

TRADEMARK ASSIGNMENT COVER SHEET

Electronic Version v1.1
Stylesheet Version v1.2

ETAS ID: TM798662

SUBMISSION TYPE:	NEW ASSIGNMENT		
NATURE OF CONVEYANCE:	TRADEMARK SECURITY AGREEMENT		
CONVEYING PARTY DATA			
Name	Formerly	Execution Date	Entity Type
22ND CENTURY GROUP, INC.		03/03/2023	Corporation: NEVADA
RECEIVING PARTY DATA			
Name:	JGB COLLATERAL, LLC		
Street Address:	21 Charles Street		
City:	Westport		
State/Country:	CONNECTICUT		
Postal Code:	06880		
Entity Type:	Limited Liability Company: DELAWARE		
PROPERTY NUMBERS Total: 11			
Property Type	Number	Word Mark	
Registration Number:	5219829	BACK PORCH	
Serial Number:	97441839	HELPS YOU SMOKE LESS	
Serial Number:	97128690	MAGIC	
Registration Number:	4576149	MOONLIGHT	
Registration Number:	5561408	PARE	
Serial Number:	88664052	PINNACLE	
Serial Number:	97466081	PINNACLE	
Registration Number:	4071725	RED SUN	
Registration Number:	4036259	SPECTRUM	
Registration Number:	5247638	TURTLE CREEK	
Registration Number:	5822999	VLN	
CORRESPONDENCE DATA			
Fax Number:	2142000853		
<i>Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.</i>			
Phone:	214-651-5000		
Email:	ipdocketing@haynesboone.com		
Correspondent Name:	HAYNES AND BOONE, LLP		
Address Line 1:	2323 VICTORY AVENUE, SUITE 700		

OP \$290.00 5219829

Address Line 2: IP Section
Address Line 4: DALLAS, TEXAS 75219

ATTORNEY DOCKET NUMBER:	52050.117
NAME OF SUBMITTER:	Jeffrey A. Wolfson
SIGNATURE:	/Jeffrey A. Wolfson/
DATE SIGNED:	03/29/2023

Total Attachments: 65

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INTELLECTUAL PROPERTY SECURITY AGREEMENT

THIS INTELLECTUAL PROPERTY AGREEMENT (as may be amended, restated, supplemented or otherwise modified from time to time, this “*Agreement*”) is entered into as of March 3, 2023 by and among 22nd Century Group, Inc., a Nevada corporation (“*Grantor*”) and *JGB Collateral, LLC*, a Delaware limited liability company in its capacity as collateral agent (in such capacity, the “*Agent*”) for the holders of the 7% Original Issue Discount Senior Secured Debentures due March 3, 2026 (collectively, the “*Debentures*”) of Grantor.

RECITALS

WHEREAS, pursuant to the Purchase Agreement (as defined in the Debentures), the Purchasers (as defined in the Purchase Agreement) have severally agreed to extend the loans to the Grantor, as evidenced by the Debentures;

WHEREAS, in order to induce the Purchasers to extend the loans evidenced by the Debentures, Agent, Grantor and certain other debtors have executed a Security Agreement dated as of the date hereof (as may be amended, restated, supplemented or otherwise modified from time to time, the “*Security Agreement*”; capitalized terms used but not defined herein shall have the meaning given to such terms in the Security Agreement), pursuant to which the Grantor has granted to Agent, for the ratable benefit of the Purchasers, a security interest in, among other things, its Intellectual Property constituting Collateral (collectively, the “*Intellectual Property Collateral*”) to secure the prompt payment, performance and discharge in full of all of the Grantor’s obligations under the Debentures and other Transaction Documents (as defined in the Purchase Agreement); and

WHEREAS, Agent and Grantor desire to enter into this Agreement to more fully evidence the Agent’s security interests in the Intellectual Property Collateral.

NOW, THEREFORE, in consideration of the agreements herein contained and for other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the parties hereto hereby agree as follows:

AGREEMENT

- (1) **Grant of Security Interest.** To secure its obligations to Agent and Purchasers (collectively, the “*Secured Parties*”), Grantor grants and pledges to Agent, for the ratable benefit of the Secured Parties, a security interest in all of Grantor’s right, title and interest in, to and under all Intellectual Property Collateral, including, without limitation:
 - (a) the registered copyrights set forth on *Exhibit A* attached hereto (the “*Copyrights*”);
 - (b) the patents and patent applications set forth on *Exhibit B* attached hereto (the “*Patents*”);
 - (c) the trademarks set forth on *Exhibit C* attached hereto (the “*Trademarks*”);

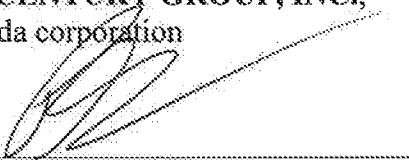
- (d) Any and all claims for damages by way of past, present and future infringements of any of the rights included above, with the right, but not the obligation, to sue for and collect such damages for said use or infringement of the intellectual property rights identified above;
 - (e) All licenses or other rights to use any of the Copyrights, Patents or Trademarks and all license fees and royalties arising from such use to the extent permitted by such license or rights;
 - (f) All amendments, extensions, renewals and extensions of any of the Copyrights, Trademarks or Patents; and
 - (g) All proceeds and products of the foregoing, including without limitation all payments under insurance or any indemnity or warranty payable in respect of any of the foregoing.
- (2) **Recordation.** Grantor authorizes the Commissioner for Patents, the Commissioner for Trademarks and the Register of Copyrights and any other government officials to record and register this Agreement upon request by Agent.
- (3) **Transaction Documents.** This Agreement has been entered into pursuant to and in conjunction with the Security Agreement, which is hereby incorporated by reference. The provisions of the Security Agreement shall supersede and control over any conflicting or inconsistent provision herein. The rights and remedies of Agent with respect to the Intellectual Property Collateral are as provided by the Security Agreement and related documents, and nothing in this Agreement shall be deemed to limit such rights and remedies.
- (4) **Execution in Counterparts.** This Agreement may be executed in counterparts (and by different parties hereto in different counterparts), each of which shall constitute an original, but all of which when taken together shall constitute a single contract. Delivery of an executed counterpart of a signature page to this Agreement by facsimile or in electronic (i.e., "pdf" or "tif" format) shall be effective as delivery of a manually executed counterpart of this Agreement.
- (5) **Successors and Assigns.** This Agreement will be binding on and shall inure to the benefit of the parties hereto and their respective successors and assigns.
- (6) **Governing Law.** This Agreement and any claim, controversy, dispute or cause of action (whether in contract or tort or otherwise) based upon, arising out of or relating to this Agreement and the transactions contemplated hereby and thereby shall be governed by, and construed in accordance with, the laws of the United States and the State of New York, without giving effect to any choice or conflict of law provision or rule (whether of the State of New York or any other jurisdiction).

[Signature page follows.]

IN WITNESS WHEREOF, the parties have caused this Intellectual Property Security Agreement to be duly executed by its officers thereunto duly authorized as of the first date written above.

GRANTOR:

22ND CENTURY GROUP, INC.,
a Nevada corporation

By: 
Name: *Peter R. Smith*
Title: *General Counsel + Secretary*

AGENT:

JGB COLLATERAL, LLC, as agent

By: 
Name: *Britt Long*
Title: *President*

EXHIBIT A

Copyrights

N/A

EXHIBIT B

Patents

Docket No.	Country	Expiration Date	Appl. No.	Patent No.	Status	Actual Application Date	Grant Date	Matter Title	All Docket No.	Licensee/Owner ship Info	Licensor Name	Co-Owner
045952-INV-123827/OA	African Union	6/10/2018			Inactive			REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0394	African Union	6/10/2018	9900257	11219	Inactive	11/24/1999	7/17/2003	REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-INV-123827/AL	Albania	6/10/2018	ALP9900100		Inactive	6/10/1998		REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0358	ARIPO	6/10/2018	AP/P/1999/001680	AP1169	Inactive	6/10/1998	5/15/2003	REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0360	Australia	6/10/2018	78291/98	748514	Inactive	10/21/1999	9/19/2002	REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0361	Australia	6/10/2018	2002300895	2002300895	Inactive	9/5/2002	7/20/2006	REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0362	Australia	6/10/2018	2004203879	2004203879	Inactive	8/13/2004	3/16/2007	REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0359	Austria	6/10/2018	98926456.9	0991766	Inactive	6/10/1998	3/17/2004	REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0363	Belgium	6/10/2018	98926456.9	0991766	Inactive	6/10/1998	3/17/2004	REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	

045952-INV-123827/BA	Bosnia and Herzegovina	6/10/2018	BAP99502A		Inactive	6/10/1998		REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0365	Brazil	6/10/2018	PI9810870-0	PI9810870-0	Inactive	12/13/1999	6/1/2021	REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0365/DIV	Brazil	6/10/2018	PI9816179-2		Inactive	11/12/2004		REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0364	Bulgaria	6/10/2018	103886	64319	Inactive	11/16/1999	9/30/2004	REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0366	Canada	6/10/2018	2287776	2287776	Inactive	10/18/1999	4/3/2012	REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0368	China	6/10/2018	98805370.5	ZL98805370.5	Inactive	12/1/1999	4/29/2009	REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0369	China	6/10/2018	200410064111.5	ZL20041006411.5	Inactive	4/25/2005	3/14/2007	REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0370/DIV	Cuba	6/10/2018	1012006	23275	Inactive	6/10/1998		REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0370	Cuba	6/10/2008	CU199900206		Inactive	11/26/1999		REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0371	Czech Republic	6/10/2018	PV1999-3677	297379	Inactive	11/26/1999	11/15/2006	REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0375	Denmark	6/10/2018	98926456.9	0991766	Inactive	6/10/1998	3/17/2004	REGULATION OF QUINOLATE PHOSPHORIBOSYL	1	Licensed	North Carolina State University	

								TRANSFERASE EXPRESSION				
045952-INV-123827/E	Estonia	6/10/2018	P199900575	4595	Inactive	6/10/1998	2/15/2006	REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0358/SZ	Eswatini	6/10/2018	AP/P/1999/001680	AP1169	Inactive	6/10/1998	5/15/2003	REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0376	Eurasian Pat. Convention	6/10/2018	2000000007	004652	Inactive	6/10/1998	6/24/2004	QUINOLATE PHOSPHORIBOSYL-TRANSFERASE (QPRTase) OF TOBACCO PLANT ENCODING SAID ENZYME AND METHODS	1	Licensed	North Carolina State University	
045952-INV-123827/E PX	European Patent Office	6/10/2018	98926456.9	0991766	Inactive	10/2/1999	3/17/2004	REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-INV-123827/E PDIV2X	European Patent Office	6/10/2018	04004192.3	1457563	Inactive	2/25/2004	3/8/2012	REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-INV-123827/E PDIVX	European Patent Office	6/10/2018	04004191.5	1457562	Inactive	2/25/2004	3/8/2012	REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0378	Finland	6/10/2018	98926456.9	0991766	Inactive	6/10/1998	3/17/2004	REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0379	France	6/10/2018	98926456.9	0991766	Inactive	6/10/1998	3/17/2004	REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0358/GM	Gambia	6/10/2018	AP/P/1999/001680	AP1169	Inactive	6/10/1998	5/15/2003	REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0372	Germany	6/10/2018	98926456.9	0991766	Inactive	6/10/1998	3/17/2004	REGULATION OF QUINOLATE PHOSPHORIBOSYL	1	Licensed	North Carolina State University	

