

Case IPR 2025-00136
Patent No. 11,140,841

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

AARDEVO NORTH AMERICA, LLC,
Petitioner,

v.

Agventure B.V.,
Patent Owner.

IPR 2025-00136

U.S. Patent No. 11,140,841

PATENT OWNER'S PRELIMINARY RESPONSE

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<u>Exhibit No.</u>	<u>Description</u>
2001	<i>Solynta 'Hybrid Potatoes from True Seeds' Technology named Dutch National Icon</i> (Nov. 18, 2014). Available at https://www.potatopro.com/news/2014/solynta-hybrid-potatoes-true-seeds-technology-named-dutch-national-icon?amp
2002	Solynta, Investors. Available at https://www.solynta.com/investors/
2003	<i>Bayer and Solynta Collaborate to Advance True Potato Seed in Smallholder Markets</i> (Jun. 24, 2024). Available at https://www.solynta.com/press/bayer-and-solynta-collaborate-to-advance-true-potato-seed-in-smallholder-markets/
2004	KWS, About Us. Available at https://www.kws.com/us/en/about-us/company/
2005	KWS Saat, Wikipedia. Available at https://en.wikipedia.org/wiki/KWS_Saat
2006	JR Simplot, Company Overview & News. Available at https://www.forbes.com/companies/jr-simplot/
2007	The J.R. Simplot Company, Overview. Available at https://www.simplot.com/company
2008	<i>KWS and J.R. Simplot Company Establish Joint Venture for Hybrid Potato Breeding</i> . Available at https://www.kws.com/corp/en/media-press/world-of-farming-stories/kws-and-j-r-simplot-company-establish-joint-venture-for-hybrid-potato-breeding/
2009	File history of U.S. Patent No. 10,524,436

I. INTRODUCTION

Patent Owner Agventure B.V. (“Agventure”), which operates under the tradename Solynta, is a Dutch company that has established itself as a world leader in innovative hybrid potato breeding technology. Solynta, at the direction of its co-founder Dr. Willem Hendrik Lindhout, has been a pioneer in potato breeding since it became the first to achieve diploid hybrid true potato seed breeding, a groundbreaking technology that grows potatoes from true seeds instead of tubers. With this technology, Solynta has unlocked the potential of potatoes to improve grower well-being and food security worldwide. Compared to traditional breeding using tubers, true potato seeds are disease-resistant, highly scalable, and produce potato plants with offspring having predictable and desired characteristics. As a result of years of research, innovation, and unconventional approaches, Solynta has had scientific breakthroughs resulting in multiple patents in potato breeding, including U.S. Patent No. 11,140,841 (“the ’841 Patent”), titled “Hybrid Seed Potato Breeding.”

Given the impactful and groundbreaking nature of the ’841 inventions, it is not surprising that Solynta and the ’841 co-inventors have received widespread acknowledgement and industry praise. As just one example, the Dutch Government honored Solynta in 2014 as a Dutch National Icon for its novel (now patented) “Hybrid Potatoes from True Seeds” technology. In announcing the honor, then

Dutch Minister of Economic Affairs, Henk Kamp, stated: “This breakthrough technique makes it possible to grow potatoes from true-seed instead of seed-tubers and makes targeted breeding possible. Valuable traits can now be utilized quickly, like disease resistance, nutritional value, and higher yields. Solynta underlines with this project the important Dutch contribution to the global food supply.”¹ Similarly in 2021, Dr. Lindhout, named inventor of the ’841 Patent, was appointed Knight of the Order of the Lion of the Netherlands for his pioneering work in potato breeding. Solynta also received the “Overall Food Quality Solution of the Year” award at the 2023 AgTech Breakthrough Awards for its potato breeding innovations.

Petitioner Aardevo North America LLC, on the other hand, is a U.S. subsidiary of Aardevo B.V. (collectively, “Aardevo”) trying to catch up to Solynta’s advances. Aardevo began as a joint venture between two industry conglomerates, KWS SAAT SE (“KWS”) and the JR Simplot Company (“Simplot”) in late 2018—well after Solynta pioneered the patented diploid, self-compatible true seed. Compared to Solynta which first started commercializing its true potato seeds in 2023, KWS is one of the largest seed producers worldwide with €1,678 million of annual net revenue, and Simplot is one of the largest private companies in the U.S.

¹ Ex. 2001 at 2.

with \$11 billion of annual revenue and 13,000 employees.² KWS has long expressed interest in Solynta's potato breeding technology. As early as 2011, KWS and Solynta negotiated potential licenses for Solynta's then-pending patents, which resulted in KWS obtaining an option to negotiate a license agreement. KWS also purchased potato materials from Solynta in an attempt to start its developmental process.³

Years later, in a press release, Aardevo recited as its mission the development of diploid hybrid potatoes which Solynta had already discovered and obtained patent protection over: "Due to the genetic make-up of potatoes, the breeding of a new variety currently takes up to 15 years. To speed up this process substantially, one of the goals set by Aardevo is the creation of diploid hybrid potatoes which are more amenable to conventional breeding than their tetraploid counterparts."⁴ Rather than innovate on its own, Aardevo leapfrogged the lengthy and fraught developmental process by deploying Solynta's industry-leading technology in Europe without a license. That left Solynta no choice but to sue Aardevo for infringing Agventure's

² See Ex. 2002 at 2; Ex. 2003 at 2; Ex. 2004 at 1; Ex. 2005 at 1; Ex. 2006 at 2; Ex. 2007 at 1.

³ KWS's purchase and negotiation with Solynta were part of the parties' Material Purchase and Cross-License Agreement that concluded in 2011.

⁴ Ex. 2008 at 1.

corresponding European Patent 3,536,146 in the Netherlands to protect its hard-earned innovation. Not surprisingly, Aardevo offered no noninfringement defense.

Rather than contain the dispute to Europe, Aardevo leveraged its deep pockets and retaliated in the U.S. Notably, there is no current accusation of infringement against Aardevo in the U.S. Rather, Aardevo threatened to retaliate in the U.S. if and only if Solynta did not capitulate to its demands in Europe. This market-dominant bullying tactic should have no place at the United States Patent Office. This is particularly true where Aardevo's Petition far exceeds the scope of *inter partes* review proceedings by relying heavily on non-statutory subject matter such as physical potato samples and experimental results, and merely recycles the same primary references already considered by the competent PTO Examiner. As such, Aardevo's IPR petition should be denied on multiple discretionary grounds and on the merits.

Specifically, the Board should deny institution because Petitioner relies on physical specimens not permissible under 35 U.S.C. § 311(b) as basis for several of its asserted grounds. Petitioner also fails to address the extensive evidence of secondary considerations presented to and relied upon by the Patent Office during prosecution. Notably, Petitioner fails to address declarations from Dr. Jones and Dr. Koornneef that the Examiner touted as being "persuasive in not making a new rejection under 35 USC 103." Ex. 1010 ('841 Patent File History) at 2692.

Additionally, the Board should deny institution under 35 U.S.C. § 325(d) because the Patent Office considered during examination prior art and arguments substantially the same as those raised by the Petitioner here. Yet Petitioner has not established that the Patent Office erred in any material way in allowing the claims now challenged. To proceed with an IPR under such circumstances would violate the statutory rules governing *inter partes* review proceedings, duplicate work already done by the Patent Office, and waste precious Board resources.

The Petition also suffers on the merits. Petitioner raises nine Grounds for unpatentability, relying on two expert declarations, two impermissible physical products, six different references for obviousness combinations, and numerous other references for context throughout its Petition. *E.g.*, Petition at vi–xiii (List of Exhibits), 3–4; Exs. 1002, 1003. The sheer number of grounds and references raised demonstrates the weakness of Petitioner’s argument. The Asserted Grounds also do not disclose every limitation of the challenged claims. For example, Petitioner acknowledges that its “anticipatory” reference, Jong, fails to disclose all limitations of the challenged claims. Instead, Petitioner seeks to patch those gaps by arguing that the missing limitations were inherent. As explained in Section IV below, background art contradicts these assertions and dooms Petitioner’s inherency argument.

For at least these reasons, the Board should deny institution.

II. OVERVIEW OF THE '841 PATENT

The '841 Patent, titled “Hybrid Seed Potato Breeding,” is a continuation of application No. 13/504,156, which issued as U.S. Patent No. 10,524,436 (“the '436 Patent”). The '841 and '436 Patents belong to the same family, claim priority to the same provisional application, and share nearly identical specifications.

The '841 and '436 disclosures “relate[] to diploid, fertile, self-compatible and essentially homozygous potato lines, wherein said lines comprise an agronomically desirable trait such as vigour.” The '841 disclosure further relates to “methods for producing such plants,” “hybrid seeds obtained by crossing such homozygous potato lines,” and “potato plants grown from said see[d].” Ex. 1001 ('841 Patent), Abstract.

A diploid, fertile, self-compatible and essentially homozygous potato line is extremely valuable in potato breeding, because it “can very suitably be used as a recurrent parent wherein additional agronomically desirable traits are introgressed by crossing, or introduced by other means such as by transgenic means” “without loss of self-compatibility and fertility.” *Id.* at 23:4–7, 25:3–7. “Once a number of agronomically desirable traits have been stacked into an essentially homozygous, vigorous, diploid, fertile and self-compatible plant . . . that plant can be used as an elite breeding line for the production of commercial F₁ hybrid potato seed.” *Id.* at 23:7–12.

