Paper No. 20
Filed: January 22, 2024

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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INARI AGRICULTURE, INC.,
Petitioner,

v.

CORTEVA AGRISCIENCE LLC,
Patent Owner.

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PGR2023-00022
Patent 11,371,055

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**PATENT OWNER'S UPDATED EXHIBIT LIST**

Pursuant to 37 C.F.R. § 42.63(e), Patent Owner Corteva Agriscience LLC hereby submits a current listing of Patent Owner Exhibits. Exhibits 2006-2030, 2032-2035, 2037-2041, 2044, 2054-2055, 2057-2067, 2069-2072, 2074-2095 are being filed today.

| Exhibit | Description |
|---|---|
| 2001 | Fumiyasu Fukumori and Robert P. Hausinger, *Purification and Characterization of 2,4-Dichlorophenoxyacetate/α-Ketoglutarate Dioxygenase*, J. of Biol. Chem., Vol. 268, No. 32, pp. 24311-17 (1993) ("Fukumori"). |
| 2002 | Tina A. Müller et al., *Structural basis for the enantiospecifics of R- and S-specific phenoxypropionate/α-ketoglutarate dioxygenases*, Protein Sci., Vol. 15, No. 6, pp. 1356-68 ("Müller") (library stamped copy of Ex. 1020). |
| 2003 | Julie C. Dunning Hotopp and Robert P. Hausinger, *Probing the 2,4-Dichlorophenoxyacetate/α-Ketoglutarate Dioxygenase Substrate-Binding Site by Site-Directed Mutagenesis and Mechanism-Based Inactivation*, Biochem., Vol. 41, No. 31, pp. 9787-94 (2002) ("Hotopp"). |
| 2004 | U.S. Patent No. 9,125,357 ("the '357 patent"). |
| 2005 | United States Environmental Protection Agency, Types of Pesticide Ingredients, *available at* https://www.epa.gov/ingredients-used-pesticide-products/types-pesticide-ingredients (last accessed July 12, 2023). |
| 2006 | US 7,914,993 to Silverstone et al. (issued Mar. 29, 2011). |
| 2007 | US 8,124,841 to Silverstone et al. (issued Feb. 28, 2012). |
| 2008 | US 8,343,747 to Silverstone et al. (issued Jan. 1, 2013). |
| 2009 | Transcript from Deposition of Dr. Silverstone (Jan. 11, 2024). |
| 2010 | Paine et al., *Improving the nutritional value of Golden Rice through increased pro-vitamin A content*, 23(4) NATURE BIOTECHNOLOGY 482–87 (2005) ("Paine"). |
| 2011 | Declaration of Dr. Bollinger. |
| 2012 | Declaration of Dr. Christou. |
| 2013 | Provisional U.S. App. No. 60/731,044. |
| 2014 | Certified File History for U.S. App. No. 12/091,896. |
| 2015 | Certified File History for U.S. App. No. 13/647,081. |

