additional components selected from</td><td>10-40% w/w sodium alkyl ether sulfate</td><td rowspan="4">4-18% by weight of dipropylene glycol</td></tr>
<tr><td>0.5-2% w/w 1-methoxy-2-propanol</td></tr>
<tr><td>4-18% w/w dipropylene glycol</td></tr>
<tr><td>4-20% w/w alkyl polysaccharide</td></tr>
<tr><td colspan="2">water as the balance of the formulation</td><td>water</td></tr>
</table>

Ex.1003, ¶116.

Likewise, as shown below, any aqueous formulation comprising 10-30% by weight of 90% L-glufosinate ammonium as recited in claim 1 and 4-20% by weight of an alkyl polysaccharide would be another example of a formulation within the scope of claim 1, regardless of the presence of any other ingredients.

<table>
<tr><th colspan="2">Claim 1</th><th>Example Formulation of Claim 1</th></tr>
<tr><td colspan="2">10-30% L-glufosinate ammonium (>90% L-enantiomer)</td><td>10-30% by weight of 90% L-glufosinate ammonium</td></tr>
<tr><td rowspan="4">one or more additional components selected from</td><td>10-40% w/w sodium alkyl ether sulfate</td><td rowspan="4">4-20% by weight of an alkyl polysaccharide</td></tr>
<tr><td>0.5-2% w/w 1-methoxy-2-propanol</td></tr>
<tr><td>4-18% w/w dipropylene glycol</td></tr>
<tr><td>4-20% w/w alkyl polysaccharide</td></tr>
<tr><td colspan="2">water as the balance of the formulation</td><td>water</td></tr>
</table>

Ex.1003, ¶117.

D. “water as the balance of the formulation”

Water is also recited as a required element in claim 1 and is recited to be present “as the ***balance*** of the formulation.”

As Dr. Iyer explains, the ’206 patent does not provide a definition for the meaning of the phrase “as the balance of the formulation.” Ex.1003, ¶119. The ’206 patent disclosure describes embodiments of formulations having a range of water concentration from as low as 36.75 % by weight to as high as 73.1 % by weight. *Id.*, 13-14 at 16:29-17:12.

The only disclosure in the ’206 patent related to the amount of diluent (including water) present in the compositions states that the amount is “an amount necessary to produce compositions ready for packaging and/or use.” *Id.*, 13 at 16:24-29.

As Dr. Iyer explains, a POSITA would understand that the amount of water present “as the balance of the formulation” in the formulations of claim 1 is that amount necessary to achieve the recited weight percentages of the other recited components. Ex.1003, ¶121.

VII. KEY PRIOR ART

A. Long (Ex.1005)

U.S. Patent No. 8,445,406 (“Long), “Stable Concentrated Herbicidal Compositions,” issued on May 21, 2013 and qualifies as prior art to the claims of the ’206 patent under 35 USC §102(a)(1). Long was considered and applied by the Examiner during prosecution of the challenged patent.

Long describes liquid compositions that include (a) 20-35 percent by weight of a water-soluble herbicide, (b) an C_{12}-C_{16} alkyl ether surfactant, (c) an organic solvent, and (d) an alkyl polyglucoside, as indicated in the Abstract.

(57) **ABSTRACT**

A liquid herbicidal composition is provided, comprising:

a. 20 to 35 percent by weight, based on the total weight of the composition, of a water-soluble herbicidal ingredient;

b. a C_{12}-C_{16} alkyl ether sulfate;

c. an organic solvent; and

d. an alkyl polyglucoside.

The composition is stable; i.e., it occurs in a substantially continuous, single phase at temperatures as low as –20° C. It also has a viscosity of no more than 2000 cps at temperatures as low as 0° C.

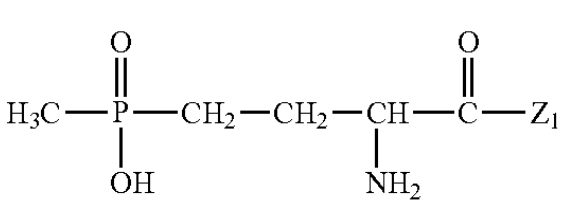
Ex.1005, 1.

Long describes that the herbicidal formulations comprise (a) "a water-soluble herbicidal ingredient," and salts thereof, and specifically identifies glufosinate ammonium.

> The liquid herbicidal composition of the present invention comprises a water-soluble herbicidal ingredient (a). Non-limiting, suitable examples include glufosinate and salts thereof such as glufosinate-ammonium, glyphosate and salts thereof, paraquat, diquat, and the like. Mixtures may also be used.

Id., 2 at 2:33-38.

Long states that the herbicidal compounds for use in the formulations are compounds of formula (I):



(I)

and contain an asymmetric carbon atom. *Id*., 2. Long describes that the herbicidal ingredient of formula (I) is intended to encompass "***all stereoisomers and mixtures thereof***," and specifically the ***biologically active enantiomer***, exemplified by "***the L enantiomer of glufosinate and its ammonium salt***."

> Note that the compounds of formula (I) contain an asymmetric carbon atom. ***The L enantiomer has been observed to be the biologically active isomer***. The formula (I) therefore is intended to encompass ***all stereoisomers and mixtures thereof***, particularly the racemate, and the biologically active enantiomer in each case. Examples of active ingredients of the formula (I) include glufosinate and/or its ammonium salt such as in a racemic mixture; i.e., 2-amino-4-hydroxy(methyl)-phosphinoyl-butanoic acid and its ammonium salt, ***the L enantiomer of glufosinate and its ammonium salt*** or other salts . . . .

Id., 3 at 3:10-23 (emphasis added).

Long teaches that glufosinate and the other water-soluble herbicidal compounds may be present in the composition "in an amount of 20 to 35 percent by weight, often 20 to 30 percent by weight, and more often 22 to 28 percent by weight." *Id*., 3 at 3:24-28.

Long describes that the herbicidal formulations may comprise (b) an alkyl ether sulfate, exemplified by sodium lauryl ether sulfate ("SLES") and other salts of lauryl ether sulfate. *Id*., 3 at 3:35-54. The preferred alkyl ether sulfate described in Long is sodium lauryl ether sulfate (SLES). *Id*., 3 at 3:46-49. Long describes that the alkyl ether sulfate is present in the composition in an amount between 3-35% by weight, preferably between 10-30%, and more preferably between 20-30%, by weight of the composition. *Id*., 3 at 3:50-54. Each of Examples 1-12 in Long is a formulation comprising 38% SLES. *Id*., 4-6 at 6:31-9:54.

Long describes that the herbicidal formulations may comprise (c) an organic solvent and identifies several solvents including dipropylene glycol and propylene glycol monomethyl ether (which is also known as 1-methoxy-2-propanol). *Id*., 3 at 3:55-4:20. Long describes that individual solvents or solvent mixtures that are substantially miscible with water may be used in order to maintain the phase stability of the composition, and that the organic solvent may be present in the composition in an amount between 1-20% by weight, and preferably 3-10% by weight, based on the total weight of the composition. *Id*.

Long describes that the herbicidal formulations may comprise (d) an alkyl polyglucoside surfactant, which may be present in the composition in an amount

between 1-15% by weight, and preferably 6-12% by weight, based on the total weight of the composition. *Id*., 3-4 at 4:21-5:4.

Long describes that the herbicidal formulations may also optionally include auxiliary agents commonly used in herbicide formulations and known to those skilled in the art, including "wetting agents, dispersants, emulsifiers, penetrants, preservatives, antifreezes and evaporation inhibitors such as glycerol and ethylene or propylene glycol, sorbitol, sodium lactate, fillers, carriers, colorants including pigments and/or dyes, pH modifiers (buffers, acids, and bases), salts such as calcium, magnesium, ammonium, potassium, sodium, and/or iron chlorides, fertilizers such as ammonium sulfate and ammonium nitrate, urea, and defoamers." *Id*., 4 at 5:36-6:3.

Long includes Examples illustrating the preparation of formulations of racemic glufosinate "demonstrating combinations of co-solvents and alkyl polyglucosides and their combined effects on stability" and "illustrating the effects of dipropylene glycol with various co-solvents." *Id*., 4-6.

B. Ruhland (Ex.1030)

Ruhland et al., "A comparative investigation of the metabolism of the herbicide glufosinate in cell cultures of transgenic glufosinate-resistant and non-transgenic oilseed rape (Brassica napus) and corn (Zea mays)," *Environ. Biosafety*

Res. 1:29–37 (2002)("Ruhland")(Ex.1030) published in 2002 and qualifies as prior art to the challenged claims patent under 35 USC §102(a)(1).

Ruhland is cited in the Background section of challenged '206 patent for the teaching that it was known that L-glufosinate is much more potent than D-glufosinate. Ex.1001, 3 at 6:48-52.