The '841 Patent has ten claims with two independent claims, Claims 1 and 8. Claim 1 generally claims a *Solanum tuberosum* potato line that “is diploid, fertile, self-compatible, produces at least 200 grams fresh weight of tubers per plant, and at least 75% of the genomic loci in said potato line are homozygous.” Claim 8 generally relates to a “method of producing a uniform diploid hybrid *Solanum tuberosum* potato seed, which seed, when sown produces a diploid, fertile, and self-compatible potato plant having a tuber yield expressed in grams of fresh weight of at least 200 grams and wherein said self-compatibility trait is due to the presence of the Sli gene.” *Id.*, Claims 1 and 8.

The '841 and '436 Patents were examined and allowed by the same Examiner. Ex. 1010 at 0417; Ex. 2009 at 441.⁵ The '841 and '436 Patents also include claims with similar limitations. During prosecution of the '841 Patent, Agventure filed a Terminal Disclaimer over the '436 Patent as requested by the Examiner to overcome the Examiner's double patenting rejection. *E.g.*, Ex. 1010 at 0449–50 (rejecting claims for double patenting over co-pending claims of application No. 13/504,156,

⁵ Ex. 2009 is a copy of the file history of the '436 Patent downloaded from Patent Center, available at <https://patentcenter.uspto.gov/applications/15026823/ifw/docs?application=>.

A certified copy has been ordered and can be supplemented if the Board requests.

which had been allowed though not yet issued as the '436 Patent; “Although the conflicting claims are not identical, they are not patentably distinct from each other. . . . The instant application is a continuation where Applicant is seeking broader coverage than the issued claims. As such[,] the instant pending claims represent genera encompassing the species claims in the 13/504,156 application.”), 2677–78 (Terminal Disclaimer filed), 2681 (Terminal Disclaimer approved).

Additionally, during prosecution of the '841 Patent, Agventure submitted, and the Examiner considered the declaration of named inventor, Dr. Lindhout, and supporting letters from experts that were initially submitted during prosecution of the '436 Patent. Ex. 1010 at 0431–32 (“The declaration by Mr. Lindhout dated 15 August 2016 in the file history of US application serial no. 13/504,156 and supporting letters document how unique the potato lines used for the instant invention are. . . . In this declaration, Dr. Lindhout summarizes the background art prior to the claimed invention.”).

Because the '436 Patent is the parent of the '841 Patent, and both were examined by the same Examiner and include claims with similar limitations, the prior art considered and the arguments made during prosecution of the '436 Patent are relevant to the patentability of '841 Patent. *Becton, Dickinson & Co. v. B. Braun Melsungen AG*, IPR2017-01586, Paper 8 at 16, 23 (P.T.A.B. Dec. 15, 2017). Petitioner also agrees that the prosecution history of the '436 Patent is relevant and

should be considered in the current proceeding. Petition at 75 (arguing “[e]rrors made by the Examiner in examination of the parent ’436 apparently caused further error in the examination of the broader claims of the ’841 patent”); Ex. 1002 (Declaration of Shelly Jansky) at ¶ 70 (“I understand from counsel that this patent is in the same patent family as the ’841 patent and thus statements made during the prosecution of that patent are relevant to the prosecution of the ’841 patent.”).

III. GROUNDS 6–9 ARE IMPERMISSIBLE UNDER 35 U.S.C. § 311(b)

As an initial matter, IPR should not be instituted on Grounds 6, 7, 8, or 9 because they all improperly rely on physical products.

An IPR petitioner may challenge a patent “only on a ground that could be raised under section 102 or 103 and *only on the basis of prior art consisting of patents or printed publications.*” 35 U.S.C. § 311(b) (emphasis added); *Lynk Labs, Inc. v. Samsung Elecs. Co.*, 125 F.4th 1120, 1125 (Fed. Cir. 2025); *Aqua Prods., Inc. v. Matal*, 872 F.3d 1290, 1309 (Fed. Cir. 2017) (“Section 311 also limits the scope of the proceeding to . . . only on the basis of prior art consisting of patents or printed publications.”) (internal quotations omitted).

The Board has consistently held that a physical product cannot be the basis of a ground for review. *Capsugel Belgium NV v. Innercap Techs., Inc.*, IPR2013-00331, Paper 9 at 15 (P.T.A.B. Dec. 9, 2013) (pre-*SAS*) (“The Midol product is not a patent or printed publication and cannot be the basis of a ground for review. We, therefore,

decline to institute *inter partes* review of claim 6.”); *DaVincia, LLC v. Enco Sys., Inc.*, IPR2020-00690, Paper 9 at 27 (P.T.A.B. Sept. 16, 2020) (“There is no exception in § 311(b) for a product admittedly in the prior art. A product ‘is not a patent or printed publication and cannot be the basis of a ground for review.’” Institution was denied.) (internal citations omitted); *Delta Elecs., Inc. v. Vicor Corp.*, IPR2024-00227, Paper 13 at 25–26 (P.T.A.B. May 24, 2024) (“To the extent Petitioner argues that the *product* described in the referenced documents renders the challenged claims obvious, we decline to consider such improper arguments. Rather, we will consider Petitioner’s arguments based solely on the disclosures of the referenced documents.” Institution was denied.) (original emphasis).⁶

Here, Petitioner relies on US-W4 potato line as the sole basis for Ground 6 and the primary basis for Ground 7, and RH89-039-16 potato line as the sole basis

⁶ See also *Wasica Fin. GmbH v. Schrader Int’l, Inc.*, 432 F. Supp. 3d 448, 453 (D. Del. 2020) (“Physical products cannot be raised during IPR proceedings.”); *Clearlamp, LLC v. LKQ Corp.*, No. 12 C 2533, 2016 WL 4734389, at *9 (N.D. Ill. Mar. 18, 2016) (“[U]nlike in district court litigation, products cannot be offered as prior art during *inter partes* review.”).

for Ground 8 and the primary basis for Ground 9.⁷ There is no dispute that US-W4 and RH89-039-16 are physical products and do not qualify as “patents or printed publications” under Section 311(b). Indeed, Petitioner does not contend that either US-W4 or RH89-039-16 constitutes a “patent[] or printed publication[],” and

⁷ Petitioner states that “Patent Owner’s corresponding European Patent [3,536,146] was recently revoked by the Opposition Division of the EPO” and that “the plants of that patent’s Claim 1 were found to lack novelty over . . . **US-W4**.” Petition at 28; Ex. 1057 (emphasis added). In contrast to the permissible scope of IPRs under 35 U.S.C. § 311(b), the EPO decision evaluated the validity of the challenged claims in light of US-W4 (i.e., product art) and is currently under appeal. The claims of EP 3,536,146 and the ’841 Patent are also not identical. For example, while Claim 1 of the ’841 Patent recites a *Solanum tuberosum* potato line where “at least 75% of the genomic loci ***in said potato line*** are homozygous,” Claim 1 of EP 3,536,146 recites a “*Solanum tuberosum* potato breeding line . . . hav[ing] a level of homozygosity that is above 75% ***when testing 100 loci***.” Ex. 1057 at 0014. And as discussed in Section III, US-W4 is a physical product inappropriate for the current proceeding.

provides no case law or statutory support for its reliance on impermissible physical products.⁸

Furthermore, Petitioner improperly introduces experimental results on *physical* samples of US-W4 and RH89-039-16 as support. Specifically, Petitioner relies on declarations of Drs. Jansky and Douches, where Dr. Jansky conducted experiments *physically* growing US-W4 potatoes, and Dr. Douches performed genotyping analysis on *physical* samples of US-W4 and RH89-039-16. Petition at 70–71; Ex. 1002 at ¶ 297; Ex. 1003 at, e.g., ¶¶ 37–41. This is precisely the type of evidence that is excluded in an IPR. *Lynk Labs*, 125 F.4th at 1128 (“The stated intent for this limitation was to allow the PTO to evaluate patents and printed materials, matters which are normally handled by patent examiners, ***while excluding challenges to validity on other grounds (e.g., public uses or sales)***, which would remain the province of the courts. . . . For example, ***prior art in the form of sales and public use often requires substantial discovery or fact finding*** into how the alleged prior-art product at issue operates, how it was formed, what it comprises,

⁸ Petitioner cites to *Monsanto v. DuPont*, 878 F.3d 1336 (Fed. Cir. 2018) and *Telemac Cellular v. Topp Telecom*, 247 F.3d 1316 (Fed. Cir. 2001) for standard for inherent anticipation. Petition at 70. Neither concerns anticipation by physical products.

and the circumstances surrounding the alleged sale or use. Patents and printed publications, on the other hand, generally do not require such additional discovery or fact finding.”) (cleaned up) (emphasis added).

As such, US-W4 and RH89-039-16 do not comply with Section 311(b) and cannot be the basis of a ground for review. The Board should not institute IPR on Grounds 6 to 9. Because the Board is required to “institute on all challenges raised in the petition or not institute at all,” to the extent the Boards finds reasonable likelihood of prevailing on any other grounds, the Board should exercise discretion under *SAS* to deny institution for more efficient use of the Board’s time and resources.

