

IN THE UNITED STATES DISTRICT COURT  
FOR THE DISTRICT OF DELAWARE

HUVEPHARMA EOOD and	)	
HUVEPHARMA, INC.,	)	
	)	
Plaintiffs,	)	
	)	C.A. No. _____
v.	)	
	)	JURY TRIAL DEMANDED
ASSOCIATED BRITISH FOODS, PLC, AB	)	
VISTA, INC., PGP INTERNATIONAL	)	
CORPORATION, ABITEC	)	
CORPORATION, AB ENZYMES, INC., and	)	
AB ENZYMES GMBH,	)	
	)	
Defendants.	)	

**COMPLAINT**

Plaintiffs Huvepharma EOOD (formerly Huvepharma AD) and Huvepharma, Inc. (collectively, “Plaintiffs” or “Huvepharma”), for their complaint against Associated British Foods, plc, AB Vista, Inc., PGP International Corporation, ABITEC Corporation, AB Enzymes, Inc., and AB Enzymes GmbH (collectively, “Defendants”), allege the following:

**NATURE OF THE ACTION**

1. This is an action for patent infringement arising under the United States Patent Act, 35 U.S.C §§ 1, *et seq.*, including 35 U.S.C § 271.
2. Huvepharma brings this action to obtain relief for Defendants’ infringement of Huvepharma’s rights under the Patent Laws of the United States 35 U.S.C §§ 1, *et seq.*, which arise from U.S. Patent Nos. 8,993,300 (the “300 patent,” attached as Exhibit 1); 6,451,572 (the “572 patent,” attached as Exhibit 2); 7,026,150 (the “150 patent,” attached as Exhibit 3); 7,312,063 (the “063 patent,” attached as Exhibit 4); 7,829,318 (the “318 patent,” attached as Exhibit 5); and 8,455,232 (the “232 patent,” attached as Exhibit 6).
3. Huvepharma EOOD is a private company incorporated and existing under the laws of the Republic of Bulgaria, registered with the Commercial Register under Unified Identity

Code (UIC) 203631745, having its headquarters at 5th floor, 3a, Nikolay Haytov Str., 1113 Sofia, Bulgaria. Huvepharma's wholly-owned United States subsidiary, Huvepharma, Inc., has an address at 525 Westpark Dr. # 230, Peachtree City, Georgia 30269. Huvepharma, Inc. operates six production facilities in the United States, and manufactures and commercializes Plaintiffs' phytase product OptiPhos® in the United States under the terms of an agreement with Huvepharma EOOD.

4. Huvepharma is a global biotech and pharmaceutical company that develops, manufactures, and commercializes human and animal health products, including enzymes for food and animal feed. One of Huvepharma's products that it successfully manufactures and sells in the United States is OptiPhos®, which is an additive to feed for animals, including swine and poultry, and in particular an E.coli derived 6-phytase produced by the yeast *Pichia pastoris* in a submerged fermentation process. OptiPhos® is available in 3 different forms, each suitable for a specific application: 1) a coated form used for pelleted feeds, 2) a liquid form used for post pelleting liquid application processes, and 3) a granular form used in mash and pelleted feeds.

5. Previously competing phytase products were less effective than OptiPhos® because they only operate effectively within a limited pH range, and are thermally intolerant during the feed manufacturing process when the phytase is combined with animal feed. These previous competing phytase products were also inferior to OptiPhos® because they degrade when exposed to pepsin, which is a naturally present (endogenous) enzyme produced in the stomach of animals.

6. Huvepharma's OptiPhos® is more effective in animal diets for poultry and swine than these previously competing products because it works effectively at a broad pH range (between pH 1 and 5), is thermally tolerant during the manufacturing process when combined

with animal feed, and is relatively insensitive to degradation by pepsin. OptiPhos® also operates much faster than others previously used in releasing phosphorus from its indigestible form phytate, which is the natural form in which most of the phosphorus is stored in grains and seeds, and thus enables the poultry and swine ingesting the product to grow faster and to receive other health benefits.

7. The method of manufacturing Huvepharma's OptiPhos® was invented and initially developed by Dr. Xingen Lei, a researcher at Cornell University, in the 1998 time frame, and constituted a publicly recognized breakthrough in the field of phytase enzymes for integration into animal feed. Cornell Research Foundation, Inc. obtained the '300, '572, '150, '063, '318, and '232 patents (the "patents") that disclose, claim, and otherwise protect Dr. Lei's inventive method of producing OptiPhos®.

8. Ultimately, Cornell Research Foundation, Inc. entered into an exclusive license with Huvepharma in return for Huvepharma commercializing OptiPhos® in the United States. However, as explained below, Huvepharma's commercialization efforts have been negatively impacted, and the patent rights have been infringed, by the actions of the Defendants, and in particular based on Defendants' manufacture, importation, sale, distribution, and commercialization in the United States of at least two product lines that infringe claims of the patents, *i.e.*, the Quantum phytase product line and the Quantum Blue phytase product line. The Quantum phytase product line includes products that have been commercialized in the United States under various names, including at least Quantum 2500D and Quantum 5000L. The Quantum Blue phytase product line includes products that are and have been commercialized in the United States under various names, including at least Quantum Blue 5G, Quantum Blue 10G, Quantum Blue 40P, Quantum Blue 200P, and Quantum Blue QBC. Some of these products are

manufactured and commercialized in the United States. Others of these products are manufactured overseas, and imported into and commercialized in the United States. For example, Quantum Blue 5G is manufactured and commercialized by Defendants in the United States; while Quantum Blue 10G is manufactured overseas, and according to publicly-available United States import and export data, imported into and commercialized by Defendants in the United States.

9. Defendant Associated British Foods, plc (“ABF”) is a United Kingdom public limited company, with its main trading address at Woodstock Court, Blenheim Road, Marlborough Business Park, Marlborough, Wiltshire, SN8 4AN, UK.

10. Defendant AB Vista, Inc. (“AB Vista”) is a corporation organized under the laws of Delaware, with its principal place of business at 150 South Pine Island Road, Plantation, Florida, 33324. AB Vista is a wholly-owned subsidiary of ABF, and effectively controlled by ABF.

11. Defendant PGP International Corporation (“PGP”) is a corporation organized under the laws of Delaware, with its principal place of business at 351 Hanson Way, Woodland, California, 95776, and with manufacturing facilities at 5404 Foundation Drive, Evansville, Indiana, 47725. PGP is a wholly-owned subsidiary of ABF, and effectively controlled by ABF.

12. Defendant ABITEC Corporation (“ABITEC”) is a corporation organized under the laws of Delaware, with its principal place of business at 501 W. 1st Ave, Columbus, Ohio, 43215. ABITEC is a wholly-owned subsidiary of ABF, and effectively controlled by ABF.

13. Defendant AB Enzymes, Inc. (“AB Enzymes, Inc.”) is a corporation organized under the laws of Delaware, with its principal place of business at 8211 W. Broward Blvd, Ste

375, Plantation, Florida, 33324. AB Enzymes, Inc. is a wholly-owned subsidiary of ABF, and effectively controlled by ABF.

14. Defendant AB Enzymes GmbH (“AB Enzymes GmbH”) is a corporation organized under the laws of the Federal Republic of Germany, with its principal place of business at Feldbergstrasse 78, Darmstadt, Germany, 64293. AB Enzymes GmbH is a wholly-owned subsidiary of ABF, and effectively controlled by ABF.

15. On information and belief, PGP is and has been engaged in the manufacture of E.coli derived phytase enzymes in the United States that are developed for use in animal feeds, including at least the phytase product Quantum Blue 5G.

16. On information and belief, PGP sells or otherwise delivers at least the manufactured Quantum Blue 5G to AB Vista, which then distributes, sells, or otherwise commercializes in the United States at least the Quantum Blue 5G.

17. On information and belief, AB Enzymes GmbH is and has been engaged in the importation into the United States of E.coli derived phytase enzymes developed for use in animal feeds, including at least the following Quantum Blue phytase products: Quantum Blue 10G, Quantum Blue 40P, Quantum Blue 200P, and/or Quantum Blue QBC; as well as the following Quantum phytase products: Quantum 2500D and Quantum 5000L.

18. On information and belief, AB Enzymes, Inc. is a United States subsidiary of AB Enzymes GmbH, and is and has participated in the importation into the United States of the following Quantum Blue phytase products: Quantum Blue 10G, Quantum Blue 40P, Quantum Blue 200P, and/or Quantum Blue QBC; as well as the following Quantum phytase products: Quantum 2500D and Quantum 5000L.

19. On information and belief, AB Enzymes GmbH and/or AB Enzymes Inc. has sold or otherwise delivered, and is selling or other delivering, at least the imported Quantum Blue 10G to AB Vista, which then distributes, sells, or otherwise commercializes at least the Quantum Blue 10G that it has received.