Ruhland studied the metabolism of glufosinate and its L- and D-enantiomers in cell cultures of glufosinate-sensitive and glufosinate-resistant oilseed rape and corn, finding that L-glufosinate was metabolized and D-glufosinate was not metabolized. Ex.1030, 1 at Abstract.

> Degradation of glufosinate was influenced not only by the cell type but also by the enantiomeric form of glufosinate applied. All metabolites were formed from LGA but not from the D-enantiomer. As already concluded by Dröge et al. (1992) from the metabolism of glufosinate in sterile transgenic plants, DGA seems to be stable in plant metabolism under sterile conditions. The separate use of LGA and DGA confirms the metabolic stability of DGA in both sensitive and transgenic oilseed rape and corn cells.

Ex.1030, 7.

C. The L-Glufosinate Synthesis References

As Dr. Iyer explains, the following prior art references describe the synthesis, isolation, and/or purification of L-glufosinate and its salts, including the ammonium salt, and are referred to collectively as the "L-Glufosinate Synthesis References." Ex.1003, ¶¶84-103.

1. Schulz (Ex.1006)

Schulz et al., "Stereospecific Production of the Herbicide Phosphinothricin (Glufosinate) by Transamination: Isolation and Characterization of a Phosphinothricin-Specific Transaminase from *Escherichia coli*," *Applied and Environmental Microbiology*, 56: 1-6 (1990)("Schulz")(Ex.1006) published in 1990 and qualifies as prior art to the claims of the '206 patent under 35 USC §102(a)(1).

As discussed *supra* in §III.B.2., during prosecution of the '254 application, the Examiner cited Shulz for the teaching of a method of using a transaminase enzyme to convert PPO to L-glufosinate. Ex.1016, 13-14. Patent Owner agreed that Shulz taught the enzymatic production of L-glufosinate from PPO and that the transaminase enzyme used in Shulz could be used to produce L-glufosinate in the second step of Patent Owner's process. *Id.*, 6.

Schulz describes the stereospecific synthesis of L-glufosinate and the isolation of pure solid L-glufosinate from a mixture containing glutamate.

> The aim of our investigations was to develop a method for the stereospecific synthesis of the L-enantiomer.

Ex.1006, 1.

> We have isolated a transaminase from E. coli K-12 that is capable of catalyzing the synthesis of the herbicidal compound L-phosphinothricin from the corresponding keto acid (PPO) with L-glutamic acid, GABA, or 3-aminopropyl (methyl) phosphinic acid as an efficient amino-group donor.

Id., 5.

Shulz describes that analysis of the L-phosphinothricin produced by its enzymatic method "revealed an optical purity of >99.9%." *Id.*, 5.

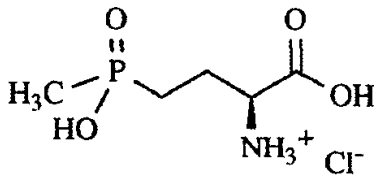
2. Zeiss (Ex.1007)

Zeiss, H-J., "Enantioselective Synthesis of L-Phosphinothricin[5] from L-Methionine and L-Glutamic Acid via L-Vinylglycine," *Tetrahedron*, 48(38):8263-70 (1992)("Zeiss")(Ex.1007) published in 1992 and qualifies as prior art to the

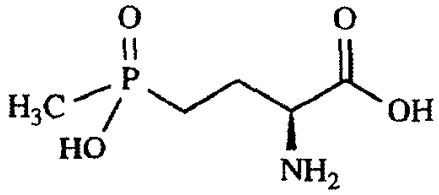
[5] L-Phosphinothricin is another name for L-glufosinate free acid. Ex.1003, ¶87 at fn.4.

claims of the ’206 patent under 35 USC §102(a)(1). Patent Owner cited Zeiss to the Office, but the Examiner did not apply Zeiss in a rejection during prosecution.

Zeiss describes the synthesis and crystallization of L-glufosinate hydrochloride (**6a**) and L-glufosinate free acid (**6**).



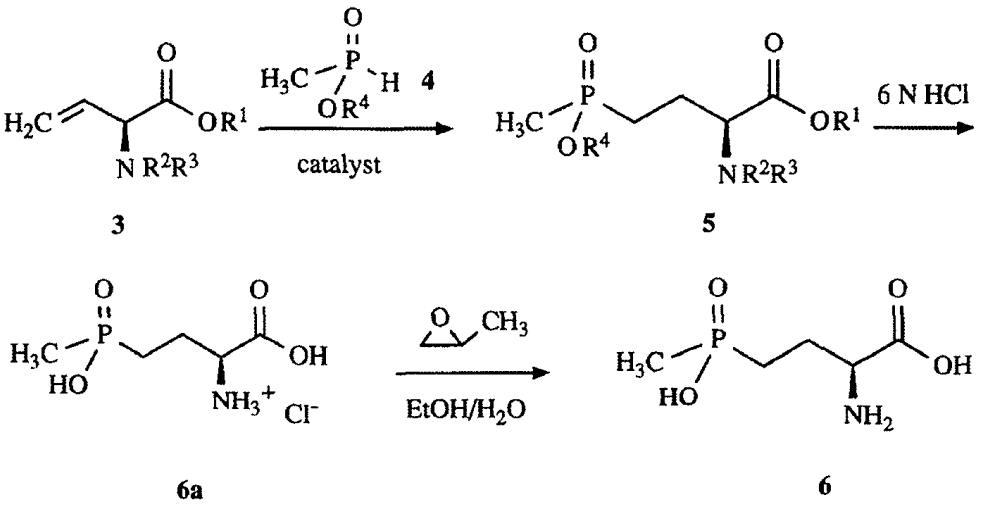
6a



6

> L-Phosphinothricin (**6**), a natural occurring amino acid which possesses herbicidal and antibiotical properties by inhibiting the enzyme glutamine synthetase (B.C. 6.3.1.2) in plants and bacteria, can be obtained with 99.4% enantiomeric excess via regioselective addition of alkyl methylphosphinates **4** to protected L-vinylglycine derivatives **3** followed by hydrysis of the intermediates **5**.

Ex.1007, 1 at Abstract.



Id., 2.

Zeiss describes obtaining L-glufosinate hydrochloride **6a** having an enantiomeric excess (ee) of 92.6% and 97.4% and obtaining[6] L-glufosinate free acid **6** having an ee of 99.4%. *Id.*, 2-3, 6.

3. Grabley (Ex.1008)

U.S. Patent No. 4,389,488 ("Grabley")(Ex.1008), entitled "Process for the Enzymatic Preparation of L-2-amino-4-methylphosphinobutyric Acid,"[7] issued in

[6] Zeiss cites to an earlier publication of his work for the details of the procedure for converting **6a** into **6**. Zeiss, H-J., "Enantioselective Synthesis of Both Enantiomers of Phosphinothricin via Asymmetric Hydrogenation of α-Acylamido Acrylates," *J. Org. Chem.*, 56:1783-1788 (1991)(Ex.1032)

[7] L-2-Amino-4-methylphosphinobutyric acid, L-phosphinothricine, and "L-PTC" are alternative names for L-glufosinate. Ex.1003, ¶90 at fn.6.

1983 and qualifies as prior art to the claims of the ’206 patent under 35 USC §102(a)(1). The Examiner did not consider Grabley during prosecution.

Grabley describes an enzymatic separation of a racemic mixture of D,L-glufosinate for the purification of L-glufosinate and provides an example of the use of the separation process to prepare pure crystalline L-glufosinate free acid. Ex.1008, 2 at 1:67-2:12 and throughout; Ex.1003, ¶91. Grabley reports preparing L-glufosinate “with an optical purity greater of at least 90% (corresponding to 95% of L form).” *Id.*, 3 at 3:20-23.

4. Nakanishi (Ex.1009)

U.S. Patent Application Publication No. 2014/0309453 A1 (“Nakanishi”)(Ex.1009) is entitled “Method for Producing Glufosinate P Free Acid”.[8] Nakanishi published on October 16, 2014 and qualifies as prior art to the claims of the ’206 patent under 35 USC §102(a)(1).

Nakanishi describes “a method for producing crystalline glufosinate P free acid [L-glufosinate] with high purity.” Ex.1009, 1 at Abstract.

> The present inventors found a method for producing glufosinate P free acid which is synthesized by

[8] “Glufosinate P free acid” and “L-phosphinothrycin” are also synonyms for L-glufosinate as its free acid. Ex.1003, ¶93 at f.7.

> neutralizing glufosinate P hydrochloride salt with caustic soda, as a crystal with high purity and good yield.

Id., 8 at ¶[0017].