SAS Q&As (Jun. 5, 2018), available at https://www.uspto.gov/sites/default/files/documents/sas_qas_20180605.pdf; *SAS Inst., Inc. v. Iancu*, 584 U.S. 357, 365–66 (2018); *Chevron Oronite Co. LLC v. Infineum USA L.P.*, IPR2018-00923, Paper 9 at 10–11 (P.T.A.B. Nov. 7, 2018) (informative); *Deeper, UAB v. Vexilar, Inc.*, IPR2018-01310, Paper 7 at 41–43 (P.T.A.B. Jan. 24, 2019).

IV. PETITIONER’S ANTICIPATION GROUND 1 IS NOT REASONABLY LIKELY TO SUCCEED

The Board should also deny institution because the proposed grounds in the Petition fail to show a reasonable likelihood of success. For example, Petitioner’s argument that Jong anticipates Claims 1, 4, and 7 is legally flawed. Petitioner

appears to admit that Jong does not describe all elements of these claims, and instead resorts to arguing that the missing elements were inherently disclosed. Petition at 33–34. Petitioner cannot meet the inherency standard.

Inherency arguments require “persuasive technical reasoning to explain” that a limitation would *necessarily* be met. *See, e.g., Albaad Massuot Yitzhak, Ltd. v. Edgewell Pers. Care Brands, LLC*, IPR2017-00693, Paper 11 at 9–10 (P.T.A.B. July 17, 2017) (denying institution of IPR and finding asserted prior art did not inherently disclose limitation). Inherency may not be established by “probabilities or possibilities.” *See, e.g., Crown Operations Int’l, Ltd. v. Solutia Inc.*, 289 F.3d 1367, 1377 (Fed. Cir. 2002) (citing *Cont’l Can Co. USA v. Monsanto Co.*, 948 F.2d 1264, 1268–69 (Fed. Cir. 1991)). “The mere fact that a certain thing *may* result from a given set of circumstances is not sufficient.” *Id.*

Here, as the Petitioner acknowledges, Jong fails to expressly disclose at least the following two elements of Claim 1:

- Claim 1[d]: “at least 75% of the genomic loci in said potato line are homozygous”;
- Claim 1[e]: “wherein said self-compatibility in said potato line is conferred by the S-locus inhibitor (*Sli*) gene, and wherein a copy of said gene is present in potato lines AGVD1, AGVD2, AGVD3, and AGVD17, representative seeds of said lines having been deposited with the NCIMB under NCIMB

accession number 41663, NCIMB accession number 41664, NCIMB accession number 41665, and NCIMB accession number 41765, respectively.”

Petitioner appears to admit that Jong does not expressly disclose a potato line that meets Claim 1[d]. Indeed, Petitioner and its expert Dr. Jansky,⁹ appear to admit that Jong does not disclose any *measured* homozygosity value. Petition at 34–35; Ex. 1002 ¶¶ 140–143. Instead, Petitioner argues that “Jong teaches, in keeping with basic principles of diploid genetics, that heterozygosity is reduced by 50% every generation of selfing. . . . A POSA would thus *estimate* that, even assuming that Jong’s initial hybrid ‘S₀’ plants are 0% homozygous (which is unlikely), the S₂ generation described in of [sic] Jong *would be expected* to be at least 75% homozygous.” Petition at 34 (emphasis added); *see also* Exhibit 1002 ¶¶ 142–143.

That the S₂ generation in Jong “would be expected to” be at least 75% homozygous based on *theoretical* calculation is no indication that it was *necessarily*, *in fact*, at least 75% homozygous. Indeed, Petitioner’s own prior art references indicate that actual homozygosity rate in subsequent generations are often *lower* than

⁹ Petitioner also submitted a declaration of Dr. Douches. That declaration is limited to the assessment of homozygosity in potato lines US-W4 and RH89-039-16, which, as discussed in Section III, are physical products inappropriate for an IPR. The declaration is thus irrelevant in the context of instituting IPR.

theoretical calculations because the reduction rate of heterozygosity per generation is often lower than theoretically expected. Phumichai states that “[t]he observed average percentage of reduction of heterozygosity per generation (38.4% or 38.5%) was lower than the theoretically expected value of 50%. The slower than expected decline in heterozygosity has been reported by Brouwer and Osborn (1997) with inbreeding diploid alfalfa and by Scotti et al. (2000) with inbreeding tetraploid alfalfa.” Ex. 1005 (Phumichai) at 0010.

Phumichai further explains that the mismatch between theoretical and actual homozygosity rates can be attributable to various practical reasons. For example, “[c]onsequential selection for vigor and fertility during selfing has been suggested as the cause (Brouwer and Osborn 1997).” *Id.* Moreover, many reproductive traits necessary to plant breeding were associated with heterozygosity, which further limits the homozygosity rate achievable in practice. As Phumichai teaches:

We previously suggested that reproductive traits, such as flowering versus nonflowering and the degree of pollen production, were strongly correlated with heterozygosity, and selection for fertility favored the more heterozygous plants (Phumichai et al. 2004). Pollen performance might also be involved because the level of heterozygosity in the sporophyte affects the phenotypic expression of the gametophyte or pollen viability (Ortiz and Peloquin 1994; Stephenson et al. 2001).

Id.

This is consistent with the overall teachings in Jong. Aside from the theoretical homozygosity rate of the S₂ generation, Petitioner and its expert, Dr. Jansky, also allege that “Jong teaches that, *theoretically* ‘the diploid S₅ generation is about 97% homozygous.’” Ex. 1002 at ¶ 141 (emphasis added); Petition at 35. Even assuming that Jong was correct on the theoretical homozygosity rate of the S₅ generation, this theoretical rate has no implication on the *actual* homozygosity rate of the S₂ generation.¹⁰

Moreover, Petitioner and Dr. Jansky have taken Jong’s disclosures out of context. Jong states: “It *appears*, therefore, that it is *possible* to obtain homozygous clones for future genetic studies on the diploid level. *Assuming no selection for*

¹⁰ Petitioner also appears to improperly conflate the S₂ and the S₅ generations in Jong. For example, for Claim 1[c] requiring “at least 200 grams fresh weight of tubers per plant,” Petitioner relies on the data for tuber yields of the S₂ generation for alleged anticipation. Petition at 34; Ex. 1002 at ¶ 137. But Jong *does not* disclose the specific tuber yields of the S₅ generation. In fact, Jong teaches that for traits including tuber yields, “the inbreeding depression coincided with a curve calculated on the basis of heterozygosity in a diploid organism,” suggesting that in theory, the more homozygous a generation is, the lower tuber yields it would achieve. Ex. 1004 at 0011.

heterozygosity, the diploid S₅ generation is about 97% homozygous.” Ex. 1004 at 0013 (emphasis added). However, as Phumichai demonstrates, selection for heterozygosity is unavoidable in actual practice. Indeed, Jong later admits: “The *unavoidable* selection for vigour during reproduction, although kept to a minimum, probably resulted to a certain extent in some selection for heterozygosity as well.” *Id.* (emphasis added). Therefore, Jong supports that the homozygosity value achieved in practice would be lower than theoretical calculation.

To the extent Petitioner refers to a recent decision by the Opposition Division of EPO concerning the corresponding European Patent 3,536,146, the EPO found that Jong “does not disclose a combination of 75% homozygosity and a tuber yield of at least 200 grams per plant for lines US-W 5309 and US-W 5315” described therein. Ex. 1057 at 0009–0010 (discussing reference D7, which is Jong), 0021. Specifically, the EPO noted that “theoretical considerations . . . are not sufficient to demonstrate that the S₂ generation indeed has 75% homozygosity,” rejected the argument that “in theory the heterozygosity is reduced by 50% in every generation,” dismissed “the value of 97% homozygosity in the S₅ generation” as “based on theoretical considerations,” and found that Jong “does not actually disclose any measured homozygosity or heterozygosity value.” *Id.* at 0010.

For these reasons, Petitioner cannot meet the inherency standard because it cannot show that any offspring generation in Jong was *necessarily* at least 75%

homozygous. Because Petitioner fails to show that Jong discloses Claim 1[d] of the '841 Patent, either explicitly or inherently, this alone is enough for the Board to conclude that Petitioner is not reasonably likely to succeed on the merit of Ground 1.

Petitioner additionally admits that Jong does not expressly disclose the *Sli* gene recited in Claim 1[e]. Petition at 35 (“Jong does not identify the genetic factor conferring self-compatibility.”). Instead, Petitioner (and Dr. Jansky) relies on the US-W4 potato line referenced in Jong, and argues that later analyses in Clot, a 2020 publication, “confirmed that Jong’s W4 necessarily derived its self-compatibility from the S-locus gene inhibitor (*Sli*)” and therefore the *Sli* gene was “inherently disclosed by the US-W4 plant Jong used.” *Id.*; Ex. 1002 at ¶¶ 145–146; Ex. 1036.

However, to the extent Petitioner “relies on [] other references to provide additional information regarding the *product* described in [a prior art reference], such reliance on a product is inappropriate for an *inter partes* review, which must be based only on patents and printed publications.” *Delta Elecs.*, IPR2024-00227, Paper 13 at 25–26 (“To the extent Petitioner argues that the *product* described in the referenced documents renders the challenged claims obvious, we decline to consider such improper arguments. Rather, we will consider Petitioner’s arguments based solely on the disclosures of the referenced documents.”) (original emphasis); *see also* § III.