								TRANSFERASE EXPRESSION				
045952-0374	Germany	6/10/2018	04004192.3	1457563	Inactive	6/10/1998	8/8/2012	REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION IN TOBACCO PLANTS	1	Licensed	North Carolina State University	
045952-0373	Germany	6/10/2018	04004191.5	1457562	Inactive	6/10/1998	8/8/2012	REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0358/GH	Ghana	6/10/2018	AP/P/1999/001680	AP1169	Inactive	6/10/1998	5/15/2003	REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0383	Greece	6/10/2018	98926456.9	0991766	Inactive	6/10/1998	3/17/2004	REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0384	Hong Kong	6/10/2018	00106489.5	1027379	Inactive	10/12/2000	8/20/2004	REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0385	Hong Kong	6/10/2018	04107697.7	1065066	Inactive	10/7/2004	8/8/2012	REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0386	Hong Kong	6/10/2018	05102204.3	1069411	Inactive	3/14/2005	11/23/2012	REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0387	Hungary	6/10/2018	P0003767	225888	Inactive	1/12/2000	10/24/2007	REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0698	India	6/10/2018			Inactive			Regulation of Quinolate Phosphoribosyl Transferase Expression	1			
045952-INV-123827/1N	India	6/10/2018	1627/DEL/1998		Inactive	6/12/1998		REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	

045952-INV-123427/1 NDIV	India	6/10/2018	10/DEL/2003		Inactive	1/2/2003		REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0353	Indonesia	6/10/2018	1999001260		Inactive	1/12/2000		REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0388	Ireland	6/10/2018	989264569	0991766	Inactive	6/10/1998	3/17/2004	REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0389	Israel	6/10/2018	132184	132184	Inactive	10/3/1999	11/30/2010	A METHOD OF PRODUCING A TRANSFORMED PLANT CELL HAVING REDUCED QUINOLATE PHOSPHORIBOSYL TRANSFERASE (QPRTASE) PRODUCTION AS WELL AS TRANSGENIC PLANT AND TOBACCO PRODUCT THEREOF	1	Licensed	North Carolina State University	
045952-0389/DIV	Israel	6/10/2018	192232		Inactive	6/15/2008		A METHOD OF PRODUCING A TRANSFORMED PLANT CELL HAVING REDUCED QUINOLATE PHOSPHORIBOSYL TRANSFERASE (QPRTASE) PRODUCTION AS WELL AS TRANSGENIC PLANT AND TOBACCO PRODUCT THEREOF	1	Licensed	North Carolina State University	
045952-0390	Italy	6/10/2018	989264569	0991766	Inactive	6/10/1998	3/17/2004	REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-INV-123827/NPJPX	Japan	6/10/2018	1999-503075	4095678	Inactive	12/13/1999	3/14/2008	REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	

045952-0352	Japan	6/10/2018	2004-155034	4288206	Inactive	5/25/2004	4/3/2009	REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-INV-123827/J PDIV2	Japan	6/10/2018	2008-001397	4459271	Inactive	1/8/2008	2/19/2010	REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-INV-123827/J PDIV3	Japan	6/10/2018	2009-046336		Inactive	2/27/2009		REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0376/KZ	Kazakhstan	6/10/2018	2000000007	004652	Inactive	6/10/1998	6/24/2004	QUINOLATE PHOSPHORIBOSYL TRANSFERASE (QPRase) OF TOBACCO PLANT ENCODING SAID ENZYME AND METHODS	1	Licensed	North Carolina State University	
045952-0358/KE	Kenya	6/10/2018	AP/P/1999/001680	AP1169	Inactive	6/10/1998	5/15/2003	REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0358/LS	Lesotho	6/10/2018	AP/P/1999/001680	AP1169	Inactive	6/10/1998	5/15/2003	REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0391	Luxembourg	6/10/2018	989264569	0991766	Inactive	6/10/1998	3/17/2004	REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-INV-123827/MG	Madagascar	6/10/2018	99042	158	Inactive	6/10/1998		REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0358/MW	Malawi	6/10/2018	AP/P/1999/001680	AP1169	Inactive	6/10/1998	5/15/2003	REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0686	Mexico	6/10/2018	2005001830		Inactive	6/10/1998		Regulation of Quinolate Phosphoribosyl Transferase Expression	1	Licensed	North Carolina State University	
045952-0685	Mexico	6/10/2018	MX/a/1999/011625		Inactive	12/13/1999		REGULATION OF QUINOLATE	1	Licensed	North Carolina	

									PHOSPHORI BOSYL TRANSFERA SE EXPRESSIO N			State University	
045952- INV- 123827/E PX/MC	Monaco	6/10/ 2018	98926456. 9	099176 6	Inactive	6/10/1 998	3/17/ 2004		REGULATIO N OF QUINOLATE PHOSPHORI BOSYL TRANSFERA SE EXPRESSIO N	1	Licensed	North Carolina State University	
045952- INV- 123827/ MN	Mongolia	6/10/ 2018	2408	1648	Inactive	6/10/1 998			REGULATIO N OF QUINOLATE PHOSPHORI BOSYL TRANSFERA SE EXPRESSIO N	1	Licensed	North Carolina State University	
045952- INV- 123827/ ME	Montenegro	6/10/ 2018	P64899	49677	Inactive	6/10/1 998			REGULATIO N OF QUINOLATE PHOSPHORI BOSYL TRANSFERA SE EXPRESSIO N	1	Licensed	North Carolina State University	
045952- 0392	Netherlands	6/10/ 2018	98926456. 9	099176 6	Inactive	6/10/1 998	3/17/ 2004		REGULATIO N OF QUINOLATE PHOSPHORI BOSYL TRANSFERA SE EXPRESSIO N	1	Licensed	North Carolina State University	
045952- 0687	New Zealand	6/10/ 2018	500963		Inactive	6/10/1 998			Regulation of Quinolate Phosphoribosyl Transferase Expression	1	Licensed	North Carolina State University	
045952- 0393	Norway	6/10/ 2018	19996169	324872	Inactive	12/13/ 1999	12/17 /2007		REGULATIO N OF QUINOLATE PHOSPHORI BOSYL TRANSFERA SE EXPRESSIO N	1	Licensed	North Carolina State University	
045952- INV- 123827/P CTX	P.C.T.		PCT/US19 98/011893		Inactive	6/10/1 998			REGULATIO N OF QUINOLATE PHOSPHORI BOSYL TRANSFERA SE EXPRESSIO N	1	Licensed	North Carolina State University	
045952- 0395	Poland	6/10/ 2018	19980337 442	201266	Inactive	12/12/ 1999	3/31/ 2009		REGULATIO N OF QUINOLATE PHOSPHORI BOSYL TRANSFERA SE EXPRESSIO N	1	Licensed	North Carolina State University	
045952- 0396	Portugal	6/10/ 2018	98926456. 9	099176 6	Inactive	6/10/1 998	3/17/ 2004		REGULATIO N OF QUINOLATE PHOSPHORI BOSYL TRANSFERA SE EXPRESSIO N	1	Licensed	North Carolina State University	
045952- INV- 123827/ GE	Republic of Georgia	6/10/ 2018	28020199	2871	Inactive	6/10/1 998			REGULATIO N OF QUINOLATE PHOSPHORI BOSYL TRANSFERA SE EXPRESSIO N	1	Licensed	North Carolina State University	

045952-0397	Romania	6/10/2018	99-01306	121968	Inactive	12/12/1999	9/30/2008	REGULATION OF QUINOLATE PHOSPHORIBOSYLTRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0376/RU	Russian Federation	6/10/2018	2000000007	004652	Inactive	6/10/1998	6/24/2004	QUINOLATE PHOSPHORIBOSYLTRANSFERASE (QPRTase) OF TOBACCO PLANT ENCODING SAID ENZYME AND METHODS	1	Licensed	North Carolina State University	
045952-0404	Serbia	6/10/2018	YU1999000648	49677	Inactive	12/12/1999	11/15/2007	REGULATION OF QUINOLATE PHOSPHORIBOSYLTRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0358/SL	Sierra Leone	6/10/2018	AP/P/1999/001680	AP1169	Inactive	6/10/1998	5/15/2003	REGULATION OF QUINOLATE PHOSPHORIBOSYLTRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-INV-123827/SG	Singapore	6/10/2018			Inactive			REGULATION OF QUINOLATE PHOSPHORIBOSYLTRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0399	Singapore	6/10/2018	1999047607	68260	Inactive	9/30/1999	12/19/2001	REGULATION OF QUINOLATE PHOSPHORIBOSYLTRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-INV-123827/KR	South Korea	6/10/2018	10-1999-7011675	365969	Inactive	12/10/1999	12/11/2002	REGULATION OF QUINOLATE PHOSPHORIBOSYLTRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0377	Spain	6/10/2018	98926456.9	0991766	Inactive	6/10/1998	3/17/2004	REGULATION OF QUINOLATE PHOSPHORIBOSYLTRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0358/SD	Sudan	6/10/2018	AP/P/1999/001680	AP1169	Inactive	6/10/1998	5/15/2003	REGULATION OF QUINOLATE PHOSPHORIBOSYLTRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0398	Sweden	6/10/2018	98926456.9	0991766	Inactive	6/10/1998	3/17/2004	REGULATION OF QUINOLATE PHOSPHORIBOSYLTRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	

045952-0367	Switzerland	6/10/2018	989264569	0991766	Inactive	6/10/1998	3/17/2004	REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0358/TZ	Tanzania	6/10/2018	AP/P/1999/001680	AP1169	Inactive	6/10/1998	5/15/2003	REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0400	Turkey	6/10/2018	1999/02728	1999/02728	Inactive	11/4/1999	3/21/2001	REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0358/UG	Uganda	6/10/2018	AP/P/1999/001680	AP1169	Inactive	6/10/1998	5/15/2003	REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0401	Ukraine	6/10/2018	99126735	72187	Inactive	1/12/2000	2/15/2005	REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0380	United Kingdom	6/9/2018	989264569	0991766	Inactive	6/10/1998	3/17/2004	REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0382	United Kingdom	6/9/2018	040041923	1457563	Inactive	6/10/1998	8/8/2012	REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0381	United Kingdom	6/9/2018	040041915	1457562	Inactive	6/10/1998	8/8/2012	REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-INV-123827/P/RCVX	United States of America		60/049471		Inactive	6/12/1997		REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed		
045952-0700	United States of America	2/10/2018	09/021286	6586661	Inactive	2/10/1998	7/1/2003	Regulation of Quinolate Phosphoribosyl Transferase Expression	1	Licensed	North Carolina State University	
045952-0692	United States of America	2/10/2018	09/431976	6423520	Inactive	10/29/1999	7/23/2002	Regulation of Quinolate Phosphoribosyl Transferase Expression	1	Licensed	North Carolina State University	