Nakanishi describes that the effect of the invention is the production of high purity crystalline glufosinate P free acid (L-glufosinate) simply and inexpensively.

> The production method according to the present invention is advantageous in that crystalline glufosinate P free acid which is industrially effective and having low hygroscopicity, can be produced with high purity and high yield. In addition, the production method according to the present invention is also advantageous in that glufosinate P free acid can be produced as a crystal, extremely simply and inexpensively without the need for special devices.

Id., 9 at ¶[0025].

Nakanishi describes crystals of glufosinate P free acid (L-glufosinate) and its various salt forms, including the ammonium salt.

> Glufosinate P free acid and its crystal can be in a salt form such as sodium salt, potassium salt, ammonium salt etc., as desired. Further, it can also be in an acid addition salt form such as hydrochloric acid, sulfuric acid, acetic acid,

> nitric acid etc. Glufosinate P monosodium salt (chemical name: sodium L-homoalanin-4-yl(methyl)phosphinate) is preferably exemplified as a salt of glufosinate P obtained from crystalline glufosinate P free acid of the present invention.

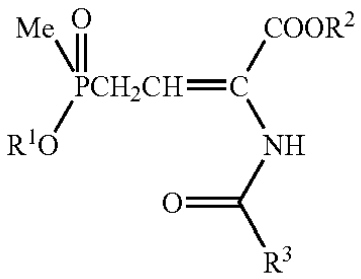
Id., 9 at ¶[0037].

5. Minowa (Ex.1010)

U.S. Patent No. 7,772,426 ("Minowa")(Ex.1010) is entitled "Method For Producing L-2-Amino-4-(Hydroxymethylphosphinyl)-Butanoic Acid".[9] Minowa issued on August 10, 2010 and qualifies as prior art to the claims of the '206 patent under 35 USC §102(a)(1). The Examiner did not consider Minowa during prosecution.

Minowa describes a process for preparing L-glufosinate free acid by subjecting the following compound to hydrogenation in the presence of asymmetric catalyst, followed by hydrolysis of the resulting product. Ex.1010, 3-4 at 2:34-3:17; Ex. 1003, ¶98.

[9] "L-2-amino-4-(hydroxymethylphosphinyl)-butanoic acid" is a synonym for L-glufosinate. Ex.1003, ¶97 at fn.8.



Minowa describes that, with its method, L-glufosinate free acid "can be efficiently produced in high enantiomeric excess, 92% ee or more. *Id.*, 5 at 5:6-9; Ex. 1003, ¶99. Minowa include seven Examples of the preparation of L-glufosinate (as the free acid) having an enantiomeric excess (ee) of greater than 92%. *Id.*, 6-7 at 8:40-10:26; Ex. 1003, ¶99.

6. Knorr (Ex.1011)

U.S. Patent No. 5,767,309 ("Knorr")(Ex.1011) is entitled "Process for Preparing [L]- or [D]-Homoalanin-4-yl-(methyl)phosphinic Acid[10] and Salts Thereof by Racemic Resolution." Knorr issued June 16, 1998 and qualifies as prior art to the claims of the '206 patent under 35 USC §102(a)(1).

Patent Owner disclosed Knorr in an IDS, but the Examiner did not apply Knorr in a rejection during prosecution.

[10] "Homoalanin-4-yl-(methyl)phosphinic acid" is another synonym for L-glufosinate free acid. Ex.1003, ¶100 at fn.9.

Knorr describes various prior art methods for preparing the active L-enantiomer of glufosinate and describes the various shortcomings of those prior art methods. Ex.1011, 2 at 1:6-46.

Knorr describes a crystallization method for resolving racemic mixtures of L- and D-glufosinate and their salts, which takes advantage of the difference in their relative solubilities in solvent mixtures of water and solvents such as alcohols. *Id*., 2 at 2:36-57.

In the ’206 patent specification, Patent Owner discusses Knorr and states that Knorr’s purification method “could be used with the present invention to obtain L-glufosinate with high enantiomeric excess, if desired.” Ex.1001, 12 at 13:11-18.

VIII. EFFECTIVE FILING DATE: FEBRUARY 28, 2017

The claims of the challenged patent are not entitled to the benefit of any of the 2016 filing dates for Patent Owner’s three provisional applications and must rely on the February 28, 2017 filing date of the ’254 application.

As discussed *supra* §III.B.1., on January 26, 2016 and January 30, 2016, Patent Owner’s predecessor (AgriMetis) filed Express Abandonments Under 37 C.F.R. §1.138, requesting abandonment of each of its provisional applications as of those dates. The USPTO mailed Notices of Abandonment, acknowledging

AgriMetis's express abandonment of those applications effective on January 26, 2016 and January 30, 2016.

Accordingly, the three provisional applications were not pending on February 28, 2017 when AgriMetis filed its '254 non-provisional application. Therefore those provisional applications were never co-pending with the '254 application and the claims of the challenged patent (which claims priority to the '254 application) are not entitled to the earlier 2016 priority dates of the filing of any of the three provisional applications.

> An application for patent for an invention disclosed in the manner provided by section 112(a) . . . in an application previously filed in the United States, . . . shall have the same effect, as to such invention, as though filed on the date of the prior application, ***if filed before the*** patenting or ***abandonment of or termination of proceedings on the first application*** . . .

35 U.S.C. §120.

For these reasons, the effective filing date for the claims of the challenged '206 patent is February 28, 2017, the filing date of the '254 non-provisional application.

IX. GROUNDS FOR POST-GRANT REVIEW

A. Ground 1 (35 U.S.C. §102(a)): Claim 1 is Anticipated by Long

Claim 1 of the ’206 patent is anticipated by the L-glufosinate ammonium formulations described in Long (Ex.1005).

The following chart compares the recited formulation elements of claim 1 with the corresponding citation for the description of those same formulation elements in Long.

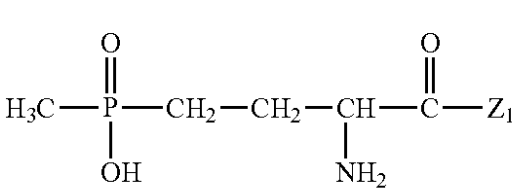
<table>
<tr><th colspan="2">Claim 1
A formulation comprising:</th><th>Long (Ex.1005)</th></tr>
<tr><td colspan="2">10-30% L-glufosinate ammonium
(>90% L-enantiomer compared to the sum of L- and D-isomers)</td><td>3 at 3:10-23, 3:24-28; 4-5 at 6:30-7:68</td></tr>
<tr><td rowspan="4">one or more additional components selected from</td><td>10-40% w/w sodium alkyl ether sulfate</td><td>3 at 3:35-54; 4-5 at Examples</td></tr>
<tr><td>0.5-2% w/w 1-methoxy-2-propanol</td><td rowspan="2">3 at 3:55–4:20; 4-5 at Examples</td></tr>
<tr><td>4-18% w/w dipropylene glycol</td></tr>
<tr><td>4-20% w/w alkyl polysaccharide</td><td>3-4 at 4:21–5:4, 4-5 at Examples</td></tr>
<tr><td colspan="2">water as the balance of the formulation</td><td>4 at 5:5-8, 4-5 at Examples</td></tr>
</table>

1. "L-glufosinate ammonium in an amount from 10-30% by weight of the formulation and D-glufosinate, wherein the formulation has greater than about 90% L-glufosinate compared to the sum of the D-glufosinate and the L-glufosinate present in the formulation"

a. "L-Glufosinate ammonium"

As explained by Dr. Iyer, Long describes aqueous formulations of L-glufosinate ammonium as the purified stereoisomer, as recited in claim 1 of the challenged patent. Ex.1003, ¶¶74, 124-126.

Long identifies typical herbicides as those of formula (I),



and states that the herbicidal compounds of formula (I) encompass "**all stereoisomers and mixtures *thereof***," including "***the biologically active enantiomer***," exemplified by "***the L enantiomer of glufosinate and its ammonium salt***."

> Note that the compounds of formula (I) contain an asymmetric carbon atom. The L enantiomer has been observed to be the biologically active isomer. The formula (I) therefore is intended to encompass ***all stereoisomers and mixtures thereof***, particularly the racemate, and ***the***

> ***biologically active enantiomer*** in each case. Examples of active ingredients of the formula (I) include glufosinate and/or its ammonium salt such as in a racemic mixture; i.e., 2-amino-4-hydroxy(methyl)phosphinoylbutanoic acid and its ammonium salt, ***the L enantiomer of glufosinate and its ammonium salt*** or other salts . . . .

Ex.1005, 3 at 3:10-23; Ex.1003, ¶74 (emphasis added).