As such, Petitioner should not be allowed to rely on the US-W4 plant described in Jong, or later references regarding the US-W4 plant for anticipation. Rather, the Board should “consider Petitioner’s arguments based solely on the disclosures of” Jong. *Delta Elecs.*, IPR2024-00227, Paper 13 at 25–26. Because Petitioner admits that Jong does not expressly disclose the *Sli* gene recited in Claim 1[e], Petitioner cannot show anticipation of Claim 1 by Jong as a matter of law.

V. PETITIONER’S OBVIOUSNESS GROUNDS 2–5 FAIL TO ADDRESS KNOWN EVIDENCE OF SECONDARY CONSIDERATIONS

While Petitioner’s Grounds 1 and 6–9 fail for the reasons discussed above, the Board should also deny institution because Petitioner’s obviousness Grounds 2–5 are flawed. Specifically, Petitioner, while fully aware of significant evidence of secondary considerations presented during prosecution of the ’841 and ’436 Patents, fails to adequately address these objective indicia of non-obviousness.

The Board has repeatedly denied institution where a petitioner (like here) fails to adequately address known evidence of secondary considerations. *Stryker Corp. v. KFX Med., LLC*, IPR2019-00817, Paper 10 at 28–29 (P.T.A.B. Sept. 16, 2019) (denying institution for failure to address known evidence of secondary considerations); *Coalition for Affordable Drugs V LLC v. Hoffman–LaRoche, Inc.*, IPR2015-01792, Paper 14 at 18–19 (P.T.A.B. Mar. 11, 2016) (denying institution for failure to address evidence of secondary considerations considered by Examiner

during original prosecution); *Merck Sharp & Dohme Corp. v. Genentech, Inc.*, PGR2021-00036, Paper 10 at 32–34 (P.T.A.B. July 24, 2021) (denying institution for petitioner’s failure to adequately address evidence of secondary considerations evidence offered during prosecution); *Praxair Distribution, Inc. v. Mallinckrodt Hosp. Prods.*, IPR2016-00779, Paper 11 at 8–10, 12 (P.T.A.B. Sept. 22, 2016) (denying institution for petitioner’s failure to address evidence of secondary consideration presented during prosecution and in earlier proceedings); *see also Robert Bosch Tool Corp. v. SD3, LLC*, IPR2016-01751, Paper 15 at 22–34 (P.T.A.B. Mar. 22, 2017) (denying institution for failure to address objective indicia presented during an ITC proceeding); *Omron Oilfield & Marine, Inc. v. MD/TOTCO, A Div. of Varco, L.P.*, IPR2013-00265, Paper 11 at 12–16 (P.T.A.B. Oct. 31, 2013) (denying institution for failure to address objective indicia successfully argued in a reexamination).

A. Agventure Presented Extensive Evidence of Secondary Considerations During Prosecution

Solynta/Agventure presented extensive secondary considerations evidence during prosecution of the ’841 and ’436 Patents, including, long-felt need, industry skepticism, failure of others, unexpected results, and industry praise. In support, Agventure cited to prior art references, submitted a declaration from named inventor Dr. Lindhout, and letters from various, world-renowned potato breeding experts.

After thoroughly analyzing this evidence, the Examiner found Dr. Lindhout's declaration and the global experts' letters persuasive in overcoming Section 103 rejections during the related '436 Patent. Ex. 2009 at 718, 734. The Examiner's Statement of Reasons for Allowance of the '841 Patent further indicates that declarations from potato breeding experts Dr. Jones and Dr. Koornneef "were persuasive in not making a new rejection under 35 USC 103," yet the Petitioner did not affirmatively address this evidence of non-obviousness when presenting their obviousness grounds. Ex. 1010 at 2692.

1. Long-Felt Need

For example, Petitioner provides no adequate response to the evidence of the long-felt need for a *S. tuberosum* potato line that is diploid, fertile, self-compatible, and highly homozygous as claimed. Specifically, Agventure presented that there had been a long-felt need in potato breeding for highly homozygous potato lines that can be used in hybrid breeding to allow the introduction of new, desirable traits. *E.g.*, Ex. 2009 at 641 ("... homozygous inbred lines have not been obtained at the diploid level due to both inbreeding depression and self-incompatibility (*see* Watanabe at introduction). However[,] such essentially homozygous lines are pivotal in allowing the introduction of new traits into *S. tuberosum* germplasm. . . . Hence, there is a long felt need for improved methods of breeding *S. tuberosum*. One of the preferred, but unavailable, methods is that of hybrid breeding using essentially homozygous

parental lines of *S. tuberosum* . . .”), 968 (“Given the state of art in breeding diploid, fertile and self-compatible *S. tuberosum* potato lines, it should be appreciated that there has been a long-felt, but unmet need for the development of these potato lines. The long-felt need is evidenced and recognized in the art and the problem persisted in the art for a long period of time without solution.”); *see also id.* at 1009.

Dr. Lindhout also explained in his declaration the long-felt but unmet need for “vigorous fertile homozygous diploid *S. tuberosum* lines”:

Decades ago, *S. tuberosum* dihaploids . . . were envisioned as a tool to simplify the breeding of *S. tuberosum* cultivar production Diploid *S. tuberosum* clones obtained through haploidization, however, suffer from inbreeding depression due to the reduction of the tetraploid genome to the diploid level. . . . Hence, despite having been proposed some 51 years before the priority date of the present application, these diploid *S. tuberosum* breeding programs have never resulted in vigorous fertile homozygous diploid *S. tuberosum* lines due to self-incompatibility and inbreeding depression.

Ex. 2009 at 682. Importantly, the Examiner found Dr. Lindhout’s declaration persuasive in overcoming Section 103 rejections and support the novelty of the claimed potato lines. *Id.* at 718, 734.

Agventure also submitted letters from potato breeding experts during prosecution of the ’436 Patent that support the long-felt need for such homozygous potato lines. For example, Dr. Sanwen Huang, Professor at the Institute of

Vegetables and Flowers at Chinese Academy of Agricultural Sciences, stated in his letter:

Therefore I have been searching for alternatives for the traditional potato breeding. In many crops hybrids are routinely used and I have seen the great advantages of the hybrid breeding method. ***Homozygous lines are a prerequisite for hybrid breeding.***

. . . .

I was surprised by the progress [Solynta/Agventure] made on developing self-compatible homozygous diploid potato with good agronomic performance. ***This research is the breakthrough we have been waiting for since nearly a century*** when the first hybrid maize was developed in the 1920s. This is crucial for the potato breeding worldwide and especially for the food security in China.

Ex. 2009 at 686–87.

2. Industry Skepticism

Agventure also presented evidence during prosecution that, despite the long-felt need for diploid, fertile, self-compatible, and highly homozygous potato lines, others in the industry were skeptical of the chance of success in producing such potato lines due to extensive inbreeding depression resulted from increasing homozygosity. *E.g., id.* at 650 (“inbreeding depression and self-incompatibility at the diploid level justified the traditional way of breeding and that the approach by the inventors was considered unrealistic and unfeasible for the development of

commercial cultivars”), 651 (“development of diploid, homozygous inbreds in potato was a daring undertaking with very little chance of success”), 967 (“The general prejudice in the art of potato breeding is that, production of homozygous true breeding lines of *S. tuberosum* would not be possible due to inbreeding depression.”). Petitioner provides no response to this evidence.

For example, Agventure noted that Phumichai, the same prior art reference cited by the Petitioner, observed inbreeding depression. *Id.* at 647. Specifically, Phumichai noted that “the fact that only 1 of 7 cross combinations reached S5 generation indicates that serious loss of fertility is typical in most families. Thus, in breeding depression, typically expressed as reduced pollen viability and tuber yield . . . will certainly limit continued selfing of the present diploid inbreds.” Ex. 1005 at 0010. Phumichai then concluded, compared to a breeding scheme of introducing the *Sli* gene followed by selfing, “[a]lternatively, a slower approach to homozygosity using sib mating or composite sibbing of inbreds may permit more effective selection before complete fixation occurs.” *Id.*

Agventure also cited a 2009 publication by Petitioner’s expert, Dr. Jansky, as support. Ex. 2009 at 639, 641, citing Shelley Jansky, *Chapter 2: Breeding, Genetics, and Cultivar Development*, *Advances in Potato Chemistry and Technology*, pp. 27–62 (June 2009) (“Jansky 2009”) (Ex. 1011). Importantly, Jansky 2009 was published only months before the effective filing date of the ’841 Patent, October 26, 2009,

and thus reflects Dr. Jansky's understanding of potato breeding around the priority date of the '841 Patent.

Specifically, Agventure submitted that in Jansky 2009, "hybrid breeding using essentially homozygous parental lines of *S. tuberosum* . . . was quickly downplayed as commercially unfeasible due to 'dramatic reductions in fertility and vigor,'" and instead, Jansky 2009 "refers to sibling mating as an attractive alternative to hybrid breeding, thereby suggesting – and further establishing the prejudice argued herein below – to stay clear of hybrid breeding in *S. tuberosum*." Ex. 2009 at 641; *see also id.* at 682.