20. On information and belief, AB Enzymes GmbH and/or AB Enzymes, Inc. has sold or otherwise delivered at least the Quantum Blue 40P and Quantum Blue QBC to ABITEC, which then has distributed, sold, or otherwise commercialized in the United States the Quantum Blue 40P and Quantum Blue QBC.

21. On information and belief, ABF owns and controls defendants AB Vista, PGP, ABITEC, AB Enzymes, Inc., and AB Enzymes GmbH, each of which has engaged at least in the infringing activities described herein. Ex. 25 at 1-132. ABF effectively controls and has effectively controlled co-defendants AB Vista, ABITEC, AB Enzymes GmbH, AB Enzymes, Inc., and PGP International, such as with regard to the production, shipping, importation, distribution, use, offers for sale, and sale of Quantum and Quantum Blue phytase products. Ex. 25 at 31; 131-132; Ex. 25 at 9-31. ABF invested in and effectively controlled the construction of a new production facility for PGP. ABF has effectively controlled production of Quantum Blue products, including Quantum Blue 5G, in the United States; and has effectively controlled the use, offer for sale, and/or sale of the domestically produced Quantum Blue products by AB Vista and/or ABITEC in the United States. Ex. 25 at 26, 29, 31, 60; Ex. 13 at 1-3; Ex. 15 at 1. For example, AB Vista published a press release in 2013 that confirms as follows: “This investment by ABF in the new production facility at Evansville further strengthens AB Vista’s supply chain, and the company’s position as a market leader in feed enzymes”. In addition, ABF has effectively controlled the production of Quantum Blue products by Roal (Ex. 25 at 135),

including Quantum Blue 10G, in Finland; effectively controlled the importation of Quantum Blue products into the United States by AB Enzymes GmbH and AB Enzymes, Inc.; and effectively controlled the use, offer for sale, and/or sale of imported Quantum Blue products, including Quantum Blue 10G, by AB Vista and/or ABITEC in the United States. Ex. 25 at 29, 87, 131; Ex. 13 at 1-5.

22. Upon information and belief, ABF has effectively controlled its subsidiaries, including the co-defendants in this suit, through central corporate controls, and has operated itself and its subsidiaries, including the defendants named in this suit, as one corporate organization having diversified business segments. Ex. 25 at 1-141; Ex. 15 at 1; Ex. 22 at 1-6. ABF has referred to its subsidiaries, including the defendants named in this suit, as “our portfolio of businesses” and referred to the markets the subsidiaries operate within as “our markets.” Ex. 25 at 9.

23. Upon information and belief, the ABF subsidiaries’ activities, including the defendants named in this suit, are centrally controlled by ABF’s “Corporate Governance.” Ex. 25 at 54-62. For example, ABF approves strategy and budgets of its subsidiaries, including the defendants named in this suit, and monitors their performance “closely.” Ex. 25 at 11. The ABF board “meets regularly throughout the year to approve the ABF subsidiaries’ strategic objectives, including the defendants named in this suit, to lead the ABF subsidiaries within a framework of effective controls which enable risk to be assessed and managed and to ensure that sufficient resources are available to meet the objectives set.” Ex. 25 at 54. The ABF board sets “specific business and governance matters” for the ABF subsidiaries and has responsibility to “oversee control of the Company’s affairs,” including annual business strategies and objectives, budgets and forecasts. Ex. 25 at 54-55. The ABF board governs material financial and non-financial

risks of the ABF subsidiaries' businesses, including the defendants named in this suit, receives regular divisional and annual groupwide updates, approves the ABF subsidiaries budget for the financial year, approves the Corporate Responsibility Report that includes ABF subsidiaries health and safety, human resources, and remuneration of employees. Ex. 25 at 56.

24. ABF requires its subsidiaries, including the defendants named in this suit, to follow "clearly defined guidelines established for capital expenditure and investment decisions, which include the preparation of budgets, appraisal and review procedures, and delegated authority levels." ABF requires its subsidiaries, including the defendants named in this suit, to submit "detailed management accounts" every four weeks, that are consolidated into a single system and reviewed by senior management and the ABF board. The accounts include "a comprehensive set of financial reports and key performance indicators covering commercial, operational, environmental and people issues." Ex. 25 at 59. ABF requires its subsidiaries, including the defendants named in this suit, to submit to internal audits that are all "coordinated centrally." Ex. 25 at 59.

### **JURISDICTION AND VENUE**

25. This action arises under the Patent Laws of the United States, Title 35, United States Code, §§ 1 *et seq.*, including 35 U.S.C. §§ 271 and 281.

26. This Court has jurisdiction over the subject matter of this action pursuant to 28 U.S.C. §§ 1331 and 1338(a).

27. This Court has personal jurisdiction over defendant ABF at least under Fed. R. Civ. P. 4(k)(2).

28. This Court has personal jurisdiction over defendant AB Vista, at least because AB Vista has purposefully availed itself of the benefits and protections of Delaware state law by incorporating in Delaware.

29. This Court has personal jurisdiction over defendant PGP, at least because PGP has purposefully availed itself of the benefits and protections of Delaware state law by incorporating in Delaware.

30. This Court has personal jurisdiction over defendant ABITEC, at least because ABITEC has purposefully availed itself of the benefits and protections of Delaware state law by incorporating in Delaware.

31. This Court has personal jurisdiction over defendant AB Enzymes, Inc., at least because AB Enzymes, Inc. has purposefully availed itself of the benefits and protections of Delaware state law by incorporating in Delaware.

32. This Court has personal jurisdiction over defendant AB Enzymes GmbH at least under Fed. R. Civ. P. 4(k)(2).

33. Venue is proper in this District under 28 U.S.C. §§ 1391(b) and (c), and 1400(b) because defendants AB Vista, PGP, ABITEC, and AB Enzymes, Inc. are Delaware corporations, defendants AB Enzymes GmbH and ABF are foreign companies, and Delaware is a convenient forum for resolution of the parties' disputes set forth herein.

### **BACKGROUND**

34. The ingestion by certain animals, such as poultry and swine, of phosphate ("P") helps to accelerate growth and provides other health benefits. Phytate (myo-inositol hexophosphate), which includes P, is often included in animal feed for this purpose, *i.e.*, to

enable the animals to ingest P. Phytases, which are a specific group of monoester phosphatases, initiate the release of P from the phytate. Ex. 1: Column 1, Lines 10-31.

35. Swine and poultry have little natural phytase in their gastrointestinal tracts. Thus, these animals naturally fail to effectively release P from the phytate in their food, and thus fail to benefit thereby. Under these circumstances, the phytate with P passes through the animals' gastrointestinal tracts and excretes as manure, which unfortunately pollutes the environment. In addition, the diet of the swine and poultry needs to be supplemented with inorganic P, which is a non-renewable nutrient, such as in the form of a vitamin. Phytase has therefore been added to animal feed to enable the animals to initiate the release of P from the phytate.

36. Two phytases, PhyA and PhyB, were used prior to the inventions that are the subject of the patents-in-suit. PhyA and PhyB were extracted from *Aspergillus niger* NRRL3135, and cloned and sequenced. Ex. 1: Column 1, Lines 32-40. As an example, a PhyA gene was introduced into *A. niger*, and this phytase was to a certain degree effective in releasing P from phytate in animal feed. In particular, supplemental microbial phytase of this source in the diets for swine and poultry was shown to be effective in allowing the animals to release P from the phytate in their feed. However, PhyA and PhyB were subject to problems. For example, PhyA and PhyB were expensive to produce. In addition, certain aspects of PhyA and PhyB made them difficult to manufacture into animal feed. For example, the manufacturing process of feed pellets involves the application of a certain amount of heat, but PhyA and PhyB are subject to being destroyed when exposed to this heat. In other words, PhyA and PhyB phytases are not sufficiently thermotolerant for this manufacturing process to avoid degradation. Ex. 1: Column 2, Lines 5-33.

37. To solve the shortcomings and problems of producing a viable phytase enzyme for use in animal feed, Dr. Lei discovered the inventions that are the subject of the patents-in-suit while he was a professor in the Department of Animal Science and Department of Horticultural Sciences at Cornell University. The production methods Dr. Lei invented produced phytases that were at least as effective as, yet more thermostable than, the existing PhyA and PhyB phytases, and therefore were more effective in the animal feed industry.

38. The patents-in-suit involve producing phytases that are encoded by genes isolated from bacterial cells, *i.e.*, from *Escherichia coli* (“E.coli”). These encoded genes are not expressed in their homologous bacterial host, but instead are expressed in either a fungal strain or a yeast strain. Isolating the expressed, encoded genes leads to an E.coli phytase that catalyzes the release of P from phytate. The phytase production methods advantageously create phytases with improved thermal stability.