As Dr. Iyer explains, a POSITA would understand from the express teachings in Long that the formulations can be employed with "all stereoisomers and mixtures thereof," and are not limited to just racemic mixtures of stereoisomers. Ex.1003, ¶125. Long expressly calls out the biologically active ***L-enantiomer of glufosinate and its ammonium salt*** as an example of an active ingredient to be used in its formulations. *Id*., ¶125-126. A POSITA would not understand that Long's formulations are limited to those comprising **racemic** glufosinate as Patent Owner argued during prosecution. *Id*.

Long is good for all that it teaches to a POSITA and its teachings are not limited to its particular embodiments or example formulations of racemic glufosinate. A prior art patent may be relied upon for all that it would have reasonably suggested to a POSITA, including nonpreferred embodiments. MPEP §2123; *Merck & Co. v. Biocraft Labs., Inc*. 874 F.2d 804 (Fed. Cir. 1989), cert.

denied, 493 U.S. 975 (1989); *Upsher-Smith Labs. v. Pamlab, LLC,* 412 F.3d 1319, 1323 (Fed. Cir. 2005)(reference disclosing optional inclusion of a particular component teaches compositions that both do and do not contain that component); *In re Susi,* 440 F.2d 442 (CCPA 1971)(examples and preferred embodiments do not constitute a teaching away from a broader disclosure or nonpreferred embodiments).

b. Long Enables the Preparation and Purification of L-Glufosinate Ammonium of "greater than about 90% L-glufosinate compared to the sum of the D-glufosinate and the L-glufosinate present in the formulation"

Long enables the preparation of purified L-glufosinate ammonium as recited in challenged claim 1. A POSITA would have been aware of the L-Glufosinate Synthesis References describing the preparation of L-glufosinate free acid and salts (including its ammonium salt) having greater than 90% L-enantiomer as recited in claim 1 of the challenged patent. Ex.1003, ¶127-130.

Here, a POSITA would have been aware of several prior art references enabling the preparation of L-glufosinate and its ammonium salt at a purity greater than about 90% (compared to the sum of L- and D-isomers) as claimed. As detailed *supra* §VII.C., and in Dr. Iyer's Declaration (Ex.1003, ¶¶127-130), prior art references Schulz (Ex.1006), Zeiss (Ex.1007), Grabley (Ex.1008), Nakanishi (Ex.1009), Minowa (Ex.1010), and Knorr (Ex.1011)(collectively "the L-

Glufosinate Synthesis References"), describe methods for preparing purified L-glufosinate and its ammonium salt to greater than 90% L-enantiomer purity as recited in claim 1 of the challenged '206 patent. *Id*.

As Dr. Iyer explains, the L-Glufosinate Synthesis References show that by 2017 (and 2016) the public was in possession of methods of preparing L-glufosinate either as its free acid (Schulz (Ex.1006), Zeiss (Ex. 1007), Grabley (Ex.1008), Nakanishi (Ex.1009), Minowa (Ex.1010)) or as a salt form (Zeiss (Ex.1007), Nakanishi (Ex.1009), Knorr (Ex.1011)), including the ammonium salt (Nakanishi (Ex.1009)). Ex.1003, ¶130. These methods included enzymatic preparation starting from materials such as PPO (Schulz (Ex.1006), Grabley (Ex.1008), Minowa (Ex.1010)), chemical synthesis (Zeiss (Ex.1007), Nakanishi (Ex.1009)), and purification from racemic mixtures (Knorr (Ex.1011)). *Id*. A POSITA would have been able to follow the teachings of the L-Glufosinate Synthesis References to prepare either the free acid or a salt of L-glufosinate, including its ammonium salt. *Id*. As discussed in Nakanishi (Ex.1010), the preparation of various salt forms of L-glufosinate from its free acid was known, and would be a matter of routine acid-base chemistry for a POSITA. *Id*.

The specification of the challenged patent acknowledges that methods of obtaining L-glufosinate with high enantiomeric purity were known in the prior art

Knorr reference (Ex.1011) and can be used to prepare L-glufosinate for use in the invention.

> Other salts of L-glufosinate are known in the art. U.S. Pat. Nos. 5,767,309 [Knorr; Ex.1011] and 5,869,668 teach the use of chiral alkaloid bases to form diastereomeric salts with racemic glufosinate. Purification is achieved because the salt of L-glufosinate precipitates from solution in much larger quantity than the corresponding salt of D-glufosinate. Therefore this method could be used with the present invention to obtain L-glufosinate with high enantiomeric excess, if desired.

Ex.1001, 12 at 13:11-18.

35 U.S.C. §102(a)(1) may be applied using multiple references when the additional references are cited to prove that the primary reference contains an enabling disclosure. MPEP §2131.01 and references cited therein. Under the same circumstances, the courts have ruled that additional references may be employed in an anticipation where the additional reference(s) are used to show that the prior art included an enabling disclosure of the preparation of a claimed chemical compound. In *In re Donohue*, 766 F.2d 531 (Fed. Cir. 1985), chemical compound claims were anticipated over a publication in view of two patents. The

publication disclosed the claimed compound structure while the patents taught methods of making compounds of that general class. *Id*., 766 F.2d at 532-533. The court held that the publication taught all the elements of the claim, and that the patents were only submitted as evidence of what was in the public's possession before the invention. *Id*. at 534.

> The additional references utilized in this case (viz., Lincoln and Wagner) are not relied upon for suggestion or motivation to combine teachings to meet the claim limitations, as in rejections under 35 U.S.C. Sec. 103. [citation omitted]. Such reliance would be pointless, because Nomura alone discloses every element claimed. ***The purpose of citing Lincoln and Wagner is, instead, to show that the claimed subject matter, as disclosed in Nomura, was in the public's possession. [citation omitted]. Therefore, the anticipation rejection based on Nomura, Lincoln, and Wagner is proper***.

Id. (emphasis added).

This is the same situation here, where Long describes formulations of L-glufosinate ammonium and the L-Glufosinate Synthesis References teach methods

of making L-glufosinate ammonium that is at least 90% L-isomer (compared to the sum of L- and D-isomers as recited in claim 1).

c. "in an amount from 10-30% by weight of the formulation"

Long describes that L-glufosinate and other herbicides of formula (I) may be present in the formulation in an amount from "10-30% by weight" as recited in challenged claim 1. Long describes formulations wherein the herbicidal ingredient is present in the composition "in an amount of 20 to 35 percent by weight, often 20 to 30 percent by weight, and more often 22 to 28 percent by weight." Ex.1005, 3 at 3:24-28. These disclosures of preferred ranges in Long fall within (are subsumed by) and therefore anticipate the "10-30% by weight" range recited in claim 1. *In re Bhagat*, 726 Fed. App'x 772 (Fed. Cir. 2018).

In *Bhagat*, the claim was to a lipid-containing formulation comprising dosages of omega (Ω) fatty acids within multiple ranges and ratios:[11]

[11] Table reproduced from Goldstein et al., "*Prima Facie* Lack of Novelty: When Prior Art Ranges Give Rise to Rebuttable Anticipation," AIPLA QJ, 53(2): 277-324, 296 (Spring 2025).

Claim: A lipid-containing formulation comprising dosages of:	**Prior Art**
Ω-6 to Ω-3 ratio of 4:1 or greater	Ω-6 to Ω-3 ratio of 4:1 to 6:1
Ω-6 are 4–75% of total lipids	Ω-6 are 4–6%
Ω-3 are 0.1–30% of total lipids	Ω-3 are 0.8–1.2%
Ω-6 are not more than 40 grams[115]	Ω-6 are 8.5 g[116]

The Federal Circuit affirmed the Board's findings that the prior art ranges fell within (were subsumed by) the claimed ranges and anticipated them. *Id*. at 774.

For these reasons, Long describes and enables formulations contain L-glufosinate ammonium in an amount from 10-30% by weight of the formulation, wherein the L-glufosinate is present at greater than about 90% L-glufosinate compared to the sum of the D-glufosinate and the L-glufosinate present in the formulation.

2. "one or more additional components selected from . . ."

Long describes formulations suitable for water-soluble herbicidal ingredients, including L-glufosinate ammonium, that meet the limitation requiring "***one*** or more additional components" recited in challenged claim 1.

Claim 1 recites a formulation comprising "***one or more***" of the following "***additional components***" at the recited weight percentages:

- sodium alkyl ether sulfate (10-40% by weight);
- 1-methoxy-2-propanol (0.5-2% by weight);
- dipropylene glycol (4-18% by weight); or
- alkyl polysaccharide (4-20% by weight).