| Exhibit | Description |
|---|---|
| 2016 | Certified File History for U.S. App. No. 14/491,197. |
| 2017 | WO 2007/053482 A2, published May 10, 2007. |
| 2018 | Lewis and Stone, *Biochemistry, Proteins Enzymes*, StatPearls (NCBI Bookshelf) (2023). |
| 2019 | Tian and Skolnick, *How Well is Enzyme Function Conserved as a Function of Pairwise Sequence Identity?* 333 J. MOL. BIOL. 863–882 (2003) ("Tian"). |
| 2020 | Tipton and Boyce, *History of the enzyme nomenclature system*, 16(1) BIOINFORMATICS 34–40 (2000) ("Tipton"). |
| 2021 | Rost, *Twilight zone of protein sequence alignments*, 12(2) PROTEIN ENGINEERING 85–94 (1999) ("Rost 1999"). |
| 2022 | Elkins et al., *X-ray Crystal Structure of Escherichia coli Taurine/α-Ketoglutarate Dioxygenase Complexed to Ferrous Iron and Substrates*, 41 BIOCHEMISTRY 5185–92 (2002) ("Elkins"). |
| 2023 | Chung and Subbiah, *A structural explanation for the twilight zone of protein sequence homology*, 4(10) STRUCTURE 1123–27 (1996) ("Chung"). |
| 2024 | Wilson et al., *Assessing Annotation Transfer for Genomics: Quantifying the Relations between Protein Sequence, Structure and Function through Traditional and Probabilistic Scores*, 297 J. MOL. BIOL. 233–249 (2000) ("Wilson"). |
| 2025 | Minshull et al., *Predicting enzyme function from protein sequence*, 9(2) CURR. OPIN. CHEM. BIOL. 202-09 (2005) ("Minshull"). |
| 2026 | Devos and Valencia, *Practical Limits of Function Prediction*, 41 PROTEINS 98–107 (2000) ("Devos"). |
| 2027 | Todd et al., *Evolution of Function in Protein Superfamilies, from a Structural Perspective*, 307 J. MOL. BIOL. 1113-43 (2001) ("Todd"). |
| 2028 | Rost, *Enzyme Function Less Conserved than Anticipated*, 318 J. MOL. BIOL. 595–608 (2002) ("Rost 2002"). |
| 2029 | desJardins, *Prediction of Enzyme Classification from Protein Sequence without the use of Sequence Similarity*, 5 PROC. INT. CONF. INTELL. SYST. MOL. BIOL. 92–99 (1997) ("desJardins"). |
| 2030 | Price and Arkin, *PaperBLAST: Text Mining Papers for Information about Homologs*, 2(4) MSYSTEMS e00039 1–10 (2017) ("Price"). |
| 2031 | Reserved. |
| 2032 | Galperin et al., *Analogous Enzymes: Independent Inventions in Enzyme Evolution*, 8 GENOME RESEARCH 779–90 (1998) ("Galperin"). |

| Exhibit | Description |
|---|---|
| 2033 | Dym and Eisenberg, *Sequence-structure analysis of FAD-containing proteins*, 10 PROTEIN SCIENCE 1712–28 (2001) ("Dym"). |
| 2034 | Minarik et al., *Malate Dehydrogenases – Structure and Function*, 21 GEN. PHYSIOL. BIOPHYS. 257–65 (2002) ("Minarik"). |
| 2035 | Chaparro-Riggers et al., *Better library design: data-driven protein engineering*, 2 BIOTECHNOL. J. 180–91 (2007) ("Chaparro-Riggers"). |
| 2036 | Reserved. |
| 2037 | Aziz et al., *Physiology, Antibody*, StatPearls (NCBI Bookshelf) (2023). |
| 2038 | Chica et al., *Semi-rational approaches to engineering enzyme activity: combining the benefits of directed evolution and rational design*, 16(4) CURR. OPIN. BIOTECHNOL. 378–84 (2005) ("Chica"). |
| 2039 | Fox et al., *Improving catalytic function by ProSAR-driven enzyme evolution*, 25(3) Nature Biotechnology 338–44 (2007) ("Fox 2007"). |
| 2040 | Altschul et al., *Gapped BLAST and PSI-BLAST: a new generation of protein database search programs*, 25(17) NUCLEIC ACIDS RESEARCH 3389–3402 (1997) ("Altschul"). |
| 2041 | Müller and Vingron, *Modeling Amino Acid Replacement*, 7(6) JOURNAL OF COMPUTATIONAL BIOLOGY 761–76 (2000) ("Müller"). |
| 2042 | Reserved. |
| 2043 | Reserved. |
| 2044 | Ng and Henikoff, *SIFT: predicting amino acid changes that affect protein function*, 31(13) NUCLEIC ACIDS RESEARCH 3812–14 (2003) ("Ng"). |
| 2045 | Reserved. |
| 2046 | Reserved. |
| 2047 | Reserved. |
| 2048 | Reserved. |
| 2049 | Reserved. |
| 2050 | Reserved. |
| 2051 | Reserved. |
| 2052 | Reserved. |
| 2053 | Reserved. |
| 2054 | Hausinger, *Fe(II)/α-Ketoglutarate-Dependent Hydroxylases and Related Enzymes*, 39(21) CRITICAL REVIEWS IN BIOCHEMISTRY AND MOLECULAR BIOLOGY 21–68 (2004) ("Hausinger"). |
| 2055 | European Patent No. 1,073,676 B1 ("the '676 patent"). |
| 2056 | Reserved. |