Indeed, as Dr. Jansky stated in her publication: "Another option is to create homozygous diploids using self-incompatibility inhibitors to allow self-pollination Each generation of self-fertilization reduces heterozygosity by 50%. ***This rate of approach to homozygosity may be too high in potato***, where ***inbreeding depression results in dramatic reductions in fertility and plant vigor*** (Phumichai et al., 2005; Phumichai and Hosaka, 2006). Sib-mating is an attractive alternative that provides a smoother transition to homozygosity."¹¹ Ex. 1011 at 0026. This demonstrates that only months before the priority date of the '841 Patent, Dr. Jansky

¹¹ Jansky 2009 was considered and discussed by the Examiner during prosecution of the '436 Patent. *E.g.*, Ex. 2009 at 600–01, 614.

was skeptical of creating homozygous diploids using the *Sli* gene and suggested that an alternative scheme would be more preferable.

In the same publication, Dr. Jansky also expressed skepticism towards breeding diploid potatoes in general, stating: “While the development of potato cultivars at the diploid level sounds appealing, ***it is not likely to be successful***. In potato, intralocus (dominance) and interlocus (epistasis) interactions are necessary to maximize yield (Mendoza and Haynes, 1974b). Tetraploidy offers many more opportunities to create such interactions.” Ex. 1011 at 0017 (emphasis added). Not only does Dr. Jansky fail to acknowledge these prior inconsistent statements contradicting her declaration here; she provides no justification for why she has radically revised her point of view. Such glaring omissions and hindsight revisionist history has no place before the Board.

Agventure also submitted statements from several potato breeding experts that support industry skepticism. For example, during prosecution of the '436 Patent, Agventure submitted a letter from Dr. Evert Jacobsen, Professor of Wageningen University in Plant Breeding, where Dr. Jacobsen stated:

It is clear that in potato breeding, ***we were convinced that inbreeding depression and self-incompatibility at the diploid level*** and the need for multi-allelism justified the traditional way of breeding and that ***your approach has been considered as unrealistic and unfeasible*** for the development of commercial cultivars.

Ex. 2009 at 684.

Similarly, Dr. Jan van Loon, a private potato breeder in the Netherlands, stated in his letter that it was very difficult to produce homozygous inbred lines:

Most researchers believe it is impossible to produce commercial potatoes from seed. From own experience I can declare *that it is very difficult, if not impossible to produce homozygous inbred lines* as parents for a variety from true potato seed.

Id. at 688.

Dr. Maarten Koornneef, a retired Professor of Plant Genetics at the Laboratory of Genetics at Wageningen University, similarly stated that there was very little chance of success in producing good performing homozygous potato lines due to inbreeding depression:

Genetic theory and practice predict[] that homozygosity increases upon inbreeding which results in inbreeding depression Inbreeding depression in potato is quite serious due to the many less or non-functional alleles This shows that starting from a heterozygous diploid potato genotype, *the chance to identify a plant without homozygous deleterious alleles is extremely small*, if not practically impossible. Therefore, to start a project aiming at developing a good performing homozygous potato plant for the purpose of hybrid production is *a daring undertaking with very little chance of success*. I believe that this has been the reason that for many decades *potato*

geneticists and breeders have been convinced that inbreeding depression in potato cannot be overcome. . . .

Id. at 690.

During prosecution of the '841 Patent, Dr. Koornneef, again submitted:

The purpose of my letter to Dr. Lindhout was to show my appreciation for Solynta's desire to challenge ***the dogma amongst potato geneticists and breeders regarding inbreeding depression*** in potato and applaud their success in obtaining high-yielding essentially homozygous diploid potato lines.

Ex. 1010 at 1058. Notably, the Examiner's Statement of Reasons for Allowance indicates that Dr. Koornneef's declaration was persuasive in not making a new rejection under 35 U.S.C. § 103. *Id.* at 2692.

3. Failure of Others

Petitioner also does not rebut evidence that others have failed in attempts to achieve diploid, fertile, self-compatible, and highly homozygous potato lines, including through a breeding scheme of introducing the *Sli* gene followed by selfing. Ex. 2009 at 651 ("attempts to produce hybrid potato at the diploid level using the *S. chacoense Sli* gene in *Solanum phureja* and selfing the lines that carry the *Sli* gene, were never successful in developing any promising material in the form of fertile homozygotes that could be useful for hybrid breeding and that could tolerate recurrent selfing"), 968 ("On the contrary, the Applicant succeeded in producing

diploid and self-compatible *S. tuberosum* potato lines of the claimed invention when others have failed. It should also be noted that the inventors themselves had many unsuccessful attempts . . .”), 1009 (“There was only a minimal expectation of success in generating vigorous, fertile plants, as all previous attempts to generate fertile, homozygous, diploid potato lines by introgression of the *Sli*-gene into naturally diploid *Solanum* species such a *S. phureja* had failed.”).

Agventure submitted statements from potato breeding experts demonstrating others’ failure in achieving the claimed invention. For example, during prosecution of the ’436 Patent, Agventure submitted a letter from Dr. Jonathan Jones, then Senior Scientist at the Sainsbury Laboratory and Professor at the University of East Anglia, where Dr. Jones discussed his own failed attempts at producing fertile homozygous potato lines through back-crossing the *Sli* gene then selfing the lines carrying the *Sli* gene:

In fact, in the mid 2000s we attempted to produce hybrid potato ourselves. ***No successes had ever been reported with S. tuberosum.*** In order to work at the diploid level, we back-crossed the *S. chacoense Sli*-gene into *Solanum phureja*. In addition, we selfed the lines that carry the *Sli*- gene. However, ***we never succeeded in developing any promising material*** in the form of fertile homozygotes that could be useful for hybrid breeding and that could tolerate recurrent selfing.

. . . . The fact that you have been able to obtain viable inbred lines using selfed diploids of *Sli* lines is very significant; ***we had a similar objective but we were unable to achieve it.***

This means that for the first time you now have established fertile homozygotes with good agronomical properties in potato that can be used to test for heterosis on intercrossing.

Ex. 2009 at 685.

During prosecution of the '841 Patent, Dr. Jones similarly submitted a declaration testifying to his failed attempts due to extensive inbreeding depression:

. . . our attempts to cross the *Sli* gene in *Solanum phureja*. As stated above, ***these attempts were unsuccessful.*** We found that, after only a few rounds of selfing with the original material from Hosaka, ***inbreeding depression was already so extensive*** that we terminated the program. While our objective in improving hybrid potato breeding was similar to that of the present inventors, ***we were unable to successfully achieve it*** for several reasons.

Ex. 1010 at 1054. Notably, the Examiner's Statement of Reasons for Allowance indicates that Dr. Jones's declaration was persuasive in not making a new rejection under 35 U.S.C. § 103. *Id.* at 2692.

4. Unexpected Results

Agventure also presented evidence during prosecution that it was unexpected to successfully develop self-compatible, highly homozygous diploid potatoes lines

with vigorous tuber yields as claimed, which Petitioner fails to adequately address. *E.g.*, Ex. 2009 at 647 (“Surprisingly, the inventors found that, successive rounds of selfing while selecting for plants that produce fertile offspring eventually resulted in plants with progressively improved fertility and vigour. . . . This result was fully unexpected, since selection for fertile plants has usually been associated with selecting for heterozygosity, not homozygosity.”) (citing Phumichai), 1009 (“After at least three years of unsuccessful attempts using four alternative methods, the inventors surprised the industry and themselves by introgressing the *Sli*-gene into diploid *S. tuberosum* plants followed by inbreeding.”).

In support, Agventure cited Phumichai which teaches that “reproductive traits, such as flowering versus nonflowering and the degree of pollen production, were strongly correlated with heterozygosity, and selection for fertility favored the more heterozygous plants.” Ex. 1005 at 0010; Ex. 2009 at 647. Because reproductive traits often correlate with heterozygosity, it would have been unexpected to achieve fertile and homozygous offsprings.

Additionally, Agventure submitted letters from potato breeding experts demonstrating that the claimed inventions were unexpected. For example, Dr. Jan van Loon found that Agventure’s inbreeding approach produced surprising results:

. . . I can declare that it is very difficult, if not impossible to produce homozygous inbred lines as parents for a variety from true potato seed.

The pioneering approach of Solynta with non common techniques in potato breeding has produced surprising results, recently honoured with the Food Valley Award.

Ex. 2009 at 688.

Dr. Koornneef similarly expressed surprise that Agventure was able to challenge the industry skepticism and successfully overcome inbreeding depression:

I believe that this has been the reason that for many decades potato geneticists and breeders have been convinced that inbreeding depression in potato cannot be overcome. . . .

Ever since Lindhout and his co-workers published their results in Potato Research volume 54 of 2011, showing high yielding hybrids from 87% homozygous F3 inbreds, *I have been positively surprised that Solynta has managed to challenge this dogma.*

Id. at 690.

Dr. Jacobsen also commented on Agventure's surprising success in diploid breeding:

All commercial potato cultivars are tetraploid and there is a common belief that tetraploids will always outperform diploids. Your F1 hybrid method relies on diploid breeding. *That your approach is successful is surprising to me.*

Id. at 684.

Agventure also submitted to the Examiner declarations from named inventor, Dr. Lindhout. Specifically, Dr. Lindhout testified in his declaration that, consistent with the statements in the expert letters, “the strategy of using a hybrid potato seed approach as presently disclosed was considered a completely new way of potato breeding and a pioneering approach that produced surprising results.” *Id.* at 680.