As discussed *supra* §VI.C. and explained by Dr. Iyer, a POSITA would understand from the claim language that the "***one or more*** additional components" limitation in claim 1 is satisfied by the presence of any ***one*** of the four members of the group in an amount within the recited weight percentage ranges. Ex.1003, ¶¶115-117.

a. "sodium alkyl ether sulfate in an amount from 10-40% by weight"

As detailed *supra* §VII.A, Long describes that the herbicidal formulations may comprise an alkyl ether sulfate, exemplified by sodium lauryl ether sulfate (SLES) and other salts of lauryl ether sulfate. Ex.1005, 3 at 3:35-54. The preferred alkyl ether sulfate described in Long is SLES. *Id.*, 3 at 3:46-49. Long describes that the alkyl ether sulfate is present in the composition in an amount between 3-35% by weight, preferably between 10-30%, and more preferably between 20-30%, by weight of the composition. *Id.*, 3 at 3:50-54.

Each of Examples 1-12 in Long is a formulation comprising 38% SLES, within the range of concentrations recited in claim 1. *Id.,* 4-6 at 6:31-9:54.

As Dr. Iyer explains, a POSITA would understand that Long describes and enables aqueous formulations containing purified L-glufosinate ammonium in an amount from 10-30% by weight (as discussed above) formulated with a sodium alkyl ether sulfate (specifically SLES) in an amount from 10-40% by weight. Ex.1003, ¶¶136-140.

Aqueous formulations of L-glufosinate stereoisomer and SLES as described in Long anticipate claim 1 of the challenged '206 patent because they include the recited formulation components:

<table>
<tr><th colspan="3">A formulation comprising</th></tr>
<tr><th colspan="2">Claim 1</th><th>Long (Ex.1005)</th></tr>
<tr><td colspan="2">10-30% L-glufosinate ammonium (>90% L-enantiomer compared to the sum of L- and D-isomers)</td><td>see discussion supra §IX.A.1.</td></tr>
<tr><td rowspan="4">one or more additional components selected from</td><td>10-40% w/w sodium alkyl ether sulfate</td><td rowspan="4">10-40% w/w sodium alkyl ether sulfate (SLES)</td></tr>
<tr><td>0.5-2% w/w 1-methoxy-2-propanol</td></tr>
<tr><td>4-18% w/w dipropylene glycol</td></tr>
<tr><td>4-20% w/w alkyl polysaccharide</td></tr>
<tr><td colspan="2">water as the balance of the formulation</td><td>water</td></tr>
</table>

Ex.1003, ¶139.

Long's formulations anticipate claim 1 regardless of whether they include additional carriers (solvent, diluents) or other components, because claim 1 includes the transitional phrase "comprising" and is open-ended and inclusive of

other non-recited ingredients. See claim construction, *supra* §VI.A; Ex.1003, ¶140.

b. "1-methoxy-2-propanol in an amount from 0.5-2% by weight" OR "dipropylene glycol in an amount rom 4-18% by weight"

As detailed *supra* §VII.A. and in Dr. Iyer's Declaration, Long describes that the herbicidal formulations can comprise an organic solvent, and identifies the specific solvents recited in challenged claim 1: dipropylene glycol and 1-methoxy-2-propanol (propylene glycol monoethyl ether). Ex.1005, 3 at 3:55-4:20; Ex.1003, ¶141-147.

Long describes individual solvents or solvent mixtures that are substantially miscible with water may be used in order to maintain the phase stability of the composition, and that the organic solvent may be present in the composition in an amount between 1-20% by weight, and preferably 3-10% by weight, based on the total weight of the composition. *Id.*

Long also includes Examples illustrating the preparation of 9 compositions of racemic glufosinate "demonstrating combinations of co-solvents and alkyl polyglucosides and their combined effects on stability." *Id.*, 4-5 at 6:30-7:15; Ex.1003, ¶142. Long also includes Examples 10-12 "illustrating the effects of dipropylene glycol with various co-solvents." *Id.*, 5 at 6:20-68; Ex.1003, ¶¶143-144.

Aqueous formulations of L-glufosinate ammonium stereoisomer and a solvent such as 1-methoxy-2-propanol or dipropylene glycol as described in Long anticipate claim 1 of the challenged '206 patent because they include the recited formulation components:

<table>
<tr><th colspan="3">A formulation comprising</th></tr>
<tr><th colspan="2">Claim 1</th><th>Long (Ex.1005)</th></tr>
<tr><td colspan="2">10-30% L-glufosinate ammonium (>90% L-enantiomer compared to the sum of L- and D-isomers)</td><td>see discussion supra §IX.A.1.</td></tr>
<tr><td rowspan="4">one or more additional components selected from</td><td>10-40% w/w sodium alkyl ether sulfate</td><td rowspan="4">0.5-2% w/w 1-methoxy-2-propanol OR 4-18% w/w dipropylene glycol</td></tr>
<tr><td>0.5-2% w/w 1-methoxy-2-propanol</td></tr>
<tr><td>4-18% w/w dipropylene glycol</td></tr>
<tr><td>4-20% w/w alkyl polysaccharide</td></tr>
<tr><td colspan="2">water as the balance of the formulation</td><td>water</td></tr>
</table>

Ex.1003, ¶146.

Long's formulations anticipate claim 1 regardless of whether they include additional carriers (solvent, diluents) or other components, because claim 1 includes the transitional phrase "comprising" and is open-ended and inclusive of other non-recited ingredients. See claim construction, *supra* §VI.A; Ex.1003, ¶147.

c. 4-20% w/w alkyl polysaccharide

As detailed *supra* §VII.A. and by Dr. Iyer, Long describes that the herbicidal formulations can comprise an alkyl polyglucoside surfactant, which may be present

in the composition in an amount between 1-15% by weight, and preferably 6-12% by weight, based on the total weight of the composition. Ex.1005, 3-4 at 4:21-5:4; Ex.1003, ¶¶148-151. Each of the Example formulations in Long employs an alkyl polyglycoside (either hexyl polyglycoside, ethylhexyl polyglycoside, or C_{8-11} alkyl polyglycoside) at 5% by weight, within the 4-20% by weight range recited in claim 1. Ex.1005, 4-5; Ex.1003, 149.

Aqueous formulations of L-glufosinate ammonium stereoisomer and an alkyl polysaccharide as described in Long anticipate claim 1 of the challenged '206 patent because they include the recited formulation components:

<table>
<tr><th colspan="2">Claim 1</th><th>Long (Ex.1005)</th></tr>
<tr><td colspan="2">10-30% L-glufosinate ammonium (>90% L-enantiomer compared to the sum of L- and D-isomers)</td><td>see discussion supra §IX.A.1.</td></tr>
<tr><td rowspan="4">one or more additional components selected from</td><td>10-40% w/w sodium alkyl ether sulfate</td><td rowspan="4">4-20% w/w alkyl polysaccharide</td></tr>
<tr><td>0.5-2% w/w 1-methoxy-2-propanol</td></tr>
<tr><td>4-18% w/w dipropylene glycol</td></tr>
<tr><td>4-20% w/w alkyl polysaccharide</td></tr>
<tr><td colspan="2">water as the balance of the formulation</td><td>water</td></tr>
</table>

Ex.1003, ¶150.

Long's formulations anticipate claim 1 regardless of whether they include additional carriers (solvent, diluents) or other components, because claim 1 includes the transitional phrase "comprising" and is open-ended and inclusive of

other non-recited ingredients. See claim construction, *supra* §VI.A; Ex.1003, ¶151.

3. "water as the balance of the formulation"

The final element recited in claim 1 is "water as the balance of the formulation." As discussed *supra* VI.D. and as Dr. Iyer explains, a POSITA would understand that the formulations of claim 1 must include water and that there is no upper or lower limitation on the amount of water, except that it is present in the formulations of claim 1 in an amount necessary to achieve the recited weight percentages of the other recited components. Ex.1003, ¶¶118-121, 152-153.

Water is described in Long throughout the specification and present in every Example formulation described in Long. See discussion *supra* VII.A.

For the reasons discussed above, the Board should find that it is more likely than not that Long anticipates claim 1, and institute Post-Grant Review.

4. Examiner Error

During prosecution, the Examiner made two errors in withdrawing the anticipation rejection of challenged claim 1 over Long, and each of those errors was material to the patentability of claim 1. *Advanced Bionics, LLC v. MED-EL Elektromedizinische Geräte GmbH*, Case IPR2019-01469, Paper 6 at 8-9 (P.T.A.B. Feb. 13, 2020)(precedential)(when relying on the same prior art previously

presented to the Office, a Petitioner must show that "the Office erred in a manner material to the patentability of challenged claims").

i. Misapprehension of the Teachings of Long

First, the Examiner materially erred in misapprehending the teaching of Long. Ex.1003, ¶¶74, 124-126. *Becton, Dickinson & Co. v. B. Braun Melsungen AG*, IPR2017-01586, Paper 8 (PTAB Dec. 15, 2017)(material error can be shown by pointing "out sufficiently how the examiner erred in its evaluation of the asserted prior art"); *Ecto World, LLC v. RAI Strategic Holdings, Inc.* IPR2024-01280, Paper 13 at 6 (May 19, 2025)(institution granted by demonstrating that "the previously presented art teaches the limitations of the challenged claims, and that no reasonable examiner could have found otherwise"); *Advanced Bionics* at 9 ("If reasonable minds can disagree regarding the purported treatment of the art or arguments, it cannot be said that the Office erred in a manner material to patentability.").