| Exhibit | Description |
|---|---|
| 2057 | Twyman et al., *Foreign DNA: Integration and Expression in Transgenic Plants*, 24 GENETIC ENGINEERING 107–36 (2002) ("Twyman 2002"). |
| 2058 | Vaeck et al., *Transgenic plants protected from insect attack*, 328 NATURE 33–37 (1987) ("Vaeck"). |
| 2059 | Block et al., *Engineering herbicide resistance in plants by expression of a detoxifying enzyme*, 6(9) THE EMBO JOURNAL 2513–18 (1987) ("Block"). |
| 2060 | Owen, *Current use of transgenic herbicide-resistant soybean and corn in the USA*, 19 CROP PROTECTION 765–71 (2000) ("Owen"). |
| 2061 | Twyman et al., *Molecular farming in plants: host systems and expression technology*, 21(12) TRENDS IN BIOTECHNOLOGY 570–78 ("Twyman 2003"). |
| 2062 | Potenza et al., *Targeting Transgene Expression in Research, Agricultural, and Environmental Applications: Promoters Used in Plant Transformation*, 40(1) IN VITRO CELL. DEV. BIOL. PLANT 1–22 (2004) ("Potenza"). |
| 2063 | Kim et al., *Handbook of Plant Biotechnology*, Vol. 1 Ch. 5 WILEY 71–80 (2004). |
| 2064 | Perlak et al., *Modification of the coding sequence enhances plant expression of insect control protein genes*, 88 PROC. NATL. ACAD. SCI. USA 3324–28 (1991) ("Perlak"). |
| 2065 | Murray et al., *Codon usage in plant genes*, 17(2) NUCLEIC ACIDS RESEARCH 477–98 (1989) ("Murray"). |
| 2066 | Verdaguer et al., *Functional organization of the cassava vein mosaic virus (CsVMV) promoter*, 37 PLANT MOLECULAR BIOLOGY 1055–67 (1998) ("Verdaguer"). |
| 2067 | De Bolle et al., *Analysis of the influence of promoter elements and a matrix attachment region on the inter-individual variation of transgene expression in populations of Arabidopsis thaliana*, 165 PLANT SCIENCE 169-179 (2003) ("De Bolle"). |
| 2068 | Reserved. |
| 2069 | McElroy et al., *Construction of expression vectors based on the rice actin 1 (Act1) 5' region for use in monocot transformation*, 231 MOL. GEN. GENET. 150–60 (1991) ("McElroy"). |