045952-0688	United States of America	2/10/2018	09/963340	7605308	Inactive	9/24/2001	10/20/2009	REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION BY TRANSFORMATION WITH A TOBACCO QUINOLATE PHOSPHORIBOSYL TRANSFERASE NUCLEIC ACID	1	Licensed	North Carolina State University	
045952-0689	United States of America	2/10/2018	10/356076	7304220	Inactive	1/31/2003	12/4/2007	Regulation of Quinolate Phosphoribosyl Transferase Expression	1	Licensed	North Carolina State University	
045952-0688/DIV	United States of America	5/15/2019	10/748789	7408098	Inactive	12/30/2003	8/5/2008	REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION BY TRANSFORMATION WITH A TOBACCO QUINOLATE PHOSPHORIBOSYL TRANSFERASE NUCLEIC ACID	1	Licensed	North Carolina State University	
045952-0690	United States of America	2/10/2018	11/416887	7795509	Inactive	5/3/2006	9/14/2010	Tobacco Products with Reduced Nicotine	1	Licensed	North Carolina State University	
045952-0691	United States of America	2/10/2018	11/416574	7645925	Inactive	5/3/2006	1/12/2010	TOBACCO PRODUCTS WITH INCREASED NICOTINE	1	Licensed	North Carolina State University	
045952-0402	Vietnam	6/10/2018	1-2000-00018	1-0003728-000	Inactive	1/11/2000	8/18/2003	REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-0358/ZW	Zimbabwe	6/10/2018	AP/P/1999/001680	AP1169	Inactive	6/10/1998	5/15/2003	REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	1	Licensed	North Carolina State University	
045952-INV-123921/AU	Australia	7/24/2016	65959/96	709691	Inactive	1/30/1998	12/16/1999	ROOT CORTEX SPECIFIC GENE PROMOTER	2	Licensed	North Carolina State University	
045952-INV-123921/BR	Brazil	7/24/2016	PI9609958-5	PI9609958-5	Inactive	1/28/1998	8/1/2006	ROOT CORTEX SPECIFIC GENE PROMOTER	2	Licensed	North Carolina State University	
045952-INV-123921/CA	Canada	7/24/2016	2228046	2228046	Inactive	1/28/1998	4/8/2003	ROOT CORTEX SPECIFIC GENE PROMOTER	2	Licensed	North Carolina State University	
045952-INV-123921/CADIV	Canada	7/24/2016	2350843	2350843	Inactive	7/6/2001	10/16/2007	ROOT CORTEX SPECIFIC GENE PROMOTER	2	Licensed	North Carolina State University	

045952-INV-123921/CN	China	7/24/2016	96197068.5	ZL961970685	Inactive	7/24/1996	6/23/2004	ROOT CORTEX SPECIFIC GENE PROMOTER	2	Licensed	North Carolina State University	
045952-INV-123921/EP	European Patent Office	7/24/2016	96925447.3	842285	Inactive	2/5/1998	12/20/2006	ROOT CORTEX SPECIFIC GENE PROMOTER	2	Licensed	North Carolina State University	
045952-INV-123921/EP/FR	France	7/24/2016	96925447.3	842285	Inactive	7/24/1996	12/20/2006	ROOT CORTEX SPECIFIC GENE PROMOTER	2	Licensed	North Carolina State University	
045952-INV-123921/EP/DE	Germany	7/24/2016	96925447.3	842285	Inactive	7/24/1996	12/20/2006	ROOT CORTEX SPECIFIC GENE PROMOTER	2	Licensed	North Carolina State University	
045952-INV-123921/HK	Hong Kong	7/24/2016	99101707.4	1016653	Inactive	4/21/1999	12/31/2004	ROOT CORTEX SPECIFIC GENE PROMOTER	2	Licensed	North Carolina State University	
045952-INV-123921/EP/IE	Ireland	7/24/2016	96925447.3	842285	Inactive	7/24/1996	12/20/2006	ROOT CORTEX SPECIFIC GENE PROMOTER	2	Licensed	North Carolina State University	
045952-INV-123921/EP/IT	Italy	7/24/2016	96925447.3	842285	Inactive	7/24/1996	12/20/2006	ROOT CORTEX SPECIFIC GENE PROMOTER	2	Licensed	North Carolina State University	
045952-0403	Japan	7/24/2016	1997-507703	3565562	Inactive	6/12/1997	9/15/2004	REGULATION OF QUINOLATE PHOSPHORIBOSYL TRANSFERASE EXPRESSION	2	Licensed	North Carolina State University	
045952-INV-123921/EP/LI	Liechtenstein	7/24/2016	96925447.3	842285	Inactive	7/24/1996	12/20/2006	ROOT CORTEX SPECIFIC GENE PROMOTER	2	Licensed	North Carolina State University	
045952-INV-123921/NZ	New Zealand	7/24/2016	313474	313474	Inactive	1/28/1998	5/18/1999	ROOT CORTEX SPECIFIC GENE PROMOTER	2	Licensed	North Carolina State University	
045952-INV-123921/PCTX	P.C.T.		PCT/US1996/012159		Inactive	7/24/1996		ROOT CORTEX SPECIFIC GENE PROMOTER	2	Licensed	North Carolina State University	
045952-INV-123921/EP/ES	Spain	7/24/2016	96925447.3	842285	Inactive	7/24/1996	12/20/2006	ROOT CORTEX SPECIFIC GENE PROMOTER	2	Licensed	North Carolina State University	
045952-INV-123921/EP/CH	Switzerland	7/23/2016	96925447.3	842285	Inactive	7/24/1996	12/20/2006	ROOT CORTEX SPECIFIC GENE PROMOTER	2	Licensed	North Carolina State University	
045952-INV-123921/EP/GB	United Kingdom	7/24/2016	96925447.3	842285	Inactive	7/24/1996	12/20/2006	ROOT CORTEX SPECIFIC GENE PROMOTER	2	Licensed	North Carolina State University	
045952-INV-123921/NPROVX	United States of America	7/28/2015	08/508786	5837876	Inactive	7/28/1995	11/17/1998	ROOT CORTEX SPECIFIC GENE PROMOTER	2	Licensed	North Carolina State University	
045952-0694	European Patent Office	11/7/2021	01990934.0	1368467	Inactive	11/7/2001	4/25/2007	PUTRESCIN E-N-METHYLTRANSFERASE PROMOTER	3	Licensed	North Carolina State University	
045952-INV-175761/PCTX	P.C.T.		PCT/US2001/047371		Inactive	11/7/2001		PUTRESCIN E-N-METHYLTRANSFERASE PROMOTER	3	Licensed	North Carolina State University	
045952-0695	United Kingdom	11/7/2021	01990934.0		Inactive	11/7/2001		PUTRESCIN E-N-METHYLTRANSFERASE PROMOTER	3	Licensed	North Carolina State University	

045952-INV-175761/P/RVX	United States of America		60/246448		Inactive	11/7/2000		Putrescine-n-methyltransferase promoter	3	Licensed	North Carolina State University	
045952-0693	United States of America	1/7/2023	10/416120	7189570	Granted	5/2/2003	3/13/2007	PUTRESCIN E-N-METHYLTRANSFERASE PROMOTER	3	Licensed	North Carolina State University	
045952-INV-179645/PCT/CN	China	8/28/2021	018181465	ZL018181465	Inactive	8/28/2001	8/8/2007	TRANSGENIC PLANTS CONTAINING MOLECULAR DECOYS THAT ALTER PROTEIN CONTENT THEREIN	4	Licensed	North Carolina State University	
045952-INV-179645/PCT/EP	European Patent Office	8/28/2021	019663186	1313868	Inactive	8/28/2003	7/19/2006	TRANSGENIC PLANTS CONTAINING MOLECULAR DECOYS THAT ALTER PROTEIN CONTENT THEREIN	4	Licensed	North Carolina State University	
045952-INV-179645/E P/FR	France	8/28/2021	019663186	1313868	Inactive	8/28/2001	7/19/2006	TRANSGENIC PLANTS CONTAINING MOLECULAR DECOYS THAT ALTER PROTEIN CONTENT THEREIN	4	Licensed	North Carolina State University	
045952-INV-179645/E P/DE	Germany	8/28/2021	019663186	1313868	Inactive	8/28/2001	7/19/2006	TRANSGENIC PLANTS CONTAINING MOLECULAR DECOYS THAT ALTER PROTEIN CONTENT THEREIN	4	Licensed	North Carolina State University	
045952-INV-179645/HK	Hong Kong	8/28/2021	031087298	1057383	Inactive	11/28/2003	4/27/2007	TRANSGENIC PLANTS CONTAINING MOLECULAR DECOYS THAT ALTER PROTEIN CONTENT THEREIN	4	Licensed	North Carolina State University	
045952-INV-179645/E P/IT	Italy	8/28/2021	019663186	1313868	Inactive	8/28/2001	7/19/2006	TRANSGENIC PLANTS CONTAINING MOLECULAR DECOYS THAT ALTER PROTEIN CONTENT THEREIN	4	Licensed	North Carolina State University	
045952-INV-179645/E P/LI	Liechtenstein	8/28/2021	019663186	1313868	Inactive	8/28/2001	7/19/2006	TRANSGENIC PLANTS CONTAINING MOLECULAR DECOYS THAT ALTER PROTEIN CONTENT THEREIN	4	Licensed	North Carolina State University	
045952-INV-179645/PCT	P.C.T.		PCT/US2001/026788		Inactive	8/28/2001		TRANSGENIC PLANTS CONTAINING MOLECULAR DECOYS THAT ALTER PROTEIN CONTENT THEREIN	4	Licensed	North Carolina State University	
045952-INV-179645/E P/ES	Spain	8/28/2021	019663186	1313868	Inactive	8/28/2001	7/19/2006	TRANSGENIC PLANTS CONTAINING MOLECULAR DECOYS THAT ALTER PROTEIN CONTENT THEREIN	4	Licensed	North Carolina State University	
045952-INV-179645/E P/CH	Switzerland	8/27/2021	019663186	1313868	Inactive	8/28/2001	7/19/2006	TRANSGENIC PLANTS CONTAINING MOLECULAR	4	Licensed	North Carolina State University	

									DECOYS THAT ALTER PROTEIN CONTENT THEREIN				
045952-INV-179645/E P/GB	United Kingdom	8/28/2021	019663186	1313868	Inactive	8/28/2001	7/19/2006	TRANSGENIC PLANTS CONTAINING MOLECULAR DECOYS THAT ALTER PROTEIN CONTENT THEREIN	4	Licensed	North Carolina State University		
045952-INV-179645/USPROV	United States of America		60/229198		Inactive	8/30/2000		TRANSGENIC PLANTS CONTAINING MOLECULAR DECOYS THAT ALTER PROTEIN CONTENT THEREIN	4	Licensed	North Carolina State University		
045952-INV-179645/US	United States of America	8/23/2021	09/941042	6911541	Inactive	8/23/2001	6/28/2005	TRANSGENIC PLANTS CONTAINING MOLECULAR DECOYS THAT ALTER PROTEIN CONTENT THEREIN	4	Licensed	North Carolina State University		
045952-INV-179645/PCT/US	United States of America	7/24/2022	10/363069	7192771	Inactive	7/14/2003	3/20/2007	TRANSGENIC PLANTS CONTAINING MOLECULAR DECOYS THAT ALTER PROTEIN CONTENT THEREIN	4	Licensed	North Carolina State University		
045952-0173	P.C.T.	11/16/2011	PCT/IB2007/004669		Inactive	11/16/2007		REGULATING ALKALOIDS	5	Owned			
045952-0790	United States of America				Not yet filed			REGULATING ALKALOIDS	5	Owned			
045952-0141	United States of America	11/17/2007	60/866352		Inactive	11/17/2006		REGULATING ALKALOIDS	5	Owned			
045952-0172	United States of America	10/5/2031	11/941950	910298	Granted	11/18/2007	8/11/2015	REGULATING ALKALOIDS	5	Owned			
045952-0300	United States of America	11/18/2027	14/820455	10287596	Granted	8/6/2015	5/14/2019	REGULATING ALKALOIDS	5	Owned			
045952-0328	United States of America	11/18/2027	14/822105	9994860	Granted	8/10/2015	6/12/2018	REGULATING ALKALOIDS	5	Owned			
045952-0474	United States of America	11/18/2027	16/003066	10731172	Granted	6/7/2018	8/4/2020	REGULATING ALKALOIDS	5	Owned			
045952-0630	United States of America		16/925069		Pending	7/9/2020		REGULATING ALKALOIDS	5	Owned			
045952-0114	African Union	8/18/2024	1200600058	13241	Inactive	3/17/2006	9/26/2006	REDUCED-EXPOSURE TOBACCO PRODUCTS	6	Owned			
045952-0147	Argentina	8/19/2024	P040102977	AR045466B1	Inactive	8/19/2004	10/19/2016	REDUCED-EXPOSURE TOBACCO PRODUCTS	6	Owned			
045952-0113	ARIPO	8/18/2024	AP/P/2006/003550	AP2265	Inactive	3/17/2006	8/1/2011	REDUCED-EXPOSURE TOBACCO PRODUCTS	6	Owned			
045952-0124	Australia	8/18/2024	2004266694		Inactive	2/10/2006		REDUCED-EXPOSURE	6	Owned			