As detailed *supra* §III.B.8., in an Office Action dated October 10, 2024, the Examiner initially applied Long in an anticipation rejection stating that Long discloses stable concentrated herbicidal compositions comprising the "**L-enantiomer glufosinate** and its salt in an amount 20%-35%" (emphasis in original). Ex.1002, 18.

In its March 10, 2025 Amendment and Response, Patent Owner argued that Long "discloses that the glufosinate used in the aqueous herbicidal formulations is **racemic** glufosinate." *Id.*, 9-10 (emphasis in original). On April 3, 2025, the Examiner issued a Notice of Allowance, indicating his allowance of claim 1 in view of Patent Owner's claim amendments and "persuasive arguments" and "showing of unexpected results."

> ***Claim Rejections: 35 USC § 102 (AIA)***
> Claims 1-6 rejected under 35 U.S.C. 102(a)(1) and 35 U.S.C. 102(a)(2) as being anticipated by Long DA., (US 8,445,406 B2, in IDS), is being withdrawn due to claim amendments, persuasive arguments and an Appendix A showing unexpected results (for details, see applicants' arguments/remarks dated 03/10/2025; pages 4-5).

Id., 3-4. The Examiner provided no justification for accepting Patent Owner's argument that Long was limited to **racemic** glufosinate.

The disclosure in question from Long is discussed in detail *supra* §VII.A. and by Dr. Iyer (Ex.1003, ¶¶74, 124-126) and reproduced again below.

> Note that the compounds of formula (I) contain an asymmetric carbon atom. ***The L enantiomer has been observed to be the biologically active isomer***. The formula (I) therefore is intended to encompass ***all stereoisomers*** and mixtures thereof, particularly the racemate, and the biologically active enantiomer in each case. Examples of

> active ingredients of the formula (I) include glufosinate and/or its ammonium salt such as in a racemic mixture; i.e., 2-amino-4-hydroxy(methyl)-phosphinoyl-butanoic acid and its ammonium salt, ***the L enantiomer of glufosinate and its ammonium salt*** or other salts . . . .

Ex.1005, 3 at 3:10-23 (emphasis added).

As discussed *supra* IX.A.1., and as Dr. Iyer explains, the language in Long is clear, and reasonable minds would agree that Long is not limited to **racemic** mixtures, such as **racemic** glufosinate. Ex.1003, ¶¶124-126. Long expressly describes that the biologically active enantiomers, and specifically "***the L enantiomer of glufosinate and its ammonium salt***," can be employed in Long's formulations as individual stereoisomers or as part of a racemic mixture. *Id.*

ii. Error of Law

Second, the Examiner committed a material error of law when he withdrew his anticipation rejection under 35 U.S.C. §102 (over Long) in view of Patent Owner's submission of data purporting to show "unexpected results" in response to an obviousness rejection under 35 U.S.C. §103.

As part of its March 10, 2025 Response to the Examiner's obviousness rejections under 35 U.S.C. §103, Patent Owner submitted data and argued that its claimed formulations demonstrate the unexpected result that L-glufosinate is less

phytotoxic than racemic glufosinate. Ex.1002, 10-12. On April 3, 2025, the Examiner issued a Notice of Allowance, indicating his allowance of the now-challenged claims in view of Patent Owner's claim amendments and "persuasive arguments" and "***showing of unexpected results***." *Id.*, 3-4.

No reasonable Examiner would withdraw an anticipation rejection under 35 U.S.C. §102(a) based on an alleged showing of unexpected results, because it would be contrary to established law and practice before the Office that unexpected results are irrelevant to anticipation. MPEP §2131.04 ("Evidence of secondary considerations, such as unexpected results or commercial success, is irrelevant to 35 U.S.C. §102 rejections and thus cannot overcome a rejection so based."), citing *In re Wiggins,* 488 F.2d 538, 543 (CCPA 1973).

B. Grounds 2 and 3 (35 U.S.C. §103): Claims 1-6 are Obvious Over Long, Either Alone (Ground 2) or in View of the "L-Glufosinate Synthesis References" (Ground 3)

The challenged claims 1-6 of the '206 patent are invalid under 35 U.S.C. §103 as obvious in view of Long, either alone (Ground 2) or in combination with one or more of the L-Glufosinate Synthesis References (Ground 3).

1. Claim 1

a. Long Alone

Long by itself renders challenged claim 1 invalid for failing to satisfy the nonobviousness requirement of 35 U.S.C. §103 for the same reasons it anticipates

claim 1, discussed *supra* §IX.A. A single reference which anticipates also renders a claim obvious under §103. *Realtime Data, LLC v. Iancu*, 912 F.3d 1368 (Fed. Cir. 2019)("[I]t is well settled that a disclosure that anticipates under §102 also renders the claim invalid under §103, for anticipation is the epitome of obviousness.").

As discussed above, Long describes and enables aqueous formulations of L-glufosinate ammonium having greater than 90% L-isomer purity and "one or more" of the "additional components" at the amounts recited in claim 1. *Supra* §§IX.A.1-3. As Dr. Iyer explains, based on Long alone, a POSITA would be motivated to make and use L-glufosinate ammonium formulations having the formulation components at the weight percentages described in Long and recited in claim 1, and would have had a reasonable expectation of success in arriving at the claimed invention. Ex.1003, ¶¶155-156.

b. Long in View of the L-Glufosinate Synthesis References[12]

Claim 1 is obvious over Long in view of the L-Glufosinate Synthesis References. The underlying factual inquiry for an obviousness analysis requires consideration of the following:

- the scope and content of the prior art;
- the differences between the prior art and the claims at issue;
- the level of ordinary skill in the pertinent art; and
- relevant secondary considerations of nonobviousness.

Graham v. John Deere Co. of Kansas City, 383 U.S. 1, 17, 86 S.Ct. 684 (1966). A conclusion of obviousness can be made where all the claimed elements were known in the prior art and a POSITA at the time the invention was made could have combined the elements as claimed by known methods and would yield nothing more than predictable results. *KSR Int'l Co. v. Teleflex Inc*., 550 U.S. 398, 416 (2007).

[12] The "L-Glufosinate Synthesis References" are Schulz (Ex.1006), Zeiss (Ex.1007), Grabley (Ex.1008), Nakanishi (Ex.1009), Minowa (Ex.1010), and Knorr (Ex.1011).

i. Level of Skill in the Art

For the subject matter of the challenged claims, the attributes of a POSITA as explained by Dr. Iyer are described *supra* §V.

ii. Scope and Content of the Prior the Art

The scope and content of the prior art, as viewed from the perspective of a POSITA as explained by Dr. Iyer is described *supra* §VII.

iii. Differences Between the Prior Art and the Claims at Issue

(a) Motivation

Long describes aqueous formulations for L-glufosinate ammonium having greater than 90% L-isomer purity as recited in challenged claim 1. See *supra* §§IX.A.1.a-b.

Dr. Iyer explains that Long would have motivated a POSITA to pursue methods of preparing purified L-glufosinate and its salts, as Long expressly describes the L-isomer as the "biologically active isomer," and specifically identifies "the L enantiomer of glufosinate and its ammonium salt" as a biologically active herbicide for use in its formulations. Ex.1003, ¶¶74, 124-126, 161-162, referencing Long Ex.1005, 3 at 3:10-23. Based on the teachings of Long, a POSITA would have been motivated to prepare and purify the biologically active isomer of an herbicidal agent for use in Long's formulations and to look to prior art methods of doing so. Ex.1003, ¶162.

(b) Expectation of Success

Whether or not there would have been a reasonable expectation of success in arriving at the claimed invention is a question of fact. *IXI IP, LLC v. Samsung Elecs. Co*., 903 F.3d 1257, 1262 (Fed. Cir. 2018). A reasonable expectation of success does not require a certainty of success and obviousness may be found even where there is some degree of unpredictability in the art. *Sanofi-Synthelabo v. Apotex, Inc*., 550 F.3d 1075, 1089 (Fed. Cir. 2008); *Pfizer, Inc. v. Apotex, Inc*., 480 F.3d 1348, 1364 (Fed. Cir. 2007)("the expectation of success need only be reasonable, not absolute.").