39. Cornell Research Foundation (“Cornell”), wishing to commercialize Dr. Lei’s breakthrough discoveries, collaborated with Phytex, LLC, which was a company formed to produce and commercialize Dr. Lei’s new thermostable phytase. On September 1, 2001, Cornell entered into an exclusive license agreement with Phytex in return for Phytex producing and commercializing the thermostable phytase. Phytex commercialized the phytase product under the trademarked name “OptiPhos®,” which it began manufacturing and selling in the United States in 2006.

40. In 2013, Huvepharma acquired all of Phytex’s rights in the thermostable phytase, *i.e.*, OptiPhos®. In particular, Huvepharma acquired Phytex’s exclusive license agreement with Cornell, which gave Huvepharma the exclusive rights to produce and commercialize OptiPhos®, and an exclusive license to Cornell’s patents. Huvepharma has been manufacturing and

commercializing OptiPhos®, which is recognized as the most efficient and stable phytase available in the market with a track record of proven effectiveness. Huvepharma has continually produced and sold OptiPhos® in the United States since acquiring the rights discussed above.

41. Upon information and belief, beginning in the 2012 time frame, ABF, by and through the other Defendants in this action, began manufacturing, importing, selling, offering to sell, distributing, and otherwise commercializing phytase products marketed under the trade name brand Quantum Blue. At least one accused product, Quantum Blue 5G, is and has been manufactured in the United States by PGP. At least the accused products Quantum Blue 10G, Quantum Blue 40P, Quantum Blue 200P, Quantum Blue QBC, and Quantum Blue 40P, are and/or have been manufactured overseas, and then imported into and commercialized in the United States by AB Enzymes GmbH and AB Enzymes, Inc., and used, offered for sale, distributed, and/or sold by AB Vista and/or ABITEC in the United States.

42. Upon information and belief, the accused Quantum Blue phytase products are produced using the same methods in the context of and as claimed in the patents. Thus, the evidence and descriptions below describing the method of producing Quantum Blue are applicable to any one or more of the other accused Quantum Blue phytase products, including but not limited to Quantum Blue 5G, and Quantum Blue 10G, Quantum Blue 40P, Quantum Blue 200P, and Quantum Blue QBC.

43. Upon information and belief, beginning in the 2012-2013 time frame, PGP built and began operating its manufacturing plant in Evansville, Indiana, to produce the accused Quantum Blue 5G product in the United States. According to a 2014 annual report by ABF, the PGP facility at Evansville, Indiana is “operating successfully providing additional capacity to meet the increasing demand for these enzymes.” Ex. 25 at 10, 28. Upon information and belief,

after producing the Quantum Blue 5G product, PGP transfers it to AB Vista, which is ABF's distributor of Quantum Blue products in the United States. AB Vista then brands and commercializes Quantum Blue 5G by using, offering for sale, and/or selling it in the United States.

44. In 2017, a Huvepharma representative purchased Quantum Blue 5G produced by PGP in the United States, on which the packaging identified AB Vista as the distributor. Exhibit 14 includes true and correct photographs of the packaging of the Quantum Blue 5G product, which indicates that it is a phytase produced in the United States. Ex. 14 at 1-3.

45. Upon information and belief, PGP has produced and/or is producing in the United States Quantum Blue 5G phytase in fungal cells. Ex. 7 at 1-21. PGP opened a new production facility in Evansville, Indiana, to increase production capacity of Quantum Blue 5G. Ex. 15 at 1. Quantum Blue 5G is produced as a phytase containing *Trichoderma reesei* fermentation extract. Ex. 14 at 2. Quantum Blue 5g is a preparation of 6-phytase produced by a genetically modified strain of *Trichoderma reesei*. Ex. 21 at 4-5. The active agent of all Quantum Blue products is 6-phytase produced by the strain *Trichoderma reesei*. Ex. 21 at 10.

46. Upon information and belief, PGP has produced and/or is producing Quantum Blue 5G phytase by providing a polynucleotide encoding an *Escherichia coli* phytase. Ex. 7 at 6-8. For example, Quantum Blue 5G phytase is produced using an *E. coli* phytase gene that is expressed in *Trichoderma reesei*. Quantum Blue 5G phytase is produced with a donor organism of *Escherichia coli*, and a production organism of *Trichoderma reesei* as a class 6-phytase. Ex. 14 at 2; Ex. 16 at 10; Ex. 18 at 3; Ex. 19 at 1; Ex. 20 at 1, Ex. 21 at 1. Additionally, Quantum Blue is manufactured using the active ingredient *E. coli* 6-phytase produced in *Trichoderma*. Ex.

17; Ex. 18 at 3; Ex. 19 at 1. The donor organism is *Escherichia coli* K12 strain MG1655. Ex. 16 at 10.

47. Upon information and belief, PGP has produced and/or is producing Quantum Blue 5G phytase by expressing the polynucleotide in the fungal cells. Ex. 7 at 8-10. Quantum Blue 5G is produced as a phytase containing *Trichoderma reesei* fermentation extract. Ex. 14 at 2. Quantum Blue is a preparation of 6-phytase produced by a genetically modified strain of *Trichoderma reesei* (CBS 126897). Ex. 21 at 5. The active agent of all Quantum Blue products is 6-phytase produced by the strain *Trichoderma reesei*. Ex. 21 at 10.

48. Upon information and belief, PGP has produced and/or is producing Quantum Blue 5G phytase by isolating the expressed *Escherichia coli* phytase. Ex. 7 at 10-11. For example, Quantum Blue 5G is a phytase containing dried *Trichoderma reesei* extract. Ex. 14 at 2. PGP manufactures Quantum Blue 5G at its fermentation facility in the United States using a *Trichoderma* platform and downstream processing technology / separation technology. Downstream processing after fermentation for Quantum Blue phytase expressed in *Trichoderma reesei* include filter aids, flocculants, filter sheets, cell waste, protein (harvest BCA). Ex. 23 at 6. In another example, Quantum Blue 5G is produced by isolating the expressed *Escherichia coli* phytase in post-fermentation tank processing using one or more of product recovery methods, filtering methods, ultra-filtering methods, stabilizing, and drying. Ex. 16 at 22.

49. Upon information and belief, PGP has produced and/or is producing Quantum Blue 5G phytase by a method wherein the *Escherichia coli* phytase catalyzes the release of phosphate from phytate. Ex. 7 at 12-13. For example, Quantum Blue 5G releases phosphates from phytate. Quantum Blue 5G contains a dry source of phytase specifically developed for use in poultry and swine diets, which hydrolyzes phytate and increases the digestibility of phytin-

bound phosphorus. Quantum Blue 5G guarantees phytase activity not less than 5,000 FTU/g (one phytase unit is defined as the quantity of enzyme, which liberates 1 micromole of inorganic phosphate per minute from sodium phytate at 37° C, pH 5.5). Ex. 14 at 2; Ex. 18 at 3. In another example, Quantum Blue 5G is an enhanced E.coli phytase, which has been specifically optimized to degrade the phytate found in plant-based feed ingredients for monogastric diets. Ex. 19 at 1. In other examples, Quantum Blue 5G has high affinity towards phytate, ensuring that even in diets with low phytate levels, it works with full efficacy to release nutrients that would otherwise be bound to phytate. Quantum Blue 5G is optimized for maximum phytate destruction and greater phosphorus release. Ex. 19 at 2; Ex. 22 at 19. In another example, Quantum Blue 5G contains a dry source of phytase specifically developed for use in poultry and swine diets, which hydrolyzes phytate and increases the digestibility of phytin-bound phosphorus. (Ex. 14 at 2).

50. Upon information and belief, PGP has produced and/or is producing Quantum Blue 5G phytase by a method wherein the phytase is an Escherichia coli AppA phytase. Ex. 7 at 13. For example, external laboratory testing of a Quantum Blue 10G sample confirmed that the sample contained an Escherichia coli AppA as the donor microorganism.

51. Upon information and belief, PGP has produced and/or is producing Quantum Blue 5G phytase by a method wherein the fungal cells are from a filamentous fungus. Ex. 7 at 13-14. For example, Quantum Blue 5G is a phytase manufactured using Trichoderma reesei fermentation extract. Ex. 14 at 2. Quantum Blue 5G is a phytase from Trichoderma reesei that is manufactured for AB Vista, Inc., 150 S. Pine Island Road, Plantation, FL 33324 with an indicated country of origin as "US." Ex. 14 at 2. In another example, the analytical data from testing the Quantum Blue 10G samples shows that each sample contained an E.coli periplasmic

AppA protein, and each sample contained *Trichoderma harzianum*, which is a filamentous fungus. The laboratory results confirm that Quantum Blue 10G phytase is manufactured by expressing fungal cells from a filamentous fungus.