									TOBACCO PRODUCTS				
045952-0133	Bangladesh	8/19/2020	197/2004	1004363	Inactive	8/19/2004	12/1/2008	REDUCED-EXPOSURE TOBACCO PRODUCTS	6	Owned			
045952-0113/BW	Botswana	8/18/2024	AP/P/2006/003550	AP2265	Inactive	8/18/2004	8/1/2011	REDUCED-EXPOSURE TOBACCO PRODUCTS	6	Owned			
045952-0115	Brazil	8/18/2024	PI0413733-7		Inactive	2/20/2006		REDUCED-EXPOSURE TOBACCO PRODUCTS	6	Owned			
045952-0116	Canada	8/18/2024	2535763		Inactive	2/14/2006		REDUCED-EXPOSURE TOBACCO PRODUCTS	6	Owned			
045952-0125	China	8/18/2024	200480023905.5		Inactive	2/20/2006		REDUCED-EXPOSURE TOBACCO PRODUCTS	6	Owned			
045952-0117	Colombia	8/18/2024	06015595		Inactive	2/16/2006		REDUCED-EXPOSURE TOBACCO PRODUCTS	6	Owned			
045952-0118	Cuba	8/18/2019	32/2006		Inactive	2/22/2006		REDUCED-EXPOSURE TOBACCO PRODUCTS	6	Owned			
045952-0122	Egypt	8/18/2024	158/2006		Inactive	2/16/2006		REDUCED-EXPOSURE TOBACCO PRODUCTS	6	Owned			
045952-0113/SZ	Eswatini	8/18/2024	AP/P/2006/003550	AP2265	Inactive	8/18/2004	8/1/2011	REDUCED-EXPOSURE TOBACCO PRODUCTS	6	Owned			
045952-0112	Eurasian Pat. Convention	8/18/2024	2006004499		Inactive	3/20/2006		REDUCED-EXPOSURE TOBACCO PRODUCTS	6	Owned			
045952-0111	European Patent Office	8/18/2024	04781495.9		Inactive	3/17/2006		REDUCED-EXPOSURE TOBACCO PRODUCTS	6	Owned			
045952-0113/GM	Gambia	8/18/2024	AP/P/2006/003550	AP2265	Inactive	8/18/2004	8/1/2011	REDUCED-EXPOSURE TOBACCO PRODUCTS	6	Owned			
045952-0113/GH	Ghana	8/18/2024	AP/P/2006/003550	AP2265	Inactive	8/18/2004	8/1/2011	REDUCED-EXPOSURE TOBACCO PRODUCTS	6	Owned			
045952-0142	Hong Kong	8/18/2024	07100083.1		Inactive	1/3/2007		REDUCED-EXPOSURE TOBACCO PRODUCTS	6	Owned			
045952-0126	Indonesia	8/18/2024	W-00200600468	IDP00045394	Inactive	2/17/2006	4/18/2017	REDUCED-EXPOSURE TOBACCO PRODUCTS	6	Owned			
045952-0148	Iran	8/19/2024	38305259	31822	Inactive	8/19/2004	6/11/2005	REDUCED-EXPOSURE TOBACCO PRODUCTS	6	Owned			
045952-0128	Japan	8/18/2024	2006-524011		Inactive	2/20/2006		REDUCED-EXPOSURE TOBACCO PRODUCTS	6	Owned			
045952-0113/KE	Kenya	8/18/2024	AP/P/2006/003550	AP2265	Inactive	8/18/2004	8/1/2011	REDUCED-EXPOSURE TOBACCO PRODUCTS	6	Owned			
045952-0113/LS	Lesotho	8/18/2024	AP/P/2006/003550	AP2265	Inactive	8/18/2004	8/1/2011	REDUCED-EXPOSURE TOBACCO PRODUCTS	6	Owned			
045952-0113/MW	Malawi	8/18/2024	AP/P/2006/003550	AP2265	Inactive	8/18/2004	8/1/2011	REDUCED-EXPOSURE TOBACCO PRODUCTS	6	Owned			
045952-0119	Mexico	8/18/2024	PA/a/2006/001591	280769	Inactive	2/9/2006	11/9/2010	REDUCED-EXPOSURE TOBACCO PRODUCTS	6	Owned			
045952-0113/MZ	Mozambique	8/18/2024	AP/P/2006/003550	AP2265	Inactive	8/18/2004	8/1/2011	REDUCED-EXPOSURE TOBACCO PRODUCTS	6	Owned			
045952-0113/NA	Namibia	8/18/2024	AP/P/2006/003550	AP2265	Inactive	8/18/2004	8/1/2011	REDUCED-EXPOSURE TOBACCO PRODUCTS	6	Owned			

045952-0129	New Zealand	8/18/2024	545918		Inactive	3/14/2006		REDUCED-EXPOSURE TOBACCO PRODUCTS	6	Owned		
045952-0149	Nigeria	8/19/2024	315/004	15797	Inactive	8/19/2004	8/17/2004	REDUCED-EXPOSURE TOBACCO PRODUCTS	6	Owned		
045952-0104	P.C.T.	8/18/2008	PCT/US2004/026815		Inactive	8/18/2004		REDUCED-EXPOSURE TOBACCO PRODUCTS	6	Owned		
045952-0110	Pakistan	8/19/2023	639/2004	139062	Inactive	8/19/2004	8/19/2003	REDUCED-EXPOSURE TOBACCO PRODUCTS	6	Owned		
045952-0130	Philippines	8/18/2024	1-2006-500342		Inactive	2/16/2006		REDUCED-EXPOSURE TOBACCO PRODUCTS	6	Owned		
045952-0113/SL	Sierra Leone	8/18/2024	AP/P/2006/003550	AP2265	Inactive	8/18/2004	8/12/011	REDUCED-EXPOSURE TOBACCO PRODUCTS	6	Owned		
045952-0131	Singapore	8/18/2024	200600666-2		Inactive	2/2/2006		REDUCED-EXPOSURE TOBACCO PRODUCTS	6	Owned		
045952-0123	South Africa	8/18/2024	2006/00749	2006/00749	Inactive	1/26/2006	3/28/2007	REDUCED-EXPOSURE TOBACCO PRODUCTS	6	Owned		
045952-0127	South Korea	8/18/2024	10-2006-7003351		Inactive	2/17/2006		REDUCED-EXPOSURE TOBACCO PRODUCTS	6	Owned		
045952-0113/SD	Sudan	8/18/2024	AP/P/2006/003550	AP2265	Inactive	8/18/2004	8/12/011	REDUCED-EXPOSURE TOBACCO PRODUCTS	6	Owned		
045952-0113/TZ	Tanzania	8/18/2024	AP/P/2006/003550	AP2265	Inactive	8/18/2004	8/12/011	REDUCED-EXPOSURE TOBACCO PRODUCTS	6	Owned		
045952-0136	Thailand	8/19/2024	0401003182/093120 (formerly)		Inactive	8/19/2004		REDUCED-EXPOSURE TOBACCO PRODUCTS	6	Owned		
045952-0113/UG	Uganda	8/18/2024	AP/P/2006/003550	AP2265	Inactive	8/18/2004	8/12/011	REDUCED-EXPOSURE TOBACCO PRODUCTS	6	Owned		
045952-0121	Ukraine	8/18/2024	200602801		Inactive	3/15/2006		REDUCED-EXPOSURE TOBACCO PRODUCTS	6	Owned		
045952-0120	United States of America	3/30/2029	10/568290	9814258	Inactive	2/16/2006	11/14/2017	REDUCED-EXPOSURE TOBACCO PRODUCTS	6	Owned		
045952-0464	United States of America		15/809505		Inactive	11/10/2017		REDUCED-EXPOSURE TOBACCO PRODUCTS	6	Owned		
045952-0132	Vietnam	8/18/2024	1-2006-00429	20304	Inactive	3/20/2006	12/11/2018	REDUCED-EXPOSURE TOBACCO PRODUCTS	6	Owned		
045952-0465	Vietnam		1-2017-04751		Inactive	11/27/2017		REDUCED-EXPOSURE TOBACCO PRODUCTS	6	Owned		
045952-0113/ZM	Zambia	8/18/2024	AP/P/2006/003550	AP2265	Inactive	8/18/2004	8/12/011	REDUCED-EXPOSURE TOBACCO PRODUCTS	6	Owned		
045952-0113/ZW	Zimbabwe	8/18/2024	AP/P/2006/003550	AP2265	Inactive	8/18/2004	8/12/011	REDUCED-EXPOSURE TOBACCO PRODUCTS	6	Owned		
045952-0150	African Union	6/5/2022	1200300315	12617	Inactive	12/4/2003	12/24/2004	TOBACCO BIOMASS UTILIZATION	7	Owned		
045952-0134	ARIPO	6/5/2022	AP/P/2003/002925	AP1726	Inactive	6/5/2002	3/30/2007	TOBACCO BIOMASS UTILIZATION	7	Owned		
045952-0151	Brazil	6/5/2022	PI0210163-7		Inactive	12/4/2003		TOBACCO BIOMASS UTILIZATION	7	Owned		
045952-0294	Brazil	6/5/2022	122014026076-8		Inactive	11/11/2014		TOBACCO BIOMASS UTILIZATION	7	Owned		