| Exhibit | Description |
|---|---|
| 2070 | Christensen and Quail, *Ubiquitin promoter-based vectors for high-level expression of selectable and/or screenable marker genes in monocotyledonous plants*, 5 TRANSGENIC RESEARCH 213–18 (1996) ("Christensen"). |
| 2071 | Mascarenhas et al., *Intron-mediated enhancement of heterologous gene expression in maize*, 15 PLANT MOLECULAR BIOLOGY 913–20 (1990) ("Mascarenhas"). |
| 2072 | Mitsuhara et al., *Efficient Promoter Cassettes for Enhanced Expression of Foreign Genes in Dicotyledonous and Monocotyledonous Plants*, 37(1) PLANT CELL PHYSIOL. 49–59 (1996) ("Mitsuhara"). |
| 2073 | Reserved. |
| 2074 | Bhat and Srinivasan, *Molecular and genetic analyses of transgenic plants: Considerations and approaches*, 163 PLANT SCIENCE 673–81 (2002) ("Bhat"). |
| 2075 | Altpeter et al., *Particle bombardment and the genetic enhancement of crops: myths and realities*, 15 MOLECULAR BREEDING 305–27 (2005) ("Altpeter"). |
| 2076 | Schroeder et al., *Transformation and Regeneration of Two Cultivars of Pea (Pisum sativum L.)*, 101 PLANT PHYSIOL. 751–57 (1993) ("Schroeder"). |
| 2077 | Engvall and Perlmann, *Enzyme-linked immunosorbent assay, ELISA, III. Quantitation of Specific Antibodies by Enzyme-Labeled Anti-Immunoglobulin in Antigen-Coated Tubes*, 109(1) THE JOURNAL OF IMMUNOLOGY 129–35 (1972) ("Engvall"). |
| 2078 | Burnette, *"Western Blotting": Electrophoretic Transfer of Proteins from Sodium Dodecyl Sulfate-Polyacrylamide Gels to Unmodified Nitrocellulose and Radiographic Detection with Antibody and Radioiodinated Protein A*, 112 ANALYTICAL BIOCHEMISTRY 195–203 (1981) ("Burnette"). |
| 2079 | Zhang et al., *The use of glufosinate as a selective agent in Agrobacterium-mediated transformation of soybean*, 56 PLANT CELL, TISSUE AND ORGAN CULTURE 37–46 (1999) ("Zhang"). |
| 2080 | Brasileiro and Aragão, *Marker Genes for In Vitro Selection of Transgenic Plants*, 3(3) JOURNAL OF PLANT BIOTECHNOLOGY 113–21 (2001) ("Brasileiro"). |
| 2081 | WO 1997/013402 A1, published April 17, 1997. |

| Exhibit | Description |
|---|---|
| 2082 | Frame et al., *Genetic Transformation Using Maize Immature Zygotic Embryos*, 710 PLANT EMBRYO CULTURE METHODS AND PROTOCOLS 327–41 (2011). |
| 2083 | Dayhoff et al., *A Model of Evolutionary Change in Proteins*, 5(3) ATLAS OF PROTEIN SEQUENCE AND STRUCTURE 345–52 (1978) ("Dayhoff"). |
| 2084 | Protein presentation (CONFIDENTIAL – PROTECTIVE ORDER MATERIAL). |
| 2085 | Protein presentation (CONFIDENTIAL – PROTECTIVE ORDER MATERIAL). |
| 2086 | Protein sequences (CONFIDENTIAL – PROTECTIVE ORDER MATERIAL). |
| 2087 | Protein sequences (CONFIDENTIAL – PROTECTIVE ORDER MATERIAL). |
| 2088 | Protein assay analysis (CONFIDENTIAL – PROTECTIVE ORDER MATERIAL). |
| 2089 | Protein sequences (CONFIDENTIAL – PROTECTIVE ORDER MATERIAL). |
| 2090 | Protein presentation (CONFIDENTIAL – PROTECTIVE ORDER MATERIAL). |
| 2091 | Protein presentation (CONFIDENTIAL – PROTECTIVE ORDER MATERIAL). |
| 2092 | Protein presentation (CONFIDENTIAL – PROTECTIVE ORDER MATERIAL). |
| 2093 | Protein presentation (CONFIDENTIAL – PROTECTIVE ORDER MATERIAL). |
| 2094 | Protein presentation (CONFIDENTIAL – PROTECTIVE ORDER MATERIAL). |
| 2095 | Protein sequences and analysis (CONFIDENTIAL – PROTECTIVE ORDER MATERIAL). |

Respectfully submitted,

Dated: January 22, 2024

/Pier D. DeRoo/
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Lead Counsel for Patent Owner
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**CERTIFICATE OF SERVICE**

The undersigned certifies that a copy of the foregoing **Patent Owner's Updated Exhibit List** and **Exhibits 2006-2030, 2032-2035, 2037-2041, 2044, 2054-2055, 2057-2067, 2069-2072, 2074-2095** were served electronically via email on January 22, 2024, in their entirety on the following:

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Petitioner has consented to electronic service by email.

Dated: January 22, 2024

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Garrett & Dunner, LLP