Dr. Lindhout later gave a presentation to the Examiner in an interview concerning the “uniqueness of [Agventure’s] potato seed technology” as claimed. *Id.* at 976, 978–84. The presentation discussed, among other things, the “[p]rejudices in hybrid potato breeding,” that Agventure had “[f]ive different projects to achieve hybrid breeding [] with *S. tuberosum*” where “introducing the *Sli*-gene” was only one of them, and that the “[e]xpectation that *Sli* should work was very low.” *Id.* at 982.

Dr. Lindhout then submitted another declaration testifying to the surprising nature of Agventure’s success in achieving homozygous diploid potato lines through a breeding scheme of introducing the *Sli* gene followed by selfing, after over three years of unsuccessful attempts with four other methods:

As I stated during the interview on 30 November 2018 at the USPTO in Alexandria, the generation of homozygous (inbred), diploid potato lines by means of introgressing the *Sli*-gene from a *Sli*-gene donor line into diploid *S. tuberosum* plants followed by inbreeding (selfing) and selection for fertile offspring, which led to the unexpected result of the

plants as claimed, was the culmination of at least three years of unsuccessful attempts using four alternative methods.

Id. at 989.

5. Industry Praise

Lastly, Agventure presented evidence of industry praise of the claimed potato lines and potato seed breeding methods that allows introduction of agronomically desirable traits, which Petitioner brushes aside. For example, Agventure submitted that “[t]he Dutch company Solynta [i.e., Agventure], which exploits the subject-matter of the present US patent application, had the honor to receive from the Dutch government the title of ‘National Icon 2014’, for its groundbreaking technology in the field of potato breeding.” *Id.* at 651. The award specifically highlighted Agventure’s “new breeding technique with potato seed instead of potatoes,” so that “[t]he genetic material of the potato can be enhanced and so varied.” *Id.*

The letters and declarations from potato breeding experts around the globe, as discussed above, also demonstrate the industry praise of the claimed invention.

B. The Examiner Found Evidence of Secondary Considerations Important in Allowance

These secondary considerations were critical to the issuance of the ’436 and ’841 Patents. During prosecution of the ’436 Patent, following Agventure’s submission of the inventor declaration and the expert letters, the Examiner withdrew his prior obviousness rejections under Section 103 “in view of Applicant’s

amendments to the claims, arguments and the Lindhout declaration.” *Id.* at 718. The Examiner noted that “[t]he invention appears to involve novel plants and the declaration by Mr. Lindhout and supporting letters document how novel these potato lines are.” *Id.* at 734.¹² Similarly, during prosecution of the ’841 Patent, the Examiner explicitly stated in the Reasons for Allowance that “the declarations by Dr. Jones (3 February 2021) and Dr. Koornneef (22 January 2021)” “were persuasive in not making a new rejection under 35 USC 103.” Ex. 1010 at 2692.

The secondary considerations evidence was critical to allowance of the challenged claims.

C. Petitioner Failed to Adequately Address Known Evidence of Secondary Considerations Presented During Prosecution

There is no dispute that Petitioner is aware of the prosecution histories of both the ’841 and ’436 Patents, and therefore the evidence of secondary considerations presented therein. *E.g.*, Petition at § VI.D. (“’841 Prosecution History”), 74–75 (referencing the “parent ’436” Patent and its prosecution history); Ex. 1002 at 8–9 (including filings from the ’436 Patent prosecution history as materials considered),

¹² While this statement was made in connection with the Examiner’s Section 112 rejections, it demonstrates that the Examiner found Dr. Lindhout’s declaration and the accompanying expert letters support the novelty of the claimed invention.

¶ 98 (referencing the '436 Patent prosecution history), § V.D. (“Overview of the Prosecution History”).

Here, the Petitioner gives short shrift to secondary considerations and asserts that “[t]here are no secondary considerations to counter the Petition’s strong obviousness grounds.” Petition at 73, § IX. In doing so, Petitioner provides no detailed explanations, no response to the secondary considerations evidence presented during prosecution, and merely makes the conclusory statements that Agventure cannot show industry praise, unexpected results, and long-felt needs. Petition at 73, § IX. That is insufficient to support institution.

Dr. Jansky similarly glosses over the secondary evidence of non-obviousness from the '841 and '436 Patent prosecutions. Ex. 1002, § VII. Dr. Jansky simply argues that there is no industry praise, no unexpected results, and no long-felt, unmet need based on prior art. *Id.* In doing so, Dr. Jansky provides no response to the evidence of secondary considerations presented during prosecution, other than explaining away her prior statement that “I was trained to believe that potatoes can’t be inbred” quoted in a 2019 publication, cited in Agventure’s response to the Examiner’s Section 112 rejections. *Id.* at ¶ 320.

Notably, neither Petitioner nor Dr. Jansky discusses other secondary considerations such as failure of others and industry skepticism that Agventure presented to the Examiner during prosecution.

Because Petitioner is aware of but fails to address the secondary considerations evidence presented to the Examiner and found critical to patentability during prosecution of the '436 and '841 Patents, the Board should follow its prior practices and deny institution. *E.g., Stryker*, IPR2019-00817, Paper 10 at 28–29; *Coalition*, IPR2015-01792, Paper 14 at 18–19.

VI. THE BOARD SHOULD DENY INSTITUTION UNDER 35 U.S.C. § 325(d) ON GROUNDS 1–5

The Board should also deny institution under 35 U.S.C. § 325(d) because proceeding with an IPR would be an inefficient use of the Board's resources where, as here, prior art and/or arguments substantially the same as those raised by Petitioner were already considered by the Patent Office, and Petitioner has not established that the Patent Office erred in way material to patentability.

Discretionary denial under Section 325(d) follows a two-step test:

(1) whether the *same or substantially the same art* previously was presented to the Office or whether *the same or substantially the same arguments* previously were presented to the Office; and

(2) if either condition of first part of the framework is satisfied, whether *the petitioner* has demonstrated that the Office erred in a manner material to the patentability of challenged claims.

Advanced Bionics, LLC v. Med-El Elektromedizinische Geräte GMBH, IPR2019-01469, Paper 6 at 8 (P.T.A.B. Feb. 13, 2020) (precedential) (emphasis added). If the

same or substantially the same art *or* arguments were previously presented under *Advanced Bionics* step 1, “and the petitioner fails to make a showing of material error” under step 2, “the Director generally will exercise discretion not to institute inter partes review.” *Id.* at 8–9.

Both steps support denial. ***First***, substantially same prior art and arguments as those raised by the Petitioner were considered by the Examiner during prosecution of the ’841 Patent and its parent ’436 Patent. ***Second***, Petitioner failed to show that the Patent office erred in a manner material to patentability when it allowed the ’841 Patent over the already-considered references and arguments.

A. Substantially the Same Prior Art References and Arguments Were Considered by the Patent Office

Petitioner relies on substantially the same prior art references and arguments already considered by the Examiner during prosecution of the ’841 and ’436 Patents for Grounds 1–5.

1. Jong

The Petitioner relies on Jong as anticipatory for Ground 1 and as the primary obviousness reference for Grounds 2 and 3.

Jong was fully considered by the Examiner during prosecution of both the ’841 and ’436 Patent. Ex. 1010 at 0478; Ex. 2009 at 1136, 1140.

The Examiner also considered substantially the same arguments as those Petitioner makes based on Jong. For example, with respect to Claim 1 of the '841 Patent, the Petitioner argues that Jong discloses:

- (1) “several novel potato plants developed by crossing a well-known, self-fertile *Solanum tuberosum* Group Tuberosum plant (US-W4), with either: i) a *Solanum tuberosum* Group Phureja plant . . . , or ii) a *Solanum tuberosum* Group Stenotomum plant”;
- (2) “diploid, fertile, and self-compatible” potato lines;
- (3) potato lines “that exhibit greater than 200g fresh weight of tubers per plant at the S₂ generation”;
- (4) “basic principles of diploid genetics, that heterozygosity is reduced by 50% every generation of selfing”;
- (5) self-compatibility of US-W4, which the Petitioner argued “necessarily derived its self-compatibility from the S-locus gene inhibitor (*Sl*i**).”

E.g., Petition at 32–35.

Substantially the same arguments had been considered by the Examiner during prosecution of the '841 and '436 Patents before allowance. For example, during prosecution of the '841 Patent, the Examiner initially rejected then-pending claims for obviousness over the same Phumichai reference relied on by Petitioner

and other prior art. Specifically, the Examiner found a prior art reference, Maris, “teaches breeding potatoes from diploid parental lines, e.g., phureja PI 195198, and thus teaches a diploid, fertile, self-compatible and [at least 25%] homozygous potato line,” and “plants that have an average tuber yield of at least 200 g/plant.” Ex. 1010 at 0448. The Examiner also cited Phumichai for teaching “developing diploid potato clones” by crossing “(1) the diploid clone . . . and (2) two advanced diploid clones,” and “using the *Sli* gene to obtain such self-compatible potato lines.” *Id.* at 0448–49.