045952-0152	Canada	6/5/2022	2448323		Inactive	11/24/2003		TOBACCO BIOMASS UTILIZATION	7	Owned		
045952-0105	China	6/5/2022	02811426.4	ZL02811426.4	Inactive	6/5/2002	12/6/2006	TOBACCO BIOMASS UTILIZATION	7	Owned		
045952-0140	China	6/5/2022	200610132149.0		Inactive	10/12/2006		TOBACCO BIOMASS UTILIZATION	7	Owned		
045952-0106	Eurasian Pat. Convention	6/5/2022	200400005		Inactive	6/5/2002		TOBACCO BIOMASS UTILIZATION	7	Owned		
045952-0107	European Patent Office	6/5/2022	02737379.4		Inactive	6/5/2002		TOBACCO BIOMASS UTILIZATION	7	Owned		
045952-0145	Hong Kong	6/5/2022	04108860.6	1065920	Inactive	6/6/2007	7/27/2007	TOBACCO BIOMASS UTILIZATION	7	Owned		
045952-0174	Hong Kong	6/5/2022	07111883.0		Inactive	11/2/2007		TOBACCO BIOMASS UTILIZATION	7	Owned		
045952-0153	India	6/5/2022	01567/KO LNP/2003		Inactive	12/2/2003		TOBACCO BIOMASS UTILIZATION	7	Owned		
045952-0154	Indonesia	6/5/2022	0020040018		Inactive	1/5/2004		TOBACCO BIOMASS UTILIZATION	7	Owned		
045952-0155	Japan	6/5/2022	2003-501260		Inactive	6/5/2002		TOBACCO BIOMASS UTILIZATION	7	Owned		
045952-0156	Mexico	6/5/2022	2003/011101		Inactive	12/2/2003		TOBACCO BIOMASS UTILIZATION	7	Owned		
045952-0103	United States of America	6/5/2022	10/163101		Inactive	6/5/2002		TOBACCO BIOMASS UTILIZATION	7	Owned		
045952-0181	Canada	6/19/2027	2656430	2656430	Granted	12/19/2008	8/5/2014	NUCLEIC ACID ENCODING N-METHYLPUTRESCINE OXIDASE AND USES THEREOF	8	Owned		
045952-0262	Canada	6/19/2027	2853387	2853387	Granted	6/3/2014	4/17/2018	NUCLEIC ACID ENCODING N-METHYLPUTRESCINE OXIDASE AND USES THEREOF	8	Owned		
045952-0471	Canada	6/19/2027	2997344		Pending	3/2/2018		NUCLEIC ACID ENCODING N-METHYLPUTRESCINE OXIDASE AND USES THEREOF	8	Owned		
045952-0182	China	6/19/2027	200780030894.7	ZL200780030894.7	Granted	2/19/2009	4/26/2017	NUCLEIC ACID ENCODING N-METHYLPUTRESCINE OXIDASE AND USES THEREOF	8	Owned		
045952-0261	China	6/19/2027	201510098497.X	ZL201510098497.X	Granted	3/5/2015	5/25/2018	NUCLEIC ACID ENCODING N-METHYLPUTRESCINE OXIDASE AND USES THEREOF	8	Owned		
045952-0183	European Patent Office	6/19/2027	07825700.3		Inactive	1/16/2009		NUCLEIC ACID ENCODING N-METHYLPUTRESCINE OXIDASE AND USES THEREOF	8	Owned		

045952-0347	Hong Kong	6/19/2027	16100928.9	1213015	Granted	1/28/2016	8/30/2019	NUCLEIC ACID ENCODING N-METHYLPUTRESCINE OXIDASE AND USES THEREOF	8	Owned		
045952-0146	P.C.T.	6/19/2011	PCT/IB2007/003550		Inactive	6/19/2007		NUCLEIC ACID ENCODING N-METHYLPUTRESCINE OXIDASE AND USES THEREOF	8	Owned		
045952-0180	United States of America	5/24/2029	12/305483	8410341	Granted	2/12/2009	4/2/2013	NUCLEIC ACID ENCODING N-METHYLPUTRESCINE OXIDASE AND USES THEREOF	8	Owned		
045952-0210	United States of America	8/14/2028	13/774902	9422532	Granted	2/22/2013	8/23/2016	NUCLEIC ACID ENCODING N-METHYLPUTRESCINE OXIDASE AND USES THEREOF	8	Owned		
045952-0211	United States of America	7/30/2028	13/774933	9422533	Granted	2/22/2013	8/23/2016	NUCLEIC ACID ENCODING N-METHYLPUTRESCINE OXIDASE AND USES THEREOF	8	Owned		
045952-0422	United States of America	6/19/2027	15/242129	10041084	Granted	8/19/2016	8/7/2018	NUCLEIC ACID ENCODING N-METHYLPUTRESCINE OXIDASE AND USES THEREOF	8	Owned		
045952-0523	United States of America	6/19/2027	16/054711	10689658	Granted	8/3/2018	6/23/2020	NUCLEIC ACID ENCODING N-METHYLPUTRESCINE OXIDASE AND USES THEREOF	8	Owned		
045952-0629	United States of America	6/19/2027	16/877401	11396656	Granted	5/18/2020	7/26/2022	NUCLEIC ACID ENCODING N-METHYLPUTRESCINE OXIDASE AND USES THEREOF	8	Owned		
045952-0743	United States of America		17/847138		Pending	6/22/2022		NUCLEIC ACID ENCODING N-METHYLPUTRESCINE OXIDASE AND USES THEREOF	8	Owned		
045952-0165	ARIPO	2/28/2026	AP/P/2007/004181	AP2990	Granted	10/5/2007	7/28/2015	REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0256	ARIPO	2/28/2026	AP/P/2014/007807	AP4477	Granted	7/21/2014	2/28/2018	REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0470	ARIPO	2/28/2026	AP/P/2018/010510		Inactive	2/8/2018		REDUCING LEVELS OF NICOTINIC	10	Owned		

									ALKALOIDS IN PLANTS				
045952-0164	Australia	2/28/2026	2006233359	2006233359	Granted	9/28/2007	7/19/2012	REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned			
045952-0205	Australia	2/28/2026	2012203977	2012203977	Granted	7/5/2012	5/14/2015	REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned			
045952-0304	Australia	2/28/2026	2015202209	2015202209	Granted	4/29/2015	10/19/2017	REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned			
045952-0462	Australia	2/28/2026	2017239579	2017239579	Granted	10/5/2017	6/13/2019	REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned			
045952-0555	Australia	2/28/2026	2019201134	2019201134	Granted	2/18/2019	12/2/2021	REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned			
045952-0712	Australia	2/28/2026	2021269393		Pending	11/18/2021		REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned			
045952-0256/BW	Botswana	2/28/2026	AP/P/2014/007807	AP4477	Granted	2/28/2006	2/28/2018	REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned			
045952-0165/BW	Botswana	2/28/2026	AP/P/2007/004181	AP2990	Granted	2/28/2006	7/28/2015	REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned			
045952-0157	Brazil	2/28/2026	0607063-9		Inactive	8/28/2007		REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned			
045952-0158	Canada	2/28/2026	2599302	2599302	Granted	8/27/2007	6/21/2016	REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned			
045952-0295	Canada	2/28/2026	2872521	2872521	Granted	11/28/2014	4/18/2017	REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned			
045952-0406	Canada	2/28/2026	2926297	2926297	Granted	4/6/2016	2/27/2018	METHOD FOR CONTROLLING NICOTINE CONTENT OF TOBACCO PLANTS	10	Owned			
045952-0469	Canada	2/28/2026	2992898		Inactive	1/24/2018		REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned			
045952-0163	China	2/28/2026	200680010544.X	200680010544.x	Granted	9/28/2007	9/5/2012	REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned			
045952-0206	China	2/28/2026	201210252031.7	ZL201210252031.7	Granted	7/19/2012	12/7/2016	REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned			
045952-0413	China	2/28/2026	201610755203.0		Pending	8/29/2016		METHOD FOR IDENTIFYING A TOBACCO PLANT, METHOD FOR PRODUCING A TOBACCO PLANT CELL AND PLANT CELL, AND	10	Owned			

									REDUCED ALKALOID PRODUCT				
045952-0416	China	2/28/2026	2016107552204		Pending	8/29/2016			Method for reducing an alkaloid in a plant, genetically engineered plant cell and reduced alkaloid product	10	Owned		
045952-0256/SZ	Eswatini	2/28/2026	AP/P/2014/007807	AP4477	Granted	2/28/2006	2/28/2018		REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0165/SZ	Eswatini	2/28/2026	AP/P/2007/004181	AP2990	Granted	2/28/2006	7/28/2015		REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0166	European Patent Office	2/28/2026	067559658		Inactive	9/27/2007			REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0256/GM	Gambia	2/28/2026	AP/P/2014/007807	AP4477	Granted	2/28/2006	2/28/2018		REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0165/GM	Gambia	2/28/2026	AP/P/2007/004181	AP2990	Granted	2/28/2006	7/28/2015		REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0256/GH	Ghana	2/28/2026	AP/P/2014/007807	AP4477	Granted	2/28/2006	2/28/2018		REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0165/GH	Ghana	2/28/2026	AP/P/2007/004181	AP2990	Granted	2/28/2006	7/28/2015		REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0215	Hong Kong	2/28/2026	131095438	HK1182136	Granted	8/15/2013	12/22/2017		PRIMER OR PROBE PAIR; TOBACCO PLANTS AND THE METHODS FOR IDENTIFYING, MODIFYING THE SAME; THEIR CELLS, THEIR PRODUCTS AND POLYNUCLEOTIDES	10	Owned		
045952-0456	Hong Kong	2/28/2026	171074206		Pending	7/25/2017			A METHOD FOR IDENTIFYING A TOBACCO PLANT, A METHOD FOR PRODUCING A TOBACCO PLANT CELL AND A REDUCED-ALKALOIDS PRODUCT	10	Owned		
045952-0455	Hong Kong	2/28/2026	171074224		Pending	7/25/2017			METHOD FOR REDUCING AN ALKALOID IN PLANT CELL AND REDUCED ALKALOID PRODUCT	10	Owned		

045952-0168	India	2/28/2026	3687/KOL NP/2007		Inactive	9/28/2007		REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0159	Indonesia	2/28/2026	W-00200702784		Inactive	8/28/2007		REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0109/JP	Japan	2/28/2026	2007-557629	4892744	Granted	8/27/2007	1/6/2012	REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Licensed	Nara Institute of Science and Technology	
045952-0256/KE	Kenya	2/28/2026	AP/P/2014/007807	AP4477	Granted	2/28/2006	2/28/2018	REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0165/KE	Kenya	2/28/2026	AP/P/2007/004181	AP2990	Granted	2/28/2006	7/28/2015	REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0256/LS	Lesotho	2/28/2026	AP/P/2014/007807	AP4477	Granted	2/28/2006	2/28/2018	REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0165/LS	Lesotho	2/28/2026	AP/P/2007/004181	AP2990	Granted	2/28/2006	7/28/2015	REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0256/MW	Malawi	2/28/2026	AP/P/2014/007807	AP4477	Granted	2/28/2006	2/28/2018	REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0165/MW	Malawi	2/28/2026	AP/P/2007/004181	AP2990	Granted	2/28/2006	7/28/2015	REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0160	Mexico	2/28/2026	MX/a/2007/010520	301367	Granted	8/28/2007	7/16/2012	REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0207	Mexico	2/28/2026	MX/a/2012/008279	305368	Granted	7/16/2012	11/16/2012	REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0209	Mexico	2/28/2026	MX/a/2012/013312	336576	Granted	11/15/2012	1/25/2016	METHOD FOR CONTROLLING NICOTINE CONTENT OF TOBACCO PLANTS	10	Owned		
045952-0256/MZ	Mozambique	2/28/2026	AP/P/2014/007807	AP4477	Granted	2/28/2006	2/28/2018	REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0165/MZ	Mozambique	2/28/2026	AP/P/2007/004181	AP2990	Granted	2/28/2006	7/28/2015	REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0256/NA	Namibia	2/28/2026	AP/P/2014/007807	AP4477	Granted	2/28/2006	2/28/2018	REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0165/NA	Namibia	2/28/2026	AP/P/2007/004181	AP2990	Granted	2/28/2006	7/28/2015	REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0170	New Zealand	2/28/2026	562009		Inactive	9/28/2007		REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0162	Nigeria	2/28/2026	481/07		Inactive	8/31/2007		REDUCING LEVELS OF NICOTINIC	10	Owned		