52. Upon information and belief, PGP has produced and/or is producing Quantum Blue 5G phytase by a method wherein the fungal cells are cultured in a growth medium. Ex. 7 at 14-15. For example, Quantum Blue is manufactured using *Trichoderma reesei* to secrete phytase enzymes into the growth medium. Ex. 23 at 6; Ex. 16 at 20-22.

53. Upon information and belief, PGP has produced and/or is producing Quantum Blue 5G phytase by a method wherein the *Escherichia coli* phytase is secreted from the fungal cells into the growth medium. Ex. 7 at 15-17. For example, Quantum Blue 5G is manufactured using *Trichoderma reesei* to secrete phytase enzymes into the growth medium. Ex. 16 at 20-22; Ex. 23 at 2-11.

54. Upon information and belief, PGP has produced and/or is producing Quantum Blue 5G phytase by a method wherein the *Escherichia coli* phytase is purified from the growth medium. Ex. 7 at 17-19. For example, the Quantum Blue 5G manufacturing processes isolate the expressed *Escherichia coli* in post-fermentation tank using one or more of product recovery methods, filtering methods, ultra-filtering methods, stabilizing, and drying. Ex. 23 at 1, 12-14. In another example, Quantum Blue 5G is manufactured using a *Trichoderma* platform. The downstream process includes filter aids, flocculants, filter sheets, cell waste, and protein (harvest BCA). Ex. 16 at 20-22; Ex. 23 at 2-11.

55. Upon information and belief, PGP has produced and/or is producing Quantum Blue 5G phytase by a method wherein the *Escherichia coli* phytase is purified from the growth

medium at a concentration greater than 300 U/ml. Ex. 7 at 19. For example, Quantum Blue 5G packaging guarantees phytase activity not less than 5000 FTU/g. Ex. 14 at 2.

56. Upon information and belief, PGP has produced and/or is producing Quantum Blue 5G phytase by a method wherein the *Escherichia coli* phytase retains at least 40% of its activity after heating the phytase for 15 minutes at 80°C. Ex. 7 at 19-20. For example, Quantum Blue 5G is an intrinsically thermostable phytase, which is non-coated, ensuring quick release in the animal. Tested in commercial feed mills with excellent recovery, Quantum Blue 5G is proven to withstand the rigors of feed processing. Ex. 19 at 1.

57. Upon information and belief, PGP has produced and/or is producing Quantum Blue 5G phytase by a method wherein the *Escherichia coli* phytase retains at least 60% of its activity after heating the phytase for 15 minutes at 60 degrees C. Ex. 7 at 20-21. For example, Quantum Blue 5G is an intrinsically thermostable phytase, which is non-coated, ensuring quick release in the animal, and tested in commercial feed mills with excellent recovery to withstand the rigors of feed processing. Ex. 19 at 1.

58. In 2017, a Huvepharma representative purchased Quantum Blue 10G phytase in the United States. Exhibit 13 includes true and correct photographs of the packaging of the Quantum Blue 10G product, which indicates that Quantum Blue 10G is a phytase containing *Trichoderma reesei* fermentation extract that was produced for AB Enzymes GmbH by “Roal.” Ex. 13 at 1-5.

59. Upon information and belief, Roal is a subsidiary of ABF located in Finland. Roal manufactures at least Quantum Blue 10G at its facility in Finland, and transfers the Quantum Blue 10G to AB Enzymes GmbH, which then imports the Quantum Blue 10G into the United States and transfers the product to AB Vista and/or ABITEC, which takes possession of

the imported Quantum Blue 10G and uses, offers for sale, distributes, and/or sells it in the United States. AB Enzymes, Inc. assists AB Enzymes GmbH or otherwise participates in the importation into or distribution in the United States of Quantum Blue 10G.

60. Upon information and belief, each use, offer for sale, and/or sale of Quantum Blue 10G phytase by AB Vista and/or ABITEC is a use, offer for sale, and/or sale of Quantum Blue 10G imported into the United States by AB Enzymes GmbH and AB Enzymes, Inc. that was produced as a phytase in fungal cells. Ex. 7 at 1-21. For example, the packaging of Quantum Blue 10G shows that the product is a phytase from *Trichoderma reesei* that is manufactured for AB Vista, and “AB Vista is AB Enzymes GmbH’s distributor of Roal’s feed enzymes.” Ex. 13 at 5; Ex. 22 at 12.

61. Huvepharma transferred samples of the purchased Quantum Blue 10G phytase to an independent laboratory, Creative Proteomics, to determine the donor organism and host organism used in the manufacture of the phytase product. In a December 1, 2017 Analysis Report, Creative Proteomics indicated that six protein samples of the Quantum Blue 10G phytase (Ex. 13) were subjected to digestion with trypsin, and were analyzed on a high-resolution mass spectrometry analysis coupled with nanoflow ultra-performance liquid chromatography. The analytical data for the samples showed that each sample contained an *E.coli* periplasmic AppA protein, and each sample contained *Trichoderma harzianum*, which is a filamentous fungus. The laboratory results confirm that Quantum Blue 10G phytase sample was manufactured using *E.coli* AppA protein and *Trichoderma* fungal cells.

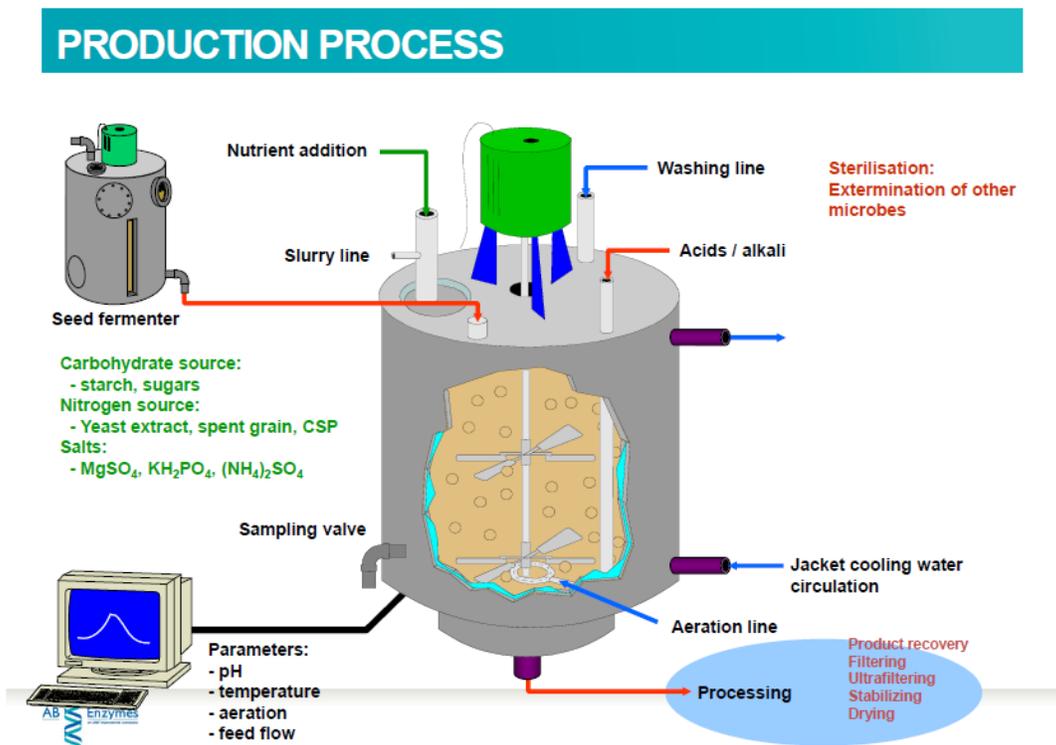
62. Upon information and belief, Roal manufactures Quantum Blue 10G at its fermentation facility in Finland using Roal’s *Trichoderma reesei* platform. Ex. 16 at 20-22; Ex. 23 at 2-11.

63. Upon information and belief, each use, offer for sale, and/or sale of Quantum Blue 10G phytase by AB Vista and/or ABITEC is a use, offer for sale, and/or sale of Quantum Blue 10G imported into the United States by AB Enzymes GmbH and AB Enzymes, Inc. that was produced by providing a polynucleotide encoding an Escherichia coli phytase. Ex. 7 at 6-8; Ex. 13 at 1-5; Ex. 16 at 10; Ex. 17; Ex. 18 at 3; Ex. 19 at 1. The donor organism for producing Quantum Blue 10G is Escherichia coli and the production organism is Trichoderma reesei. Ex. 16 at 10.

64. Upon information and belief, each use, offer for sale, and/or sale of Quantum Blue 10G phytase is a use, offer for sale, and/or sale of Quantum Blue 10G imported into the United States by AB Enzymes GmbH and AB Enzymes, Inc. that was produced by expressing the polynucleotide in the fungal cells. Ex. 7 at 8-10. For example, Quantum Blue 10G is produced as a phytase containing dried Trichoderma reesei extract. Ex. 13 at 4. In an example, Quantum Blue 10G is a preparation of 6-phytase produced by a genetically modified strain of Trichoderma reesei (CBS 126897). Ex. 20 at 1; Ex. 21 at 4-5. In another example, the active agent of Quantum Blue 10G is 6-phytase produced by the strain *Trichoderma reesei*. Ex. 21 at 10.