In a later rejection, the Examiner cited another publication by Phumichai in 2006, noting that it “teaches selfing diploid potato clones using the *Sli* gene for obtaining self-compatible potato lines,” which were “at least 50%” homozygous. *Id.* at 0954–95; Chalernpol Phumichai and Kazuyoshi Hosaka, *Cryptic improvement for fertility by continuous selfing of diploid potatoes using Sli gene*, Euphytica, 149:251–258 (2006) (“Phumichai and Hosaka”) (Ex. 1037). Similar to Petitioner’s arguments based on Jong, Phumichai and Hosaka also teaches continued selfing, and specifically states that when “a diploid potato was continuously selfed by a function of *Sli* gene, the level of heterozygosity reduced.” Ex. 1037 at 0001.

Additionally, during prosecution of the ’436 Patent, the same Examiner found that “[c]reating a plant line that is, e.g., 50% or **75% homozygous**, is routine [in] the agricultural art.” Ex. 2009 at 916 (emphasis added).

As such, the Examiner considered substantially the same arguments as those raised by Petitioner regarding Jong for Claim 1 during prosecution before allowance.

Similarly, the Examiner considered substantially the same arguments as those Petitioner makes with Jong against the other independent claim, Claim 8.

Compared to Claim 1, “Claim 8 recites a method of producing uniform diploid hybrid *Solanum tuberosum* potato plants by crossing two inbreds as described in Claim 1.” Petition at 47. With respect to the preamble, steps (a) and (b) of Claim 8, Petitioner argues that Jong discloses the preamble, the “first potato plant” described step (a), and the “second potato plant” described in step (b) by referencing its earlier argument that Jong discloses the inbreds described in Claim 1. Petition at 47, 48; *see also id.* at 66–67. For similar reasons as discussed above for Claim 1, these arguments have been considered by the Examiner during prosecution.

With respect to steps (c) and (d) of Claim 8, Petitioner argues that “Jong teaches cross-pollination to produce hybrids,” that “[a] POSA would understand that Jong’s call to cross inbred clones with high combining ability also encompasses the step of collecting the resulting potato seeds,” and cites to its obviousness arguments based on Jong for Claim 5, another method claim of the ’841 Patent. Petition at 50; *see also id.* at 67–68.

Specifically, steps (c) and (d) of Claim 8 recites “(c) cross-pollinating said first and said second potato plant and allowing said potato plant to produce berries

with seeds; and (d) collecting said seeds from said berries to provide hybrid potato seeds.” Ex. 1001, Claim 8. The breeding scheme in Claim 5 recites the identical. *Id.*, Claim 5 (reciting as step (c) “cross-pollinating said first potato plant and said second potato plant to produce seeds and collecting said seeds to thereby provide hybrid offspring seeds”). As analyzed in Section VI.A.3 below, a breeding scheme with steps identical to Claim 5, including the steps of cross-pollinating a first potato plant and a second potato plant to produce seeds and collecting said seeds to provide hybrid offspring seeds, was considered by and initially rejected as obvious by the Examiner because “[o]ther than the starting material, the steps . . . are merely routine backcrossing steps” based on prior art. § VI.A.3; Ex. 1010 at 0110 (pending Claim 41), 0447–49.

As such, substantially the same arguments as those Petitioner makes regarding steps (c) and (d) of Claim 8 based on Jong have been considered by the Examiner.

2. Phumichai

The Petitioner relies on Phumichai as the primary obviousness reference for Grounds 4 and 5.

Phumichai was fully considered and extensively discussed by the Examiner during prosecution of both the ’436 and ’841 Patents. *E.g.*, Ex. 1010 at 0448–49, 0478; Ex. 2009 at 600–606, 614.

The Examiner has considered substantially the same arguments as those Petitioner makes based on Phumichai. For example, with respect to Claim 1 of the '841 Patent, Petitioner argues that Phumichai discloses:

- (1) “produc[ing] highly inbred plants of a cross between *S. tuberosum* Group Phureja and *S. chacoense*”;
- (2) “introduction of *Sli* into several *S. tuberosum* Group Phureja cultivated inbred lines” that are diploid, fertile, and self-compatible;
- (3) “develop[ing] several inbred lines with the homozygosity and fertility limitations of the claims, exhibiting ‘considerable tuber yields’ at the S₄ level”;
- (4) “‘highly homozygous’ lines with much greater than 75% homozygosity”;
- (5) lines that “have the same *Sli* gene as the recited deposits” in Claim 1 of the '841 Patent.

Petition at 52–57, § VIII.E.1.

Substantially the same arguments were considered by the Examiner during prosecution of the '841 Patent and/or the '436 Patent before allowance. During prosecution of the '841 Patent, the Examiner found that Phumichai “teaches developing diploid potato clones based on (1) the diploid clone 97H32-6 and (2) two advanced diploid clones” by “crossing them,” and “using the *Sli* gene to obtain such

self-compatible potato lines.” Ex. 1010 at 0448–49. The Examiner noted in the same rejection that another prior art reference, Maris, “teaches breeding potatoes from diploid parental lines, e.g., phureja PI 195198, and thus teaches a diploid, fertile, self-compatible and [at least 25%] homozygous potato line,” and “plants that have an average tuber yield of at least 200 g/plant.” *Id.* at 0448.

The Examiner further noted, in a later Section 103 rejection, that Phumichai “teaches crossing potato plants to obtain ***highly homozygous lines***.” *Id.* at 0957 (emphasis added).

In response to the rejections, Agventure amended all independent claims to recite “at least 75% of” homozygosity and “at least 200 grams” fresh weight of tubers. Ex. 1010 at 1029–1032, 1044. In response to the amendments, the Examiner issued a Notice of Allowance on August 6, 2021, proposing further amendments, including explicitly reciting at least 75% of homozygosity and at least 200 grams fresh weight of tubers per plant in a dependent claim. *Id.* at 2690. The Examiner then allowed the claims as amended, and noted that the Section 103 rejections “are withdrawn in view of the Examiner’s amendment.” *Id.* at 2692.

During prosecution of the ’436 Patent, the Examiner similarly rejected pending claims over Phumichai and other references. Specifically, the Examiner found that “introducing, e.g., the *Sli* gene as taught by Phumichai et al. into a[] self-

incompatible cultivated diploid potato line would have been obvious [to] one of skill in the art at the time of Applicant's invention." Ex. 2009 at 603.

In response to the Examiner March 8, 2016 rejection, Agventure distinguished Phumichai by arguing, in part, that "the inbreeding technique reported by Phumichai for obtaining homozygous potatoes is NOT performed with *S. tuberosum*. The plants of Phumichai are not *S. tuberosum* plants but a mixture of the genomes of three wild relatives *S. chacoense*, *S[.] phureja*, and *S. stenotomum*." *Id.* at 645; *see also id.* at 652.

The Examiner did not find this distinguishment convincing. Later during prosecution, the Examiner noted in rejections that crossing genes into *S. tuberosum* was taught in the prior art including Phumichai. For example, the Examiner found that Phumichai "teaches using diploid self-incompatible *S. tuberosum* plants," *id.* at 1136, and that another prior art reference, Bradshaw, teaches "using *S. tuberosum* lines" and "the value of obtaining genes from *S. chacoense* and crossing such genes into *S. tuberosum*." *Id.* at 914–15. Based on the prior art, the Examiner concluded that "[c]reating a plant line that is, e.g., 50% or 75% homozygous, is routine [in] the agricultural art." *Id.* at 916.

Therefore, to the extent that the Petitioner now argues that "[p]rior art describing studies with potato labeled as *S. phureja* was, before 2009, understood to describe species *S. tuberosum* potatoes," and that Agventure was wrong in stating

during prosecution that the inbreeding technique in Phumichai was not performed with *S. tuberosum*, such argument has been fully considered by the Examiner during prosecution of the parent '436 Patent. Petition at 4–5, 27, 53–55.

For these reasons, substantially the same arguments as those raised by Petitioner based on Jong for Claim 1 have also already been considered by the Examiner during prosecution before allowance.

With respect to Claim 8, Petitioner makes the same arguments based on Phumichai and Jong. Petition at 66–68. For example, Petitioner states that “Phumichai and Jong each disclose inbred plants displaying the phenotypes recited” in Claim 8, that “[b]oth Phumichai and Jong teach crossing plants,” and that “[b]oth Phumichai and Jong recommend using diploid inbreds to produce hybrid varieties.” *Id.* Because substantially the same arguments raised by Petitioner based on Jong were considered during prosecution, *see* § VI.A.1, substantially the same arguments based on Phumichai were also considered.

3. Spooner, Chase, Springer, Bamberg

Petitioner relies on Spooner, Chase, Springer, and Bamberg as secondary combination references for obviousness Grounds 2, 3, 4, 5, 7, and 9. While the exact references were not cited during prosecution, substantially the same arguments as those the Petitioner makes relying on these references have been considered by the Examiner during prosecution of the '436 and '841 Patents.

Specifically, Petitioner argues that Spooner “provides taxonomy confirming that Phureja are within the species *S. tuberosum*.” Petition at 30. Substantially the same arguments have been considered by the Examiner during prosecution. For example, as discussed above, despite Agventure’s argument to the Examiner that Phureja was distinguishable from the species *S. tuberosum*, the Examiner continued to find that Phumichai teaches “using diploid self-incompatible *S. tuberosum* plants” through studies using Phureja. Ex. 2009 at 1136.