As Dr. Iyer explains, a POSITA following the teachings of Long would have had a reasonable expectation of success in preparing stable, active herbicidal formulations for application to crops, for instance by following the Examples provided in Long. Ex.1003, ¶¶164-166. Long expressly states that the formulations can be employed for racemates or biologically active isomers, and for the reasons discussed above, a POSITA would have a reasonable expectation of success that the formulations described in Long can be used specifically for L-glufosinate ammonium at the greater than 90% isomeric purity level recited in claim 1 of the '206 patent. *Id*.

A POSITA further would have been able to follow all the teachings in Long, and the L-Glufosinate Synthesis References enabling the production of purified L-glufosinate ammonium, with a reasonable expectation of success. *Id*., 165.

iv. Secondary Considerations of Nonobviousness

The final *Graham* factor requires consideration of objective indicia of nonobviousness, often called "secondary considerations of nonobviousness," including evidence of unexpected results, commercial success, long-felt but unsolved needs, failure of others, skepticism of experts, and copying by competitors. *Graham* at 17-18. For "objective evidence of secondary considerations to be accorded substantial weight, its proponent must establish a nexus between the evidence and the merits of the claimed invention." *In re Huai-Hung Kao*, 639 F.3d 1057, 1068 (Fed. Cir. 2011); *see also* MPEP §2145 and references cited therein.

During prosecution, Patent Owner submitted data from field tests "carried out using racemic glufosinate (GA) and L-glufosinate (LGA) to determine the phytotoxicity to glufosinate-tolerant soybeans at various concentrations (i.e., 300 g/ha, 600 g/ha, and 1200 g/ha)," and alleged that based on its tests "the claimed herbicidal formulation recited in claim 1 has unexpected results." Ex.1002, 10-12. Along with its data, Patent Owner stated that the test formulations for each

experiment included "sodium lauryl ester sulfate (SLES) with adjuvant ratios typically used in commercial glufosinate formulations." *Id.*, 12 at Appendix A.

Patent Owner presented the following results of its visual crop injury assessment (i.e., % crop injury compared to an untreated control) made 7 days after treatment.

Table 2e: Ratings of herbicidal activity (phytotoxicity) in an greenhouse experiment against the above mentioned glufosinate tolerant soybeans (GLXMA) after a single post-emergence treatments with racemate glufosinate-ammonium (GA) and L-glufosinate-ammonium (LGA) rated 7 DAA.

Field crop	LGA 300 g/ha	GA 300 g/ha	LGA 600 g/ha	GA 600 g/ha	LGA 1200 g/ha	GA 1200 g/ha
GLXMA (CZ1660)	0	5	10	15	10	40
GLXMA (CZ3519)	5	10	10	35	15	70
average	**2.5**	**7.5**	**10**	**25**	**12.5**	**55**

Id.

According to Patent Owner, "the L-glufosinate surprisingly resulted in less phytotoxicity to the soybeans than the same amount of racemic glufosinate (i.e., LGA 300 vs. GA 300, etc.) and when comparing the same amounts of L-glufosinate i.e., LGA 300 vs. GA 600 or LGA 600 vs. GA 1200)." *Id.*, 10.

Even if Patent Owner's field test data is credible, it would be irrelevant to the obviousness of challenged formulation claim 1 because (a) any differences in phytotoxicity in the field tests would be due to the inherent properties of L-glufosinate ammonium and racemic glufosinate ammonium and not the ***formulation*** recited in challenged claim 1, and (b) the data is for a single

(undefined) formulation and a single use (on glufosinate-resistant soybeans) and is not commensurate in scope with the unrestricted use of the broad genus of formulations recited in challenged claim 1.

(a) Any Differences in Phytotoxicity in the Field Tests are Due to the Inherent Properties of Glufosinate and its Enantiomers and Not the Formulation of Claim 1

In Patent Owner's field tests, L-glufosinate (LGA) and racemic glufosinate (GA) were compared ***in the same formulation*** containing SLES at the same unspecified concentration, and therefore, any observed differences in phytotoxicity between LGA and GA on glufosinate-tolerant soybeans could not have been due to the particulars of the formulation (since they were the ***same***) and would have been due to the inherent differences in phytotoxicity between LGA and GA on glufosinate-tolerant soybeans, which existed in the prior art. Ex.1003, ¶¶172-174.

A *prima facie* case of obviousness cannot be rebutted by mere recognition of a latent property in the prior art. MPEP §2145; *In re Baxter Travenol Labs.,* 952 F.2d 388 (Fed. Cir. 1991)("unexpected results" have no nexus to the claimed invention when the prior art inherently achieves same result, even if this fact was unknown in the prior art.); *Rambus Inc. v. Rea,* 731 F.3d 1248, 1257 (Fed. Cir. 2013)("objective evidence of nonobviousness lacks a nexus if it exclusively relates to a feature that was 'known in the prior art'—not necessarily well-known,"

quoting *Ormco Corp. v. Align Technology, Inc.,* 463 F.3d 1299, 1312 (Fed. Cir. 2006)).

Racemic glufosinate ammonium (GA) has been used as an herbicide on glufosinate-tolerant soybeans in the U.S. since at least 1998. Ex.1031. Dr. Iyer explains (Ex.1003, ¶173) that the prior art also taught that L-glufosinate ammonium (LGA) was the biologically active enantiomer (see, e.g. Long (Ex.1005), Schulz (Ex.1006), Zeiss (Ex.1007), Nakanishi (Ex.1009), Knorr (Ex.1011), discussed *supra*) and the specification of the challenged '206 patent acknowledges that LGA is the active isomer and in the prior art. Ex.1001, 6 at 1:48-52 (citing to Ruhland (Ex.1030)); *Id*., 13 at 3:3-11 (citing to U.S. Pat. No. 9,255,115 in the same family as Nakanishi (Ex.1010)).

In its field tests, Patent Owner used the ***same formulation*** for both LGA and GA applications and did not compare its claimed formulation to any other formulation. As Dr. Iyer explains, if Patent Owner's field test data comparing identical formulations of LGA and GA shows anything, it is the relative lower phytotoxicity of LGA than GA in glufosinate-tolerant soybeans—an inherent property of LGA and GA. Ex.1003, ¶174. The data showing alleged unexpected lower phytotoxicity for LGA has no nexus to the presence of the "one or more additional components" in the weight percentage recited in challenged claim 1—since the tested LGA and GA formulations were both formulated with the same

SLES adjuvant and were identical. *Id*. Without ***a comparison to other formulations***, nothing can be said about unexpected results of the formulation tested. *Id*.

(b) PO's Data is Not Commensurate with the Full Scope of the Genus of Formulations Recited in Claim 1

For its field test experiments, Patent Owner used the same formulation for each of the LGA and GA applications on glufosinate-tolerant soybeans, but did not provide any details of that formulation, except that "[a]ll treatments were applied with an adjuvant Sodium-lauryl-ester sulfate (SLES) with adjuvant ratios typically used in commercial with [sic] Glufosinate formulations." Ex.1002, 12. Dr. Iyer explains (Ex.1003, ¶175) that there is no way to tell whether claim 1 encompasses the test formulation, except to accept Patent Owner's statement that the data shows that "the claimed herbicidal formulation recited in claim 1 has unexpected results." *Id.*, 10.

First, the test formulation included a single adjuvant (SLES) in a single undisclosed concentration. *Id*., 12. There is no indication that Patent Owner tested any formulations having any of the other "additional components" recited in claim 1, namely 1-methoxy-2-propanol, dipropylene glycol, and an alkyl polysaccharide, at any of the weight percentages recited in claim 1. Ex.1003, ¶176. The field test data for this single formulation using SLES is not commensurate with the genus of

formulations recited in claim 1. *In re Grasselli*, 713 F.2d 731, 741 (Fed. Cir. 1983)(evidence comparing catalysts containing sodium not commensurate with claims reciting catalysts containing an alkali metal). Patent Owner's field test data cannot support an unexpected result commensurate in scope with claim 1, because the data says nothing about formulations having any of the other "additional components" at any of the weight percentages recited in claim 1.

Second, Patent Owner's field test data is not commensurate in scope with claim 1 for the additional reason that the data does not cover the entire range of weight percentage of SLES (or any other "additional components") recited in claim 1. MPEP §716.02(d)("the showing of unexpected results must be reviewed to see if the results occur over the entire claimed range"). The field test formulation included SLES at a single (and unspecified) weight percentage "typically used in commercial glufosinate." Ex.1003, ¶¶175-176. But the resulting data cannot support an unexpected result commensurate with the full scope of claim 1, because the data says nothing about formulations having the full range of "10-40% by weight" SLES recited in claim 1. MPEP §716.02(d), citing *In re Peterson*, 315 F.3d 1325, 1329-31 (Fed. Cir. 2003)(data showing improved alloy strength with the addition of 2% rhenium did not evidence unexpected results for the entire claimed range of about 1-3% rhenium). And of course, Patent Owner's field test data has no nexus to formulations having 0.5-2% by weight 1-methoxy-2-propanol,

4-18% by weight dipropylene glycol, or 4-20% by weight alkyl polysaccharide—the other "additional components" recited in claim 1.