									ALKALOIDS IN PLANTS				
045952-0109	P.C.T.	2/28/2010	PCT/IB2006/001741		Inactive	2/28/2006			REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0135-1	P.C.T.	9/6/2010	PCT/IB2006/004144		Inactive	9/6/2006			INCREASING LEVELS OF NICOTINIC ALKALOIDS	10	Owned		
045952-0135	P.C.T.	9/7/2010	PCT/IB2006/003510		Inactive	9/7/2006			INCREASING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0308	Philippines				Inactive				REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0161	Philippines	2/28/2026	1-2007-501841	1-2007-501841	Inactive	8/28/2007	8/27/2015		REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0293	Philippines	2/28/2026	1-2014-502317		Inactive	10/16/2014			REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0167	Russian Federation	2/28/2026	2007135976		Inactive	9/28/2007			REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0256/SL	Sierra Leone	2/28/2026	AP/P/2014/007807	AP4477	Granted	2/28/2006	2/28/2018		REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0165/SL	Sierra Leone	2/28/2026	AP/P/2007/004181	AP2990	Granted	2/28/2006	7/28/2015		REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0171	South Africa	2/28/2026	2007/08331	2007/08331	Inactive	9/28/2007	9/30/2009		REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0169	South Korea	2/28/2026	10-2007-7022315	1413122	Granted	9/28/2007	6/23/2014		REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0212	South Korea	2/28/2026	10-2013-7006598	1495337	Granted	3/14/2013	2/13/2015		REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0247	South Korea	2/28/2026	10-2013-7031265	10-1563998	Granted	11/25/2013	10/22/2015		REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0257	South Korea	2/28/2026	10-2014-7019393	10-1538797	Granted	7/11/2014	7/16/2015		REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0296	South Korea	2/28/2026	10-2014-7029200		Inactive	10/17/2014			REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0298	South Korea	2/28/2026	10-2015-7003104	10-1581039	Granted	2/4/2015	12/22/2015		REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0332	South Korea	2/28/2026	10-2015-7023754	10-1631597	Granted	9/1/2015	6/13/2016		REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0346	South Korea	2/28/2026	10-2015-7036289	1672423	Granted	12/22/2015	10/28/2016		REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0256/SD	Sudan	2/28/2026	AP/P/2014/007807	AP4477	Granted	2/28/2006	2/28/2018		REDUCING LEVELS OF NICOTINIC	10	Owned		

								ALKALOIDS IN PLANTS				
045952-0165/SD	Sudan	2/28/2026	AP/P/2007/004181	AP2990	Granted	2/28/2006	7/28/2015	REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0256/TZ	Tanzania	2/28/2026	AP/P/2014/007807	AP4477	Granted	2/28/2006	2/28/2018	REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0165/TZ	Tanzania	2/28/2026	AP/P/2007/004181	AP2990	Granted	2/28/2006	7/28/2015	REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0256/UG	Uganda	2/28/2026	AP/P/2014/007807	AP4477	Granted	2/28/2006	2/28/2018	REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0165/UG	Uganda	2/28/2026	AP/P/2007/004181	AP2990	Granted	2/28/2006	7/28/2015	REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0137	United States of America	8/23/2029	11/579661	8791329	Granted	11/6/2006	7/29/2014	REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0197	United States of America	2/28/2026	13/082953	9029656	Granted	4/8/2011	5/12/2015	REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0260	United States of America	2/28/2026	14/339061	8987555	Granted	7/23/2014	3/24/2015	REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0272	United States of America	2/28/2026	14/444511	9856487	Granted	7/28/2014	1/2/2018	REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0301	United States of America	2/28/2026	14/685361	9834780	Granted	4/13/2015	12/5/2017	REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0440	United States of America	2/28/2026	15/422455	10201182	Granted	2/1/2017	2/12/2019	METHODS AND COMPOSITIONS FOR SUPPRESSING NBB1 EXPRESSION	10	Owned		
045952-0433	United States of America	2/28/2026	15/422460	10111456	Granted	2/1/2017	10/30/2018	METHODS AND COMPOSITIONS FOR IDENTIFYING NBB1 MUTATIONS	10	Owned		
045952-0467	United States of America	2/28/2026	15/828875	10076134	Granted	12/1/2017	9/18/2018	REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0466	United States of America	2/28/2026	15/828868	10085478	Granted	12/1/2017	10/2/2018	REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0468	United States of America	2/28/2026	15/858599	10368573	Granted	12/29/2017	8/6/2019	REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0595	United States of America	2/23/2026	16/508041	11109617	Granted	7/10/2019	9/7/2021	REDUCING LEVELS OF NICOTINE IN PLANTS	10	Owned		
045952-0704	United States of America	2/28/2026	17/463502		Pending	8/31/2021		REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned		
045952-0256/ZM	Zambia	2/28/2026	AP/P/2014/007807	AP4477	Granted	2/28/2006	2/28/2018	REDUCING LEVELS OF	10	Owned		

								NICOTINIC ALKALOIDS IN PLANTS						
045952-0165/ZM	Zambia	2/28/2026	AP/P/2007/004181	AP2990	Granted	2/28/2006	7/28/2015	REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned				
045952-0256/ZW	Zimbabwe	2/28/2026	AP/P/2014/007807	AP4477	Granted	2/28/2006	2/28/2018	REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned				
045952-0165/ZW	Zimbabwe	2/28/2026	AP/P/2007/004181	AP2990	Granted	2/28/2006	7/28/2015	REDUCING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	10	Owned				
045952-0309	Austria	9/13/2026	11187201.6	245044.6	Inactive	9/13/2006	4/29/2015	INCREASING LEVELS OF NICOTINIC ALKALOIDS	11	Owned				
045952-0599	Belgium	9/13/2026	14163682.9	2792750	Inactive	9/13/2006	7/3/2019	INCREASING LEVELS OF NICOTINIC ALKALOIDS	11	Owned				
045952-0310	Belgium	9/13/2026	11187201.6	245044.6	Inactive	9/13/2006	4/29/2015	INCREASING LEVELS OF NICOTINIC ALKALOIDS	11	Owned				
045952-0311	Bulgaria	9/13/2026	11187201.6	245044.6	Inactive	9/13/2006	4/29/2015	INCREASING LEVELS OF NICOTINIC ALKALOIDS	11	Owned				
045952-0313	Czech Republic	9/13/2026	11187201.6	245044.6	Inactive	9/13/2006	4/29/2015	INCREASING LEVELS OF NICOTINIC ALKALOIDS	11	Owned				
045952-0184	European Patent Office	9/13/2026	06848676.0	2061889	Inactive	3/31/2009	4/23/2014	INCREASING LEVELS OF NICOTINIC ALKALOIDS	11	Owned				
045952-0202	European Patent Office	9/13/2026	11187201.6	245044.6	Inactive	10/28/2011	4/29/2015	INCREASING LEVELS OF NICOTINIC ALKALOIDS	11	Owned				
045952-0255	European Patent Office	9/13/2026	14163682.9	2792750	Inactive	4/7/2014	7/3/2019	INCREASING LEVELS OF NICOTINIC ALKALOIDS	11	Owned				
045952-0593	European Patent Office	9/13/2026	19177939.6		Inactive	6/3/2019		INCREASING LEVELS OF NICOTINIC ALKALOIDS	11	Owned				
045952-0600	France	9/13/2026	14163682.9	2792750	Inactive	9/13/2006	7/3/2019	INCREASING LEVELS OF NICOTINIC ALKALOIDS	11	Owned				
045952-0316	France	9/13/2026	11187201.6	245044.6	Inactive	9/13/2006	4/29/2015	INCREASING LEVELS OF NICOTINIC ALKALOIDS	11	Owned				
045952-0263	France	9/13/2026	06848676.0		Inactive	9/13/2006		INCREASING LEVELS OF NICOTINIC ALKALOIDS	11	Owned				
045952-0601	Germany	9/13/2026	14163682.9	2792750	Inactive	9/13/2006	7/3/2019	INCREASING LEVELS OF NICOTINIC ALKALOIDS	11	Owned				
045952-0314	Germany	9/13/2026	11187201.6	245044.6	Inactive	9/13/2006	4/29/2015	INCREASING LEVELS OF NICOTINIC ALKALOIDS	11	Owned				
045952-0267	Germany	9/13/2026	06848676.0		Inactive	9/13/2006		INCREASING LEVELS OF NICOTINIC ALKALOIDS	11	Owned				
045952-0318	Greece	9/14/2026	11187201.6	245044.6	Inactive	9/13/2006	4/29/2015	INCREASING LEVELS OF NICOTINIC ALKALOIDS	11	Owned				
045952-0208	Hong Kong	9/13/2026	12110455.3	116967.7	Inactive	10/19/2012	11/20/2015	INCREASING LEVELS OF NICOTINIC ALKALOIDS	11	Owned				
045952-0299	Hong Kong	9/13/2026	15103733.9		Inactive	4/16/2015		INCREASING LEVELS OF NICOTINIC ALKALOIDS	11	Owned				
045952-0319	Hungary	9/13/2026	11187201.6	245044.6	Inactive	9/13/2006	4/29/2015	INCREASING LEVELS OF NICOTINIC ALKALOIDS	11	Owned				