Petitioner argues that Chase “discloses a systematic approach to inbreeding homozygous diploid potato for creating hybrids between said lines to achieve heterosis” and a “breeding program . . . effectively identical to” the ’841 Patent. Petition at 13, 30–31, 40–44. For example, with respect to Claim 5 of the ’841 Patent, a method claim for “producing a plant of a potato line” that depends from Claim 1, Petitioner argues that Claim 5 is obvious over Jong and Chase because “Jong discloses the potato plants of Claim 1, and, in combination with Chase, describes the hybridization and inbreeding/selfing methods of Claim 5.” *Id.* at 40–41.

During prosecution of the ’841 Patent, the Examiner considered references disclosing breeding schemes identical to Claim 5. For example, the Examiner rejected then-pending Claim 41 as obvious over Phumichai and other references. Pending Claim 41 recites a breeding scheme with steps identical to the issued Claim 5, though using and producing plants with slightly different attributes:

Pending Claim 41	Claim 5
41. A method of producing a <i>Solanum</i> species plant line, wherein said plant line is diploid, fertile, self-compatible, produces at least 200 grams fresh weight of tubers per plant, and at least 50% of the genomic loci in said plant line are homozygous, comprising the steps of:	5. A method of producing a plant of a potato line, wherein said potato line is diploid, fertile, self-compatible, produces at least 200 grams fresh weight of tubers per plant, and at least 75% of the genomic loci in said plant line are homozygous, comprising the steps of:
(a) providing a first potato plant, wherein said first potato plant is diploid, fertile, self-compatible and essentially homozygous;	(a) providing a first potato plant, wherein said first potato plant is the plant according to claim 1;
(b) providing a second potato plant, wherein said second potato plant is a diploid <i>Solanum</i> species plant, said potato plant having any level of homozygosity;	(b) providing a second potato plant, wherein said second potato plant is a diploid plant, and wherein said potato plant comprises any level of homozygosity;
(c) cross-pollinating said first potato plant and said second potato plant to provide a seed and collecting said seed to thereby provide a hybrid offspring seed;	(c) cross-pollinating said first potato plant and said second potato plant to produce seeds and collecting said seeds to thereby provide hybrid offspring seeds;
(d) growing a multiplicity of said hybrid offspring seed in a population of hybrid offspring potato plants and selecting from said population a self-compatible plant;	(d) growing said hybrid offspring seeds to provide a population of hybrid offspring potato plants and selecting from said population a self-compatible potato plant;
(e) inbreeding said self-compatible potato plant by selfing or backcrossing said self-compatible potato plant to a potato plant of said line of said first potato plant, for between 1 to 8 selfings or backcrosses to thereby increase the	(e) inbreeding said self-compatible potato plant by selfing said self-compatible potato plant for between 1 to 8 selfings to thereby increase the degree of homozygosity in each successive generation; and

Pending Claim 41	Claim 5
degree of homozygosity in each successive generation; and	
(f) selecting within each generation of inbreeding for a fertile offspring plant to provide a diploid, fertile, self-compatible <i>Solanum</i> species plant line, wherein at least 50% of the genomic loci in said plant line are homozygous.	(f) selecting within each generation of inbreeding for a fertile offspring plant, and providing a diploid, fertile, self-compatible potato plant, wherein at least 75% of the genomic loci in said plant are homozygous.

Ex. 1010 at 0110–11, 0447–48; Ex. 1001, Claim 5.

In rejecting Claim 41 as obvious, the Examiner found that Phumichai “teaches developing diploid potato clones based on (1) the diploid clone 97H32-6 and (2) two advanced diploid clones,” “crossing them,” and “using the Sli gene to obtain such self-compatible potato lines.” Ex. 1010 at 0447–48. Citing Phumichai, the Examiner concluded that “[o]ther than the starting material, the steps in claim 41 are merely routine backcrossing steps.” *Id.* at 0449. Therefore, substantially the same disclosures and arguments as those Petitioner argues with Chase have been considered by the Examiner.

Petitioner also asserts that Bamberg “lists accessions of potato germplasm available to the public and provid[ing] data on their agronomically desirable traits.” Petition at 31, 40. The Examiner considered substantially the same disclosures from various prior art references during prosecution. For example, the Examiner found that Watanabe “teaches the value of introgressing an agronomically desirable trait[s],

such as nematode resistance, into a diploid breeding stock,” that Birhman & Hosaka “teaches using different potato lines to add traits to a reference line with the *Sli* gene,” and that Bradshaw “teaches crossing traits such as disease resistance . . . into potato plants.” Ex. 1010 at 0449, 0955–56 .

Petitioner also cites to Springer for alleged disclosure of step (d) of Claim 8, specifically that based on the studies in Springer, “hybrid crosses using parents with at least 20% contrasting homozygous loci based on molecular marker analysis was known.” Petition at 49–51. Substantially the same arguments were considered by the Examiner. During prosecution of the ’436 Patent, the Examiner cited a publication by Phumichai, and concluded that “[i]n view of the teachings of Phumichai et al. regarding the heterozygosity of two lines (see, e.g., page 978), two breeding lines that comprise at least 20% contrasting homozygous loci are obvious.”¹³ Ex. 2009 at 915.

¹³ The Examiner cited Chalernpol Phumichai et al., *Expression of S-locus Inhibitor Gene (Sli) in Various Diploid Potatoes*, Euphytica, 148:227–234 (2006) as basis for its Section 103 rejection. Ex. 2009 at 913; Ex. 1024. However, the page cite in the quoted statement suggests that the reference discussed in this particular context was Chalernpol Phumichai et al., *Toward the development of highly homozygous diploid potato lines using the self-compatibility controlling Sli gene*, Genome, 48(6):977–

Therefore, substantially the same arguments as those raised by Petitioner based on Spooner, Chase, Springer, and Bamberg have been considered by the Examiner during prosecution of the '841 and '436 Patents.

B. Petitioner Has Not Demonstrated That the Office Erred in a Manner Material to the Patentability of Challenged Claims

Petitioner fails to establish that the Examiner erred in any material way. Petitioner alleges two errors made by the Examiner, that is, (1) “the Examiner erred in accepting Agventure’s inaccurate representations across both prosecution histories that the Phureja plants disclosed in Phumichai were not of the species *S. tuberosum*”; and (2) “[t]he Examiner also erred with respect to Jong, disclosed in an IDS but never used in any rejection, by overlooking specific disclosures, such as Jong’s express disclosures of diploid, fertile, self-compatible potatoes that were highly homozygous and which gave tuber yields exceeding the claims’ requirements, and the use of such plants for inbreeding and hybrid crossing.” Petition at 75–76.

Not true. The Examiner did not err in allowing the '841 and the '436 Patents as Petitioner suggests, and even assuming the Examiner did, such errors are not material to the patentability of the challenged claims.

984 (2005), the same Phumichai reference raised by Petitioner. Ex. 2009 at 915; Ex. 1005.

First, the Examiner did **not** accept Agventure's point that the Phureja plants disclosed in Phumichai were distinguishable from the specific *S. tuberosum*. As discussed in Section VI.A.2 above, during prosecution of the '436 Patent, after Agventure argued that Phumichai was distinguishable from the pending claims because "[t]he plants of Phumichai are not *S. tuberosum* plants but a mixture of the genomes of three wild relatives *S. chacoense*, *S[.] phureja*, and *S. stenotomum*," the Examiner continued to state in a later rejection that Phumichai "teaches using diploid self-incompatible *S. tuberosum* plants." Ex. 2009 at 645, 652, 1136. This shows that the Examiner did not accept Agventure's argument. Indeed, Petitioner points to no record during prosecution indicating that the Examiner was persuaded by Agventure's argument.

Second, the Examiner did not overlook Jong. On the contrary, the Examiner rejected pending claims for obviousness over prior art references including Phumichai and Jong during prosecution of the '436 Patent. Ex. 2009 at 1134–36. Additionally, while Petitioner alleges that the Examiner erred by overlooking "Jong's express disclosures of diploid, fertile, self-compatible potatoes that were highly homozygous and which gave tuber yields exceeding the claims' requirements, and the use of such plants for inbreeding and hybrid crossing," Petition at 75–76, as analyzed in Section VI.A.1, substantially the same disclosures from other references were discussed and considered by the Examiner before allowing the '436 and '841

Patents. Therefore, any errors alleged by Petitioner with regards to Jong are not material to the patentability of the challenged claims.

As such, because substantially the same references and/or arguments that Petitioner raises have been considered by the Patent Office, and Petitioner has not established that the Patent Office erred in a material way, the Board should deny institution under 35 U.S.C. § 325(d).

VII. CONCLUSION

For the reasons presented above, Patent Owner requests that the Board deny institution and terminate this proceeding.

Case IPR 2025-00136
Patent No. 11,140,841

Date: February 21, 2025

Respectfully submitted,

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CERTIFICATION OF WORD COUNT

The undersigned hereby certifies that the portions of the above-captioned **PATENT OWNER PRELIMINARY RESPONSE** specified in 37 C.F.R. § 42.24 have 12,005 words, in compliance with the 14,000 word limit set forth in 37 C.F.R. § 42.24(b)(1). Counsel has relied upon the word count feature provided by Microsoft Word.

Date: February 21, 2025

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CERTIFICATE OF SERVICE

In compliance with 37 C.F.R. §§ 42.105, 42.6(e), the undersigned hereby certifies that a complete copy of the foregoing document was served on February 21, 2025 on counsel of record for the Petitioner via email to the following addresses:

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