Third, the field test was limited to two varieties of transgenic soybeans and not commensurate in scope with challenged claim 1, which recites "a ***formulation***" and is not limited to any use or to uses on any crops such as soybeans or transgenic soybeans. Ex.1003, ¶178. As discussed *supra*, whether LGA and GA have different phytotoxicity in the tested glufosinate-tolerant soybeans is an inherent property of LGA and GA and that data says nothing about the relative phytotoxicities of LGA and GA in any other plants for which ***formulation*** claim 1 can be used.

Petitioner is not aware of any other evidence of nonobviousness which would be commensurate with the scope of claim 1 of the challenged patent, and which would be sufficient to overcome the strong case of *prima facie* obviousness based on the prior art set forth above.

2. Dependent Claims 2-6

As Dr. Iyer explains, challenged dependent claims 2-6 recite nothing more than specific weight percentages that would be arrived at by the routine optimization of the same formulation components described in Long. Ex.1003, ¶¶179-189. For the same reasons discussed *supra* for claim 1, and in view of the routine optimization of a POSITA, claims 2-6 are obvious over Long, either alone

(Ground 2) or in combination with one or more of the L-Glufosinate Synthesis References (Ground 3).

Dependent claims 2-6 recite formulations having L-glufosinate ammonium, "additional components," and water, at specific weight percentages. Claim 2 is representative and reproduced below.

> **2**. The formulation of claim **1**, wherein the L-glufosinate composition comprises L-glufosinate ammonium in an amount of 12.25% by weight of the formulation; and wherein the one or more additional components comprise sodium alkyl ether sulfate in an amount of 31.6% by weight of the formulation; 1-methoxy-2-propanol in an amount of 1% by weight of the formulation; dipropylene glycol in an amount of 8.6% by weight of the formulation; alkyl polysaccharide in an amount of 9.8% by weight of the formulation; and water in an amount of 36.75% by weight of the formulation.

Ex.1001, 22.

Dependent claims 3-6 recite the same formulation components as dependent claim 2, but recite different specific weight percentages, as summarized in the following Table.

Recited "% by weight"					
	Claim 2	Claim 3	Claim 4	Claim 5	Claim 6
L-glufosinate ammonium	12.25	24.5	12.25	12.25	24.5
sodium alkyl ether sulfate	31.6	31.6	15.8	22.1	22.1
1-methoxy-2-propanol	1	1	0.5	1	1
dipropylene glycol	8.6	8.6	4.3		
alkyl polysaccharide	9.8	9.8	4.9	6.2	6.2
Water	36.75	24.5	62.25	58.45	46.2

Long provides Examples of aqueous formulations of racemic glufosinate comprising the same additional components—sodium alkyl ether sulfate, 1-methoxy-2-propanol, dipropylene glycol, alkyl polysaccharide, and water. Ex.1005, 4-5; Ex.1003, ¶182. As discussed in detail above for claim 1, the teachings of Long are not limited to the Examples of racemic glufosinate, and Long expressly describes that L-glufosinate is the active enantiomer and that L-glufosinate ammonium can be used in Long's aqueous formulations. *Supra*, §IX.A.1.a.

As Dr. Iyer explains, following the teachings of Long it would have been only a matter of routine optimization for a POSITA to adjust the ratios of active herbicide and formulation components to arrive at the specific weight percentages recited in dependent claims 2-6. Ex.1003, ¶¶184-189.

First, the weight percentages recited in dependent claims 2-6 are all within the ranges disclosed in Long. *Id*., ¶185; *supra*, §IX.A. *In re Peterson,* 315 F.3d 1325, 1330 (Fed. Cir. 2003)(obviousness based on the normal desire of a POSITA to make improvements and motivation to determine the optimum percentages within a disclosed set of percentage ranges).

Second, as Dr. Iyer explains, a POSITA would be motivated to adjust the ratios of formulation components in Long's Examples to account for the use of half the amount of herbicide, since twice as much racemic glufosinate is necessary to deliver the same amount of active L-glufosinate enantiomer. *Id.*, ¶186.

Long's Examples use racemic glufosinate at 44% by weight (of a 50% (w/w) glufosinate solution), which corresponds to 22% by weight racemic glufosinate in Long's Example formulations (0.44 × 0.50 = 0.22). *Id*., ¶186; Ex.1005, 4-5. Because only half of the racemate is the L-isomer, this provides 11% L-glufosinate in Long's Example formulations. Ex.1003, ¶186. A POSITA's routine calculation would also consider the purity of the L-isomer used in the formulation, adjusting the weight percentage accordingly. *Id.*, ¶187. For example, to account for L-glufosinate of 90% enantiomeric purity, a POSITA would adjust the 11% L-glufosinate to 11%/0.90 = 12.2% of 90% pure L-isomer. *Id.* The result of this routine calculation—"12.2%"—is recited ("12.25%) in claims 2, 4, and 5 of the challenged '206 patent. *Id*.; Ex.1001, 22. Similarly, it would have been routine for

a POSITA to prepare more concentrated formulations for later dilution and double the concentration L-glufosinate—to 24.5% by weight—and that is exactly what is recited in dependent claims 3 and 6. Ex.1001, 22; Ex.1003, ¶188.

Third, Patent Owner's specification does not allege that there is any criticality to the specific weight percentages recited in dependent claims 2-6 and Patent Owner does not allege that its field test data alleging "unexpected results" for claim 1 (see *supra* §IX.B.1.b.iv.) was of the same scope as any of claims 2-6. "Generally differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical." MPEP §2144.05; Ex. ¶189.

For the reasons discussed above, the Board should find that it is more likely than not that claims 1-6 are obvious in view of Long, either alone or in view of the L-Glufosinate Synthesis references, and institute Post-Grant Review.

X. CONCLUSION

The Board should find that it is more likely than not that claims 1-6 of the '206 patent are unpatentable. Petitioner respectfully requests that the Board grant the Petition, institute Post-Grant Review, and cancel claims 1-6 for unpatentability.

XI. MANDATORY NOTICES

Pursuant to 37 C.F.R. §42.8, Petitioner Albaugh, LLC respectfully submits the following mandatory notices:

A. Real Party-In-Interest Under 37 C.F.R. §42.8(b)(1)

Albaugh, LLC is the real party-in-interest.

B. Related Matters Under 37 C.F.R. §42.8(b)(2)

Petitioner is not aware of any disclaimers, reexamination certificates, or petitions for inter partes or post-grant review for the ’206 patent, nor is Petitioner aware of any pending civil actions involving the ’206 patent. The challenged ’206 patent and pending U.S. Application Nos. 19/258,402 (filed July 2, 2025), 19/324,859 (filed September 10, 2025), and 19/372,848 (filed October 29, 2025) share the same parent U.S. Application No. 18/179,136. The ’206 patent has no child applications.

C. Lead and Back-Up Counsel Under 37 C.F.R. §42.8(b)(3)

Petitioner provides the following designation of counsel.

Lead Counsel	Back-Up Counsel
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D. Service Information

Please address all correspondence and service to the address listed above. Petitioner consents to email service at VLC@capuanoip.com.

E. Payment Of Fees – 37 C.F.R. §42.203

Petitioner herein submits the required Institution Fee of $25,000.00 and requests that the Patent and Trademark Office notify the undersigned in the event the amount paid is incorrect.

Date: February 20, 2026

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CERTIFICATE OF COMPLIANCE

I hereby certify that this brief complies with the type-volume limitations of 37 C.F.R. §42.24(a)(ii), because it contains 15,719 words (as determined by the Microsoft Word word-processing system used to prepare the brief) and another approximately 900 words contained in various chemical structures and selected images copied from file histories and prior art references, excluding the parts of the brief exempted by 37 C.F.R. §42.24.

Dated: February 20, 2026

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CERTIFICATE OF SERVICE

I hereby certify that on this 20th day of February, 2026, copies of this Petition for Post Grant Review and Exhibits have been served in their entirety by Federal Express at the correspondence address of record for the '206 patent in the USPTO Patent Center:

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A courtesy copy of the Petition and Declaration of Dr. Suri S. Iyer (Ex.1003) was also sent via electronic mail to Patent Owner's counsel at the following address: jelliott@marshallip.com.

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