65. Analytical data from testing the Quantum Blue 10G samples shows that each sample contained an E.coli periplasmic AppA protein, and each sample contained Trichoderma harzianum, which is a filamentous fungus. The laboratory results confirm that Quantum Blue 10G phytase is manufactured by expressing the polynucleotide in the fungal cells.

66. In another example, Trichoderma reesei fungal cells is a production platform for Quantum Blue phytase. Ex. 16 at 20-22; Ex. 23 at 2-11. Quantum Blue 10G is produced using a fermentation process to express the polynucleotide in the fungal cells for Quantum Blue phytase, which is shown below:



Ex. 16 at 22.

67. Upon information and belief, each use, offer for sale, and/or sale of Quantum Blue 10G phytase by AB Vista and/or ABITEC is a use, offer for sale, and/or sale of Quantum Blue 10G imported into the United States by AB Enzymes GmbH and AB Enzymes, Inc. that was produced by isolating the expressed *Escherichia coli* phytase. Ex. 7 at 10-12. For example, Quantum Blue 10G is a phytase containing dried *Trichoderma reesei* extract. Ex. 13 at 5. In another example, Quantum Blue 10G is produced using a *Trichoderma* platform and downstream processing technology / separation technology including filter aids, flocculants, filter sheets, cell waste, and protein (harvest BCA). Ex. 16 at 20-22. In another example, Quantum Blue 10G is produced by isolating the expressed *Escherichia coli* phytase in a post-fermentation tank using

one or more of product recovery methods, filtering methods, ultra filtering methods, stabilizing, and drying. Ex. 23 at 2-11.

68. Upon information and belief, each use, offer for sale, and/or sale of Quantum Blue 10G phytase by AB Vista and/or ABITEC is a use, offer for sale, and/or sale of Quantum Blue 10G imported into the United States by AB Enzymes GmbH and AB Enzymes, Inc. that was produced by a method wherein the *Escherichia coli* phytase catalyzes the release of phosphate from phytate. Ex. 7 at 12-13. For example, Quantum Blue 10G contains a dry source of phytase specifically developed for use in poultry and swine diets, which hydrolyzes phytate and increases the digestibility of phytin-bound phosphorus. Quantum Blue 10G packaging guarantees phytase (*Trichoderma reesei*) activity not less than 10,000 FTU/g (one phytase unit is defined as the quantity of enzyme, which liberates 1 micromole of inorganic phosphate per minute from sodium phytate at 37° C, pH 5.5). Ex. 13 at 5. In another example, Quantum Blue 10G releases phosphates from phytate. Ex. 18 at 3. Further, Quantum Blue 10G is an enhanced *E.coli* phytase that has been specifically optimized to degrade the phytate found in plant-based feed ingredients for monogastric diets. Ex. 19 at 1; Ex. 22 at 19. In other examples, Quantum Blue 10G has high affinity towards phytate, ensuring that even in diets with low phytate levels, it works with full efficacy to release nutrients that would otherwise be bound to phytate. Quantum Blue 10G is optimized for maximum phytate destruction and greater phosphorus release. Ex. 19 at 2. In a further example, Quantum Blue 10G contains a dry source of phytase specifically developed for use in poultry and swine diets, which hydrolyzes phytate and increases the digestibility of phytin-bound phosphorus. Ex. 13 at 5.

69. Upon information and belief, each use, offer for sale, and/or sale of Quantum Blue 10G phytase by AB Vista and/or ABITEC is a use, offer for sale, and/or sale of Quantum

Blue 10G imported into the United States by AB Enzymes GmbH and AB Enzymes, Inc. that was produced by a method wherein the phytase is an Escherichia coli AppA phytase. Ex. 7 at 13.

70. Upon information and belief, each use, offer for sale, and/or sale of Quantum Blue 10G phytase by AB Vista and/or ABITEC is a use, offer for sale, and/or sale of Quantum Blue 10G imported into the United States by AB Enzymes GmbH and AB Enzymes, Inc. that was produced by a method wherein the fungal cells are from a filamentous fungus. Ex. 7 at 13-14. For example, Quantum Blue 10G is a phytase from Trichoderma reesei, which is a filamentous fungus, that is manufactured for AB Vista, which is AB Enzymes GmbH's distributor of Roal's feed enzymes. Ex. 13 at 5.

71. Upon information and belief, each use, offer for sale, and/or sale of Quantum Blue 10G phytase by AB Vista and/or ABITEC is a use, offer for sale, and/or sale of Quantum Blue 10G imported into the United States by AB Enzymes GmbH and AB Enzymes, Inc. that was produced by a method wherein the fungal cells are cultured in a growth medium. Ex. 7 at 14-15. For example, Trichoderma reesei cells are cultured in inexpensive growth media to produce Quantum Blue phytase. Ex. 16 at 20-22; Ex. 23 at 2-11. In another example, the Quantum Blue 10G manufacturing processes use and/or have used growth mediums to culture fungal cells in a fermentation process. Ex. 16 at 20-22; Ex. 23 at 2-11.

72. Upon information and belief, each use, offer for sale, and/or sale of Quantum Blue 10G phytase by AB Vista and/or ABITEC is a use, offer for sale, and/or sale of Quantum Blue 10G imported into the United States by AB Enzymes GmbH and AB Enzymes, Inc. that was produced by a method wherein the Escherichia coli phytase is secreted from the fungal cells into the growth medium. Ex. 7 at 15-17. For example, the Quantum Blue 10G is manufactured

using *Trichoderma reesei* to secrete phytase enzymes into the growth medium. Ex. 16 at 20-22; Ex. 23 at 2-11.

73. Upon information and belief, each use, offer for sale, and/or sale of Quantum Blue 10G phytase by AB Vista and/or ABITEC is a use, offer for sale, and/or sale of Quantum Blue 10G imported into the United States by AB Enzymes GmbH and AB Enzymes, Inc. that was produced by a method wherein the *Escherichia coli* phytase is purified from the growth medium. Ex. 7 at 17-19. For example, the Quantum Blue 10G manufacturing processes isolate the expressed *Escherichia coli* in post-fermentation tank processing using one or more of product recovery methods, filtering methods, ultra-filtering methods, stabilizing, and drying. Ex. 16 at 20-22; Ex. 23 at 2-11. In another example, Quantum Blue 10G is manufactured using a *Trichoderma* platform. The downstream process includes filter aids, flocculants, filter sheets, cell waste, and protein (harvest BCA). Ex. 16 at 20-22; Ex. 23 at 2-11.

74. Upon information and belief, each use, offer for sale, and/or sale of Quantum Blue 10G phytase by AB Vista and/or ABITEC is a use, offer for sale, and/or sale of Quantum Blue 10G imported into the United States by AB Enzymes GmbH and AB Enzymes, Inc. that was produced by a method wherein the *Escherichia coli* phytase is purified from the growth medium at a concentration greater than 300 U/ml. Ex. 7 at 19. For example, Quantum Blue 10G packaging guarantees phytase activity not less than 10,000 FTU/g. Ex. 13 at 5.

75. Upon information and belief, each use, offer for sale, and/or sale of Quantum Blue 10G phytase by AB Vista and/or ABITEC is a use, offer for sale, and/or sale of Quantum Blue 10G imported into the United States by AB Enzymes GmbH and AB Enzymes, Inc. that was produced by a method wherein the *Escherichia coli* phytase retains at least 40% of its activity after heating the phytase for 15 minutes at 80 degrees C. Ex. 7 at 19-20. For example,

Quantum Blue 10G is an intrinsically thermostable phytase, which is non-coated, ensuring quick release in the animal. Ex. 19 at 1.

76. Upon information and belief, each use, offer for sale, and/or sale of Quantum Blue 10G phytase by AB Vista and/or ABITEC is a use, offer for sale, and/or sale of Quantum Blue 10G imported into the United States by AB Enzymes GmbH and AB Enzymes, Inc. that was produced by a method wherein the *Escherichia coli* phytase retains at least 60% of its activity after heating the phytase for 15 minutes at 60 degrees C. Ex. 7 at 20-21. For example, Quantum Blue 10G is an intrinsically thermostable phytase, which is non-coated, ensuring quick release in the animal. Ex. 19 at 1.

77. Upon information and belief, beginning in the 2008 time frame, AB Enzymes GmbH and AB Enzymes, Inc. imported into the United States a phytase product with the trade name “Quantum” that was manufactured by Roal in Finland. After importation, the Quantum phytase products, including the Quantum 2500D and Quantum 5000L, were transferred to AB Vista and/or ABITEC, which used, offered for sale, distributed, and/or sold these phytase products in the United States.