045952-0266	Ireland	9/13/2026	06848676.0	2061889	Inactive	9/13/2006	4/23/2014	INCREASING LEVELS OF NICOTINIC ALKALOIDS	11	Owned		
045952-0602	Italy	9/13/2026	14163682.9	2792750	Inactive	9/13/2006	7/3/2019	INCREASING LEVELS OF NICOTINIC ALKALOIDS	11	Owned		
045952-0320	Italy	9/13/2026	11187201.6	2450446	Inactive	9/13/2006	4/29/2015	INCREASING LEVELS OF NICOTINIC ALKALOIDS	11	Owned		
045952-0271	Italy	9/13/2026	06848676.0		Inactive	9/13/2006		INCREASING LEVELS OF NICOTINIC ALKALOIDS	11	Owned		
045952-INV-64641/JP	Japan	9/13/2026	2009-537707	5087777	Inactive	9/13/2006	9/21/2012	INCREASING LEVELS OF NICOTINIC ALKALOIDS	11	Licensed	Nara Institute of Science and Technology	
045952-0606	Netherlands	9/13/2026	14163682.9	2792750	Inactive	9/13/2006	7/3/2019	INCREASING LEVELS OF NICOTINIC ALKALOIDS	11	Owned		
045952-0321	Netherlands	9/13/2026	11187201.6	2450446	Inactive	9/13/2006	4/29/2015	INCREASING LEVELS OF NICOTINIC ALKALOIDS	11	Owned		
045952-0138	P.C.T.	9/13/2010	PCT/IB2006/004043		Inactive	9/13/2006		INCREASING LEVELS OF NICOTINIC ALKALOIDS	11	Owned		
045952-0603	Poland	9/13/2026	14163682.9	2792750	Inactive	9/13/2006	7/3/2019	INCREASING LEVELS OF NICOTINIC ALKALOIDS	11	Owned		
045952-0322	Poland	9/13/2026	11187201.6	2450446	Inactive	9/13/2006	4/29/2015	INCREASING LEVELS OF NICOTINIC ALKALOIDS	11	Owned		
045952-0270	Poland	9/13/2026	06848676.0	2061889	Inactive	9/13/2006	4/23/2014	INCREASING LEVELS OF NICOTINIC ALKALOIDS	11	Owned		
045952-0323	Portugal	9/13/2026	11187201.6	2450446	Inactive	9/13/2006	4/29/2015	INCREASING LEVELS OF NICOTINIC ALKALOIDS	11	Owned		
045952-0324	Romania	9/13/2026	11187201.6	2450446	Inactive	9/13/2006	4/29/2015	INCREASING LEVELS OF NICOTINIC ALKALOIDS	11	Owned		
045952-0604	Spain	9/13/2026	14163682.9	2792750	Inactive	9/13/2006	7/3/2019	INCREASING LEVELS OF NICOTINIC ALKALOIDS	11	Owned		
045952-0315	Spain	9/13/2026	11187201.6	2450446	Inactive	9/13/2006	4/29/2015	INCREASING LEVELS OF NICOTINIC ALKALOIDS	11	Owned		
045952-0265	Spain	9/13/2026	06848676.0		Inactive	9/13/2006		INCREASING LEVELS OF NICOTINIC ALKALOIDS	11	Owned		
045952-0325	Sweden	9/13/2026	11187201.6	2450446	Inactive	9/13/2006	4/29/2015	INCREASING LEVELS OF NICOTINIC ALKALOIDS	11	Owned		
045952-0605	Switzerland	9/12/2026	14163682.9	2792750	Inactive	9/13/2006	7/3/2019	INCREASING LEVELS OF NICOTINIC ALKALOIDS	11	Owned		
045952-0312	Switzerland	9/13/2026	11187201.6	2450446	Inactive	9/13/2006	4/29/2015	INCREASING LEVELS OF NICOTINIC ALKALOIDS	11	Owned		
045952-0264	Switzerland	9/13/2026	06848676.0		Inactive	9/13/2006		INCREASING LEVELS OF NICOTINIC ALKALOIDS	11	Owned		
045952-0144	Taiwan	5/7/2027	096116136	421341	Inactive	5/7/2007	1/1/2014	INCREASING LEVELS OF NICOTINIC ALKALOIDS	11	Owned		
045952-0248	Taiwan	5/6/2027	102137008	1657141	Inactive	11/15/2013	4/21/2019	INCREASING LEVELS OF NICOTINIC ALKALOIDS	11	Owned		
045952-0405	Taiwan	5/6/2027	105106584	1659102	Inactive	3/9/2016	5/11/2019	INCREASING LEVELS OF NICOTINIC ALKALOIDS	11	Owned		

045952-0530	Taiwan	5/6/2027	107144438		Inactive	12/11/2018		INCREASING LEVELS OF NICOTINIC ALKALOIDS	11	Owned		
045952-0607	Turkey	5/6/2027	141636829	2792750	Inactive	9/13/2006	7/3/2019	INCREASING LEVELS OF NICOTINIC ALKALOIDS	11	Owned		
045952-0326	Turkey	9/13/2026	111872016	2450446	Inactive	9/13/2006	4/29/2015	INCREASING LEVELS OF NICOTINIC ALKALOIDS	11	Owned		
045952-0268	Turkey	9/13/2026	068486760	2061889	Inactive	9/13/2006	4/23/2014	INCREASING LEVELS OF NICOTINIC ALKALOIDS	11	Owned		
045952-0608	United Kingdom	9/13/2026	141636829	2792750	Inactive	9/13/2006	7/3/2019	INCREASING LEVELS OF NICOTINIC ALKALOIDS	11	Owned		
045952-0317	United Kingdom	9/12/2026	111872016	2450446	Inactive	9/13/2006	4/29/2015	INCREASING LEVELS OF NICOTINIC ALKALOIDS	11	Owned		
045952-0269	United Kingdom	9/12/2026	068486760		Inactive	9/13/2006		INCREASING LEVELS OF NICOTINIC ALKALOIDS	11	Owned		
045952-0139	United States of America	11/5/2029	11/520036	9551003	Granted	9/13/2006	1/24/2017	INCREASING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	11	Owned		
045952-0201	United States of America	2/10/2027	14/687910	9719103	Granted	4/15/2015	8/1/2017	INCREASING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	11	Owned		
045952-0438	United States of America	9/13/2026	15/411721	10190129	Granted	1/20/2017	1/29/2019	INCREASING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	11	Owned		
045952-0533	United States of America	9/13/2026	16/258445	10829774	Granted	1/25/2019	11/10/2020	INCREASING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	11	Owned		
045952-0531	United States of America	9/13/2026	16/258393	10907170	Granted	1/25/2019	2/2/2021	INCREASING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	11	Owned		
045952-0647	United States of America		17/141030		Pending	1/4/2021		INCREASING LEVELS OF NICOTINIC ALKALOIDS IN PLANTS	11	Owned		
045952-0186	Canada	5/23/2028	2688306	2688306	Granted	11/25/2009	7/6/2021	NUCLEIC ACID SEQUENCES ENCODING TRANSCRIPTION FACTORS REGULATING ALKALOID BIOSYNTHESIS AND THEIR USE IN MODIFYING PLANT METABOLISM	14	Owned		
045952-0502	Canada	5/23/2028	3008999	3008999	Granted	6/21/2018	10/4/2022	NUCLEIC ACID SEQUENCES ENCODING TRANSCRIPTION FACTORS REGULATING ALKALOID BIOSYNTHESIS AND THEIR USE IN MODIFYING PLANT METABOLISM	14	Owned		

045952-0654	Canada	5/23/2028	3114078		Pending	4/5/2021		NUCLEIC ACID SEQUENCES ENCODING TRANSCRIPTION FACTORS REGULATING ALKALOID BIOSYNTHESIS AND THEIR USE IN MODIFYING PLANT METABOLISM	14	Owned		
045952-0187	China	5/23/2028	20088010279.3	ZL200880100279.3	Granted	1/25/2010	3/16/2016	NUCLEIC ACID SEQUENCES ENCODING TRANSCRIPTION FACTORS REGULATING ALKALOID BIOSYNTHESIS AND THEIR USE IN MODIFYING PLANT METABOLISM	14	Owned		
045952-0302	China	5/23/2028	201510236373.3	ZL201510236373.3	Granted	5/11/2015	1/1/2019	NUCLEIC ACID SEQUENCES ENCODING TRANSCRIPTION FACTORS REGULATING ALKALOID BIOSYNTHESIS AND THEIR USE IN MODIFYING PLANT METABOLISM	14	Owned		
045952-0342	China	5/23/2028	201610092006.5	ZL201610092006.5	Granted	2/18/2016	1/1/2021	NUCLEIC ACID SEQUENCES ENCODING TRANSCRIPTION FACTORS REGULATING ALKALOID BIOSYNTHESIS AND THEIR USE IN MODIFYING PLANT METABOLISM	14	Owned		
045952-0343	China	5/23/2028	201610091915.7	ZL201610091915.7	Granted	2/18/2016	9/1/2020	NUCLEIC ACID SEQUENCES ENCODING TRANSCRIPTION FACTORS REGULATING ALKALOID BIOSYNTHESIS AND THEIR USE IN MODIFYING PLANT METABOLISM	14	Owned		
045952-0610	China	5/23/2028	201910750541.9		Pending	8/14/2019		NUCLEIC ACID SEQUENCES ENCODING TRANSCRIPTION FACTORS REGULATING ALKALOID BIOSYNTHESIS AND THEIR USE IN MODIFYING PLANT METABOLISM	14	Owned		

								SIS AND THEIR USE IN MODIFYING PLANT METABOLISM (NbTF4)				
045952-0612	China	5/23/2028	201910750533.4		Pending	8/14/2019		NUCLEIC ACID SEQUENCES ENCODING TRANSCRIPTION FACTORS REGULATING ALKALOID BIOSYNTHESIS AND THEIR USE IN MODIFYING PLANT METABOLISM (NbTF7)	14	Owned		
045952-0611	China	5/23/2028	201910750534.9		Pending	8/14/2019		NUCLEIC ACID SEQUENCES ENCODING TRANSCRIPTION FACTORS REGULATING ALKALOID BIOSYNTHESIS AND THEIR USE IN MODIFYING PLANT METABOLISM (NbTF6)	14	Owned		
045952-0609	China	5/23/2028	201910751022.4		Pending	8/14/2019		NUCLEIC ACID SEQUENCES ENCODING TRANSCRIPTION FACTORS REGULATING ALKALOID BIOSYNTHESIS AND THEIR USE IN MODIFYING PLANT METABOLISM (NbTF3)	14	Owned		
045952-0203	Hong Kong	5/23/2028	11113618.2	HK1159172	Granted	12/16/2011	5/12/2017	NUCLEIC ACID SEQUENCES ENCODING TRANSCRIPTION FACTORS REGULATING ALKALOID BIOSYNTHESIS AND THEIR USE IN MODIFYING PLANT METABOLISM	14	Owned		
045952-0348	Hong Kong	5/23/2028	16100927.0	1213014	Granted	1/23/2016	2/7/2020	NUCLEIC ACID SEQUENCES ENCODING TRANSCRIPTION FACTORS REGULATING ALKALOID BIOSYNTHESIS AND THEIR USE IN MODIFYING PLANT METABOLISM	14	Owned		

045952-0430	Hong Kong	5/23/2028	16112768.7	122469.5	Granted	11/7/2016	5/7/2021	NUCLEIC ACID SEQUENCES ENCODING TRANSCRIPTION FACTORS REGULATING ALKALOID BIOSYNTHESIS AND THEIR USE IN MODIFYING PLANT METABOLISM	14	Owned		
045952-0429	Hong Kong	5/23/2028	16112768.6	HK1224696	Granted	11/7/2016	5/14/2021	NUCLEIC ACID SEQUENCES ENCODING TRANSCRIPTION FACTORS REGULATING ALKALOID BIOSYNTHESIS AND THEIR USE IN MODIFYING PLANT METABOLISM	14	Owned		
045952-0635	Hong Kong	5/23/2028	42020013604.2		Pending	8/12/2020		NUCLEIC ACID SEQUENCES ENCODING TRANSCRIPTION FACTORS REGULATING ALKALOID BIOSYNTHESIS AND THEIR USE IN MODIFYING PLANT METABOLISM (NbTF3)	14	Owned		
045952-0636	Hong Kong	5/23/2028	42020013603.4		Pending	8/12/2020		NUCLEIC ACID SEQUENCES ENCODING TRANSCRIPTION FACTORS REGULATING ALKALOID BIOSYNTHESIS AND THEIR USE IN MODIFYING PLANT METABOLISM (NbTF4)	14	Owned		
045952-0637	Hong Kong	5/23/2028	42020013602.6		Pending	8/12/2020		NUCLEIC ACID SEQUENCES ENCODING TRANSCRIPTION FACTORS REGULATING ALKALOID BIOSYNTHESIS AND THEIR USE IN MODIFYING PLANT METABOLISM (NbTF6)	14	Owned		
045952-0638	Hong Kong	5/23/2028	42020013601.8		Pending	8/12/2020		NUCLEIC ACID SEQUENCES ENCODING TRANSCRIPTION FACTORS REGULATING ALKALOID BIOSYNTHESIS	14	Owned		