78. Upon information and belief, each use, offer for sale, and/or sale of Quantum phytase by AB Vista and/or ABITEC is a use, offer for sale, and/or sale of Quantum phytase imported into the United States by AB Enzymes GmbH and AB Enzymes, Inc. that was produced and/or is being produced in *Pichia* yeast. Ex. 8 at 1-10, 7; Ex. 9 at 1-17, 10; Ex. 10 at 1-8; Ex. 11 at 1-7; Ex. 12 at 1-6. For example, the Quantum phytase is produced by fermentation of the yeast *Pichia pastoris*, which is genetically modified to contain a synthetic gene encoding a thermotolerant phytase. Ex. 24 at 2. In another example, Quantum phytase is produced by fermentation of a genetically modified strain of *Pichia pastoris* and intended for use as a feed

additive for chickens, turkeys and ducks for fattening, laying hens and weaned piglets within the category of zootechnical additives, in functional groups: 1) digestibility enhancer, and 2) substances favourably affecting the environment. Ex. 24 at 2, 5-6.

79. Upon information and belief, each use, offer for sale, and/or sale of Quantum phytase by AB Vista and/or ABITEC is a use, offer for sale, and/or sale of Quantum imported into the United States by AB Enzymes GmbH and AB Enzymes, Inc. that was produced and/or is being produced by providing an appA polynucleotide from *Escherichia coli* which encodes a protein or polypeptide with phytase activity. Ex. 8 at 2-3, 7-8; Ex. 9 at 2-3, 5-6, 10-11; Ex. 10 at 2-3; Ex. 11 at 2-3; Ex. 12 at 2-3, 5. For example, the donor organism for Quantum is *Escherichia coli*. To produce Quantum, a synthetic appA gene from *E. coli* encoding a phytase is introduced into the recipient organism. Ex. 24 at 6-7.

80. Upon information and belief, each use, offer for sale, and/or sale of Quantum phytase by AB Vista and/or ABITEC is a use, offer for sale, and/or sale of Quantum imported into the United States by AB Enzymes GmbH and AB Enzymes, Inc. that was produced and/or is being produced by expressing the polynucleotide in a *Pichia* yeast strain. Ex. 8 at 3, 8; Ex. 9 at 3, 6, 11-12, Ex. 10 at 3, 5-6; Ex. 11 at 2-4; Ex. 12 at 3, 5-6. For example, Quantum is produced by fermentation of yeast *Pichia pastoris*, which is genetically modified to contain a cloned *E. coli* gene encoding a thermotolerant phytase. Ex. 24 at 2, 6-7. A phytase expression cassette using *Pichia* yeast is used in the production of the Quantum. Ex. 24 at 6.

81. Upon information and belief, each use, offer for sale, and/or sale of Quantum phytase by AB Vista and/or ABITEC is a use, offer for sale, and/or sale of Quantum imported by AB Enzymes GmbH and AB Enzymes, Inc. into the United States that was produced and/or is being produced by isolating the expressed protein. Ex. 8 at 4, 9-10; Ex. 9 at 4, 12; Ex. 10 at 4;

Ex. 11 at 4; Ex. 12 at 3-4. For example, Quantum is produced in a contained, submerged fed-batch, pure culture fermentation and conventional process controls are in place. The phytase enzyme is recovered from the fermentation broth by cell separation, clarification, ultrafiltration, diafiltration and polishing filtration. Most cells (> 99 %) are removed in the cell separation step by centrifugation. The remaining cells are removed in the clarification step by filtration. Ultrafiltration is then used for concentration, diafiltration for removal of low-molecular weight compounds and polishing for removal of non-enzyme precipitates. Ex. 24 at 2, 7.

82. Upon information and belief, each use, offer for sale, and/or sale of Quantum phytase by AB Vista and/or ABITEC is a use, offer for sale, and/or sale of Quantum imported into the United States by AB Enzymes GmbH and AB Enzymes, Inc. that was produced and/or is being produced by a method wherein the phytase product catalyzes the release of phosphate from phytate. Ex. 8 at 4; Ex. 9 at 4-5; Ex. 10 at 4-5; Ex. 11 at 4-5; Ex. 12 at 4-5. For example, the determination of the activity of phytase in Quantum is made with a method which measures the enzyme-catalysed formation of inorganic phosphate released from sodium phytate. Ex. 24 at 7. In another example, Quantum is intended to be marketed in two formulations, Quantum Phytase 5000 L (liquid), with a minimum phytase activity of 5000 FTU g<sup>-1</sup>, and Quantum Phytase 2500 D (solid), with a minimum phytase activity of 2500 FTU g<sup>-1</sup> (one phytase unit is defined as the quantity of enzyme which liberates 1 micromole of inorganic phosphate per minute from sodium phytate at 37 °C, pH 5.5). Ex. 24 at 6.

83. Upon information and belief, each use, offer for sale, and/or sale of Quantum phytase by AB Vista and/or ABITEC is a use, offer for sale, and/or sale of Quantum imported into the United States by AB Enzymes GmbH and AB Enzymes, Inc. that was produced and/or is being produced by a method that provides increased thermostability as compared to the phytase

expressed in a non-yeast host cell. Ex. 8 at 4; Ex. 9 at 5; Ex. 10 at 5; Ex. 11 at 5. For example, Quantum is produced to render the phytase thermotolerant in order to withstand the high temperatures during feed pelleting. Ex. 24 at 2, 6-7.

84. Upon information and belief, each use, offer for sale, and/or sale of Quantum phytase by AB Vista and/or ABITEC is a use, offer for sale, and/or sale of Quantum imported into the United States by AB Enzymes GmbH and AB Enzymes, Inc. that was produced by a method wherein the protein or polypeptide, preceded by a signal peptide, is secreted by the cell into growth media or expressed intracellularly. Ex. 8 at 5; Ex. 9 at 7-8, 7-9, 14-15; Ex. 10 at 7; Ex. 11 at 5-6. For example, Quantum is produced in a contained, submerged fed-batch, pure culture fermentation with conventional process controls in place. The phytase enzyme is recovered from the fermentation broth by cell separation, clarification, ultrafiltration, diafiltration and polishing filtration. Ex. 24 at 2, 7.

85. Upon information and belief, each use, offer for sale, and/or sale of Quantum phytase by AB Vista and/or ABITEC is a use, offer for sale, and/or sale of Quantum imported into the United States by AB Enzymes GmbH and AB Enzymes, Inc. that was produced by a method wherein the protein or polypeptide is secreted into the growth media and has a concentration greater than 300 units/ml. Ex. 8 at 6; Ex. 9 at 8-9, 15-16; Ex. 10 at 7-8; Ex. 11 at 6-7. For example, Quantum is intended to be marketed in two formulations, Quantum Phytase 5000 L (liquid), with a minimum phytase activity of 5000 FTU g<sup>-1</sup>, and Quantum™ Phytase 2500 D (solid), with a minimum phytase activity of 2500 FTU g<sup>-1</sup> (one phytase unit is defined as the quantity of enzyme which liberates 1 micromole of inorganic phosphate per minute from sodium phytate at 37 °C, pH 5.5). Ex. 24 at 6.

86. Upon information and belief, each use, offer for sale, and/or sale of Quantum phytase by AB Vista and/or ABITEC is a use, offer for sale, and/or sale of Quantum imported into the United States by AB Enzymes GmbH and AB Enzymes, Inc. that was produced and/or is being produced by a method wherein the appA polynucleotide which encodes a protein or polypeptide with phytase activity is spliced in frame with a transcriptional enhancer element. Ex. 9 at 9, 16; Ex. 10 at 8; Ex. 11 at 7. For example, the phytase gene in the Quantum phytase construct is under the control of a *Pichia pastoris* methanol-inducible alcohol oxidase 1 (AOX1) promoter. Ex. 24 at 7.

**COUNT I**  
**(Infringement of U.S. Patent No. 8,993,300)**

87. Plaintiffs repeat and re-allege each and every allegation contained in the preceding paragraphs of this Complaint as if stated in their entirety herein, and incorporates them herein by reference.

88. On March 31, 2015, the United States Patent and Trademark Office duly and legally issued the '300 patent, entitled "Overexpression of Phytase Genes in Yeast Systems," to inventor Xingen Lei. The '300 patent was assigned at issuance to Cornell Research Foundation, Inc., Ithaca, New York. Cornell Research Foundation, Inc. is the owner of the '300 patent by virtue of an assignment that was duly recorded at the United States Patent and Trademark Office at Reel 009457 and Frame 0350, and continues to be the owner of the '300 patent. Ex. 1.

89. Pursuant to an agreement entered into with Cornell Research Foundation, Inc., Huvepharma obtained an exclusive license to the '300 patent, and has the right to sue for infringement of that patent and to recover damages for such infringement.

90. Upon information and belief, ABF, AB Enzymes GmbH, and AB Enzymes, Inc. have infringed and continue to infringe at least claims 1, 2, 3, 6, 7, 8, 11, and 12 of the '300

patent pursuant to 35 U.S.C. § 271(g), literally or under the doctrine of equivalents, a least by importing into the United States, offering to sell, selling, and/or using without authority Quantum Blue products, including but not limited to Quantum Blue 10G, Quantum Blue 40P, Quantum Blue 200P, and/or Quantum Blue QBC.

91. Upon information and belief, ABF, AB Vista, and ABITEC have infringed and continue to infringe at least claims 1, 2, 3, 6, 7, 8, 11, and 12 of the '300 patent pursuant to 35 U.S.C. § 271(g), literally or under the doctrine of equivalents, by offering to sell, selling, and/or using within the United States without authority imported Quantum Blue products, including but not limited to Quantum Blue 10G, Quantum Blue 40P, Quantum Blue 200P, and/or Quantum Blue QBC.

92. Upon information and belief, ABF and PGP have infringed and continue to infringe at least claims 1, 2, 3, 6, 7, 8, 11, and 12 of the '300 patent pursuant to 35 U.S.C. § 271(a), literally or under the doctrine of equivalents, at least by making within the United States without authority at least Quantum Blue 5G products.

93. Upon information and belief, the Quantum Blue products are produced using the same methods in the context of the '300 patent claims. Thus, the evidence and descriptions herein describing the method of producing Quantum Blue are applicable to any one or more of the Quantum Blue products, including but not limited to Quantum Blue 5G, Quantum Blue 10G, Quantum Blue 40P, Quantum Blue 200P, and/or Quantum Blue QBC.

94. As an example, Exhibit 7 is a preliminary and exemplary claim chart detailing Defendants' infringement of multiple claims of the '300 patent. This chart is not intended to limit Huvepharma's right to modify the chart or allege that other products and/or activities of Defendants infringe the above identified claims or any other claims of the '300 patent or any

other patent. Exhibit 7 is hereby incorporated by reference in its entirety. Each claim element in Exhibit 7 that is mapped to the accused Quantum Blue product shall be considered an allegation within the meaning of the Federal Rules of Civil Procedure and therefore a response to each allegation is required.

95. Defendants' infringement of the '300 patent has injured Plaintiffs in their business and property rights. Plaintiffs are entitled to recover monetary damages the injuries arising from Defendants' infringement pursuant to 35 U.S.C. § 284 in an amount to be determined at trial.

**COUNT II**  
**(Infringement of U.S. Patent No. 6,451,572)**

96. Plaintiffs repeat and re-allege each and every allegation contained in the preceding paragraphs of this Complaint as if stated in their entirety herein, and incorporates them herein by reference.

97. On September 17, 2002, the United States Patent and Trademark Office duly and legally issued the '572 patent, entitled "Overexpression of Phytase Genes in Yeast Systems," to inventor Xingen Lei. The '572 patent was assigned at issuance to Cornell Research Foundation, Inc., Ithaca, New York. Cornell Research Foundation, Inc. is the owner of the '572 patent by virtue of an assignment that was duly recorded at the United States Patent and Trademark Office at Reel 009457 and Frame 0350, and continues to be the owner of the '572 patent. Ex. 2.

98. Pursuant to an agreement entered into with Cornell Research Foundation, Inc., Huvepharma obtained an exclusive license to the '572 patent, and has the right to sue for infringement of that patent and to recover damages for such infringement.

99. Upon information and belief, ABF, AB Enzymes GmbH, and AB Enzymes, Inc. have infringed and continue to infringe at least claims 1-4 and 9-10 of the '572 patent pursuant to 35 U.S.C. § 271(g), literally or under the doctrine of equivalents, at least by importing into the

United States, offering to sell, selling, and/or using without authority Quantum products, including but not limited to Quantum 2500D and 5000L products.

100. Upon information and belief, ABF, AB Vista, and ABITEC have infringed and continue to infringe at least claims 1-4 and 9-10 of the '572 patent pursuant to 35 U.S.C. § 271(g), literally or under the doctrine of equivalents, by offering to sell, selling, and/or using within the United States without authority Quantum products, including but not limited to Quantum 2500D and Quantum 5000L, which were imported into the United States.

101. Upon information and belief, the Quantum products are produced using the same methods in the context of the '572 patent claims. Thus, the evidence and descriptions herein describing, for example, the method of producing Quantum 2500D, is applicable to any one or more of the other Quantum products including but not limited to Quantum 5000L.

102. As an example, Exhibit 8 is a preliminary and exemplary claim chart detailing Defendants' infringement of claims 1-4 and 9-10 of the '572 patent. This chart is not intended to limit Huvepharma's right to modify the chart or allege that other products and/or activities of Defendants infringe the above identified claims or any other claims of the '572 patent or any other patent. Exhibit 8 is hereby incorporated by reference in its entirety. Each claim element in Exhibit 8 that is mapped to the accused Quantum products, including Quantum 2500D and Quantum 5000L, shall be considered an allegation within the meaning of the Federal Rules of Civil Procedure and therefore a response to each allegation is required.

103. Defendants' infringement of the '572 patent has injured Plaintiffs in their business and property rights. Plaintiffs are entitled to recover monetary damages based on the injuries arising from Defendants' infringement pursuant to 35 U.S.C. § 284 in an amount to be determined at trial.

**COUNT III**  
**(Infringement of U.S. Patent No. 7,026,150)**

104. Plaintiffs repeat and re-allege each and every allegation contained in the preceding paragraphs of this Complaint as if stated in their entirety herein, and incorporates them herein by reference.

105. On April 11, 2006, the United States Patent and Trademark Office duly and legally issued the '150 patent, entitled "Overexpression of Phytase Genes in Yeast Systems," to inventor Xingen Lei. The '150 patent was assigned at issuance to Cornell Research Foundation, Inc., Ithaca, New York. Cornell Research Foundation, Inc. is the owner of the '150 patent by virtue of an assignment that was duly recorded at the United States Patent and Trademark Office at Reel 013294 and Frame 0133, and continues to be the owner of the '150 patent. Ex. 3.

106. Pursuant to an agreement entered into with Cornell Research Foundation, Inc., Huvepharma obtained an exclusive license to the '150 patent and has the right to sue for infringement of that patent and to recover damages for such infringement.

107. Upon information and belief, ABF, AB Enzymes GmbH, and AB Enzymes, Inc. have infringed and continue to infringe at least claims 1-4, 6-8, 28-33, and 37 of the '150 patent pursuant to 35 U.S.C. § 271(g), literally or under the doctrine of equivalents, at least by importing into the United States, offering to sell, selling, and/or using without authority Quantum products, including but not limited to Quantum 2500D and Quantum 5000L.

108. On information and belief, ABF, AB Vista and ABITEC have infringed and continue to infringe at least claims 1-4, 6-8, 28-33, and 37 of the '150 patent pursuant to 35 U.S.C. § 271(g), literally or under the doctrine of equivalents, by offering to sell, selling, and/or using within the United States without authority Quantum products, including but not limited to Quantum 2500D and Quantum 5000L, which were imported into the United States.

109. On information and belief, the Quantum products are produced using the same methods in the context of the '150 patent claims. Thus, the evidence and descriptions herein describing the method of producing Quantum 2500D is applicable to any one or more of the other Quantum products, including but not limited to Quantum 5000L.

110. As an example, Exhibit 9 is a preliminary and exemplary claim chart detailing Defendants' infringement of claims 1-4, 6-8, 28-33, and 37 of the '150 patent. This chart is not intended to limit Huvepharma's right to modify the chart or allege that other products and/or activities of Defendants infringe the above identified claims or any other claims of the '150 patent or any other patent. Exhibit 9 is hereby incorporated by reference in its entirety. Each claim element in Exhibit 9 that is mapped to the accused Quantum products, including Quantum 2500D and Quantum 5000L, shall be considered an allegation within the meaning of the Federal Rules of Civil Procedure and therefore a response to each allegation is required.

111. Defendants' infringement of the '150 patent has injured Plaintiffs in their business and property rights. Plaintiffs are entitled to recover monetary damages based on the injuries arising from Defendants' infringement pursuant to 35 U.S.C. § 284 in an amount to be determined at trial.

**COUNT IV**  
**(Infringement of U.S. Patent No. 7,312,063)**

112. Plaintiffs repeat and re-allege each and every allegation contained in the preceding paragraphs of this Complaint as if stated in their entirety herein, and incorporates them herein by reference.

113. On December 25, 2007, the United States Patent and Trademark Office duly and legally issued the '063 patent, entitled "Overexpression of Phytase Genes in Yeast Systems," to inventor Xingen Lei. The '063 patent was assigned at issuance to Cornell Research Foundation,

Inc., Ithaca, New York. Cornell Research Foundation, Inc. is the owner of the '063 patent by virtue of an assignment that was duly recorded at the United States Patent and Trademark Office at Reel 009457 and Frame 0350, and continues to be the owner of the '063 patent.

114. Pursuant to an agreement entered into with Cornell Research Foundation, Inc., Huvepharma obtained an exclusive license to the '063 patent and has the right to sue for infringement of that patent and to recover damages for such infringement.

115. Upon information and belief, ABF, AB Enzymes GmbH, and AB Enzymes, Inc. have infringed and continue to infringe at least claims 1-3 and 5-7 of the '063 patent pursuant to 35 U.S.C. § 271(g), literally or under the doctrine of equivalents, at least by importing into the United States, offering to sell, selling, and/or using without authority Quantum products, including at least Quantum 2500D and 5000L.

116. Upon information and belief, ABF, AB Vista and ABITEC have infringed and continue to infringe at least claims 1-3 and 5-7 of the '063 patent pursuant to 35 U.S.C. § 271(g), literally or under the doctrine of equivalents, by offering to sell, selling, and/or using within the United States without authority Quantum products, including but not limited to Quantum 2500D and 5000L, which were imported into the United States.

117. Upon information and belief, the Quantum phytase products are produced using the same methods in the context of the '063 patent claims. Thus, the evidence and descriptions herein describing the method of producing Quantum 2500D is applicable to any one or more of the other Quantum products, including but not limited to Quantum 5000L.

118. As an example, Exhibit 10 is a preliminary and exemplary claim chart detailing Defendants' infringement of claims 1-3 and 5-7 of the '063 patent. This chart is not intended to limit Huvepharma's right to modify the chart or allege that other products and/or activities of

Defendants' infringe the above identified claims or any other claims of the '063 patent or any other patent. Exhibit 10 is hereby incorporated by reference in its entirety. Each claim element in Exhibit 10 that is mapped to the accused Quantum products, including Quantum 2500D and Quantum 5000L, shall be considered an allegation within the meaning of the Federal Rules of Civil Procedure and therefore a response to each allegation is required.

119. Defendants' infringement of the '063 patent has injured Plaintiffs in their business and property rights. Plaintiffs are entitled to recover monetary damages based on the injuries arising from Defendants' infringement pursuant to 35 U.S.C. § 284 in an amount to be determined at trial.

**COUNT V**  
**(Infringement of U.S. Patent No. 7,829,318)**

120. Plaintiffs repeat and re-allege each and every allegation contained in the preceding paragraphs of this Complaint as if stated in their entirety herein, and incorporates them herein by reference.

121. On November 9, 2010, the United States Patent and Trademark Office duly and legally issued the '318 patent, entitled "Overexpression of Phytase Genes in Yeast Systems," to inventor Xingen Lei. The '318 patent was assigned at issuance to Cornell Research Foundation, Inc., Ithaca, New York. Cornell Research Foundation, Inc. is the owner of the '318 patent by virtue of an assignment that was duly recorded at the United States Patent and Trademark Office at Reel 009457 and Frame 0350, continues to be the owner of the '318 patent. Ex. 5.

122. Pursuant to an agreement entered into with Cornell Research Foundation, Inc., Huvepharma obtained an exclusive license to the '318 patent and has the right to sue for infringement of that patent and to recover damages for such infringement.

123. Upon information and belief, ABF, AB Enzymes GmbH, and AB Enzymes, Inc. have infringed and continue to infringe at least claims 1-4 of the '318 patent pursuant to 35 U.S.C. § 271(g), literally or under the doctrine of equivalents, by at least importing into the United States, offering to sell, selling, and/or using without authority Quantum products, including but not limited to Quantum 2500D and 5000L.

124. Upon information and belief, ABF, AB Vista and ABITEC have infringed and continue to infringe at least claims 1-4 of the '318 patent pursuant to 35 U.S.C. § 271(g), literally or under the doctrine of equivalents, by offering to sell, selling, and/or using within the United States without authority Quantum products, including but not limited to Quantum 2500D and 5000L, which were imported into the United States.

125. Upon information and belief, the Quantum products are produced using the same methods in the context of the '318 patent claims. Thus, the evidence and descriptions herein describing, for example, the method of producing Quantum 2500D is applicable to any one or more of the other Quantum products, including but not limited to Quantum 5000L.

126. As an example, Exhibit 11 is a preliminary and exemplary claim chart detailing Defendants' infringement of claims 1-4 of the '318 patent. This chart is not intended to limit Huvepharma's right to modify the chart or allege that other products and/or activities of Defendants infringe the above identified claims or any other claims of the '318 patent or any other patent. Exhibit 11 is hereby incorporated by reference in its entirety. Each claim element in Exhibit 11 that is mapped to the accused Quantum products shall be considered an allegation within the meaning of the Federal Rules of Civil Procedure and therefore a response to each allegation is required.

127. Defendants' infringement of the '318 patent has injured Plaintiffs in their business and property rights. Plaintiffs are entitled to recover monetary damages based on the injuries arising from Defendants' infringement pursuant to 35 U.S.C. § 284 in an amount to be determined at trial.

**COUNT VI**  
**(Infringement of U.S. Patent No. 8,455,232)**

128. Plaintiffs repeat and re-allege each and every allegation contained in the preceding paragraphs of this Complaint as if stated in their entirety herein, and incorporates them herein by reference.

129. On June 4, 2013, the United States Patent and Trademark Office duly and legally issued the '232 patent, entitled "Overexpression of Phytase Genes in Yeast Systems," to inventor Xingen Lei. The '232 patent was assigned at issuance to Cornell Research Foundation, Inc., Ithaca, New York. Cornell Research Foundation, Inc. is the owner of the '232 patent by virtue of an assignment that was duly recorded at the United States Patent and Trademark Office at Reel 009457 and Frame 0350, continues to be the owner of the '232 patent. Ex. 6.

130. Pursuant to an agreement entered into with Cornell Research Foundation, Inc., Huvepharma obtained an exclusive license to the '232 patent and has the right to sue for infringement of that patent and to recover damages for such infringement.

131. Upon information and belief, ABF, AB Enzymes GmbH, and AB Enzymes, Inc. have infringed and continue to infringe at least claims 1-3 of the '232 patent pursuant to 35 U.S.C. § 271(g), literally or under the doctrine of equivalents, at least by importing into the United States, offering to sell, selling, and/or using without authority Quantum products, including but not limited to Quantum 2500D and 5000L.

132. Upon information and belief, ABF, AB Vista, and ABITEC have infringed and continue to infringe at least claims 1-3 of the '232 patent pursuant to 35 U.S.C. § 271(g), literally or under the doctrine of equivalents, by offering to sell, selling, and/or using within the United States without authority Quantum products, including but not limited to Quantum 2500D and 5000L which were imported into the United States.

133. Upon information and belief, the Quantum products are produced using the same methods in the context of the '232 patent claims. Thus, the evidence and descriptions herein describing the method of producing Quantum 2500D is applicable to any one or more of the other Quantum products, including but not limited to Quantum 5000L.

134. As an example, Exhibit 12 is a preliminary and exemplary claim chart detailing Defendants' infringement of claims 1-3 of the '232 patent. This chart is not intended to limit Huvepharma's right to modify the chart or allege that other products and/or activities of Defendants infringe the above identified claims or any other claims of the '232 patent or any other patent. Exhibit 12 is hereby incorporated by reference in its entirety. Each claim element in Exhibit 12 that is mapped to the accused Quantum products shall be considered an allegation within the meaning of the Federal Rules of Civil Procedure and therefore a response to each allegation is required.

135. Defendants' infringement of the '232 patent has injured Plaintiffs in their business and property rights. Plaintiffs are entitled to recover monetary damages based on the injuries arising from Defendants' infringement pursuant to 35 U.S.C. § 284 in an amount to be determined at trial.

**PRAYER FOR RELIEF**

WHEREFORE, Plaintiffs pray for relief as follows:

- A. Judgment that Defendants have infringed one or more claims of the '300 patent, the '572 patent, the '150 patent, the '063 patent, the '318 patent, and/or the '232 patent;
- B. An award of damages pursuant to pursuant to 35 U.S.C. § 284;
- C. An award to Plaintiffs of their costs and reasonable expenses to the fullest extent permitted by law; and
- D. An award of such other and further relief as the Court may deem just and proper.

**DEMAND FOR JURY TRIAL**

Pursuant to Federal Rule of Civil Procedure 38(b), Plaintiff demands trial by jury on all issues so triable.

MORRIS, NICHOLS, ARSHT & TUNNELL LLP

*/s/ Jeremy A. Tigan*

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