									SIS AND THEIR USE IN MODIFYING PLANT METABOLISM (NbTF7)				
045952-0175	P.C.T.	5/23/2012	PCT/IB2008/003131		Inactive	5/23/2008			NUCLEIC ACID SEQUENCES ENCODING TRANSCRIPTION FACTORS REGULATING ALKALOID BIOSYNTHESIS AND THEIR USE IN MODIFYING PLANT METABOLISM	14	Owned		
045952-0185	United States of America	5/23/2028	12/601752	8822757	Granted	3/1/2010	9/2/2014		NUCLEIC ACID SEQUENCES ENCODING TRANSCRIPTION FACTORS REGULATING NICOTINE ALKALOID BIOSYNTHESIS AND THEIR USE IN MODIFYING PLANT METABOLISM	14	Owned		
045952-0204	United States of America	5/23/2028	13/464212	8624083	Granted	5/4/2012	1/7/2014		NUCLEIC ACID SEQUENCES ENCODING TRANSCRIPTION FACTORS REGULATING ALKALOID BIOSYNTHESIS AND THEIR USE IN MODIFYING PLANT METABOLISM	14	Owned		
045952-0254	United States of America	5/23/2028	14/261284	9175302	Granted	4/24/2014	11/3/2015		METHOD FOR INCREASING A NICOTINIC ALKALOID IN A NICOTIANA PLANT BY INTRODUCING A MUTATION INTO THE GENE ENCODING THE NbTF7 TRANSCRIPTION FACTOR AND PLANTS AND PRODUCTS MADE BY SAID METHOD	14	Owned		
045952-0253	United States of America	5/23/2028	14/261259	9157090	Granted	4/24/2014	10/13/2015		NUCLEIC ACID SEQUENCES ENCODING TRANSCRIPTION FACTORS REGULATING ALKALOID BIOSYNTHESIS AND THEIR USE	14	Owned		

									IN MODIFYING PLANT METABOLIS M				
045952-0252	United States of America	5/23/2028	14/261240	9121030	Granted	4/24/2014	9/1/2015	NUCLEIC ACID SEQUENCES ENCODING TRANSCRIPTION FACTORS REGULATING ALKALOID BIOSYNTHESIS AND THEIR USE IN MODIFYING PLANT METABOLISM	14	Owned			
045952-0251	United States of America	5/23/2028	14/261203	9133468	Granted	4/24/2014	9/15/2015	NUCLEIC ACID SEQUENCES ENCODING TRANSCRIPTION FACTORS REGULATING ALKALOID BIOSYNTHESIS AND THEIR USE IN MODIFYING PLANT METABOLISM	14	Owned			
045952-0249	United States of America	5/23/2028	14/261132	9157089	Granted	4/24/2014	10/13/2015	NUCLEIC ACID SEQUENCES ENCODING TRANSCRIPTION FACTORS REGULATING ALKALOID BIOSYNTHESIS AND THEIR USE IN MODIFYING PLANT METABOLISM	14	Owned			
045952-0250	United States of America	5/23/2028	14/261165	9150872	Granted	4/24/2014	10/6/2015	NUCLEIC ACID SEQUENCES ENCODING TRANSCRIPTION FACTORS REGULATING ALKALOID BIOSYNTHESIS AND THEIR USE IN MODIFYING PLANT METABOLISM	14	Owned			
045952-0275	United States of America	9/11/2030	14/681073	9988640	Granted	4/7/2015	6/5/2018	NUCLEIC ACID SEQUENCES ENCODING TRANSCRIPTION FACTORS REGULATING ALKALOID BIOSYNTHESIS AND THEIR USE IN MODIFYING PLANT METABOLISM	14	Owned			
045952-0306	United States of America	7/7/2028	14/840019	9752156	Granted	8/30/2015	9/5/2017	NUCLEIC ACID SEQUENCES ENCODING TRANSCRIPTION	14	Owned			

									TION FACTORS REGULATING ALKALOID BIOSYNTHESIS AND THEIR USE IN MODIFYING PLANT METABOLISM				
045952-0329	United States of America	10/11/2028	14/842328	9879272	Granted	9/1/2015	1/30/2018	NUCLEIC ACID SEQUENCES ENCODING TRANSCRIPTION FACTORS REGULATING ALKALOID BIOSYNTHESIS AND THEIR USE IN MODIFYING PLANT METABOLISM	14	Owned			
045952-0330	United States of America	8/16/2028	14/842335	10100323	Granted	9/1/2015	10/16/2018	NUCLEIC ACID SEQUENCES ENCODING TRANSCRIPTION FACTORS REGULATING ALKALOID BIOSYNTHESIS AND THEIR USE IN MODIFYING PLANT METABOLISM	14	Owned			
045952-0307	United States of America	5/23/2028	14/852172	9976153	Granted	9/11/2015	5/22/2018	DOWN REGULATION OF AUXIN RESPONSE FACTOR NbTF7 TO INCREASE NICOTINE IN A PLANT	14	Owned			
045952-0331	United States of America	5/23/2028	14/852158	10030249	Granted	9/11/2015	7/24/2018	NUCLEIC ACID SEQUENCES ENCODING TRANSCRIPTION FACTORS REGULATING ALKALOID BIOSYNTHESIS AND THEIR USE IN MODIFYING PLANT METABOLISM	14	Owned			
045952-0339	United States of America	5/23/2028	14/879456	9732350	Granted	10/9/2015	8/15/2017	NUCLEIC ACID SEQUENCES ENCODING TRANSCRIPTION FACTORS REGULATING ALKALOID BIOSYNTHESIS AND THEIR USE IN MODIFYING PLANT METABOLISM	14	Owned			
045952-0457	United States of America	5/23/2028	15/658236	10337020	Granted	7/24/2017	7/2/2019	NUCLEIC ACID SEQUENCES ENCODING TRANSCRIPTION	14	Owned			

									FACTORS REGULATING ALKALOID BIOSYNTHESIS AND THEIR USE IN MODIFYING PLANT METABOLISM				
045952-0476	United States of America	5/23/2028	15/985146	10669552	Granted	5/21/2018	6/2/2020		UP-REGULATION OF AUXIN RESPONSE FACTOR NbTF7 TO INCREASE NICOTINE IN A PLANT	14	Owned		
045952-0498	United States of America	10/16/2028	15/996064	10941410	Granted	6/1/2018	3/9/2021		NUCLEIC ACID SEQUENCES ENCODING TRANSCRIPTION FACTORS REGULATING ALKALOID BIOSYNTHESIS AND THEIR USE IN MODIFYING PLANT METABOLISM	14	Owned		
045952-0521	United States of America	5/23/2028	16/041152	10968459	Granted	7/20/2018	4/6/2021		NUCLEIC ACID SEQUENCES ENCODING TRANSCRIPTION FACTORS REGULATING ALKALOID BIOSYNTHESIS AND THEIR USE IN MODIFYING PLANT METABOLISM	14	Owned		
045952-0501	United States of America		16/148923		Inactive	10/1/2018			NUCLEIC ACID SEQUENCES ENCODING TRANSCRIPTION FACTORS REGULATING ALKALOID BIOSYNTHESIS AND THEIR USE IN MODIFYING PLANT METABOLISM	14	Owned		
045952-0651	United States of America		17/187597		Pending	2/26/2021			NUCLEIC ACID SEQUENCES ENCODING TRANSCRIPTION FACTORS REGULATING ALKALOID BIOSYNTHESIS AND THEIR USE IN MODIFYING PLANT METABOLISM	14	Owned		
045952-0734	United States of America		17/737964		Pending	5/5/2022			NUCLEIC ACID SEQUENCES ENCODING TRANSCRIPTION FACTORS	14	Owned		

								REGULATING ALKALOID BIOSYNTHESIS AND THEIR USE IN MODIFYING PLANT METABOLISM				
045952-0354	Israel	6/6/2022	159213	159213	Inactive	12/7/2003	2/1/2007	MODIFYING NICOTINE AND NITROSAMINE LEVELS IN TOBACCO	16	Licensed	North Carolina State University	
045952-0355	New Zealand	6/6/2022	530238	530238	Inactive	12/18/2003	12/9/2004	MODIFYING NICOTINE AND NITROSAMINE LEVELS IN TOBACCO	16	Licensed	North Carolina State University	
045952-INV-123983/PCTX	P.C.T.		PCT/US2002/018040		Inactive	6/6/2002		MODIFYING NICOTINE AND NITROSAMINE LEVELS IN TOBACCO	16	Licensed	North Carolina State University	
045952-0356	Singapore	6/6/2022	2003073590	101253	Inactive	12/8/2003	12/30/2005	MODIFYING NICOTINE AND NITROSAMINE LEVELS IN TOBACCO	16	Licensed	North Carolina State University	
045952-0356/DIV	Singapore		2005075296		Inactive	11/25/2005		MODIFYING NICOTINE AND NITROSAMINE LEVELS IN TOBACCO	16	Licensed	North Carolina State University	
045952-0357	South Africa	6/6/2022	2004/00084	2004/00084	Inactive	1/7/2004	12/29/2004	MODIFYING NICOTINE AND NITROSAMINE LEVELS IN TOBACCO	16	Licensed	North Carolina State University	
045952-0697	Taiwan	6/7/2022	91112317		Pending	6/7/2002		Modifying Nicotine and Nitrosamine Levels in Tobacco	16	Licensed	North Carolina State University	
045952-INV-123983/PROVX	United States of America		60297154		Inactive	6/8/2001		MODIFYING NICOTINE AND NITROSAMINE LEVELS IN TOBACCO	16	Licensed	North Carolina State University	
045952-0696	United States of America	6/6/2022	10729121	6907887	Inactive	12/5/2003	6/21/2005	Modifying Nicotine and Nitrosamine Levels in Tobacco	16	Licensed	North Carolina State University	
045952-0432	Algeria	2/27/2034	150579		Inactive	9/27/2015		TRANSCRIPTION FACTORS THAT REGULATE NICOTINE BIOSYNTHESIS IN TOBACCO	17	Licensed	North Carolina State University	
045952-0434	Argentina	2/27/2034	P140100659		Pending	2/28/2014		TRANSCRIPTION FACTORS THAT REGULATE NICOTINE BIOSYNTHESIS IN TOBACCO	17	Licensed	North Carolina State University	
045952-0777	Brazil	2/27/2034	122022017687-9		Pending	9/2/2022		TRANSCRIPTION FACTORS THAT REGULATE NICOTINE BIOSYNTHESIS IN TOBACCO	17	Licensed	North Carolina State University	
045952-0333	Brazil	2/27/2034	112015020938-6		Pending	8/28/2015		TRANSCRIPTION FACTORS THAT REGULATE NICOTINE	17	Licensed	North Carolina State University	

									BIOSYNTHESIS IN TOBACCO				
045952-0622	Brazil	2/27/2034	12202000175-5		Pending	1/3/2020			TRANSCRIPTION FACTORS THAT REGULATE NICOTINE BIOSYNTHESIS IN TOBACCO	17	Licensed	North Carolina State University	
045952-0621	Brazil	2/27/2034	12202000165-8		Pending	1/3/2020			TRANSCRIPTION FACTORS THAT REGULATE NICOTINE BIOSYNTHESIS IN TOBACCO	17	Licensed	North Carolina State University	
045952-0620	Brazil	2/27/2034	12202000172-0		Pending	1/3/2020			TRANSCRIPTION FACTORS THAT REGULATE NICOTINE BIOSYNTHESIS IN TOBACCO	17	Licensed	North Carolina State University	
045952-0351	Colombia	2/27/2034	15231252	33798	Inactive	9/30/2015	6/14/2018		TRANSCRIPTION FACTORS THAT REGULATE NICOTINE BIOSYNTHESIS IN TOBACCO	17	Licensed	North Carolina State University	
045952-0449	Colombia	2/27/2034	NC2018/002325	34307	Inactive	5/23/2017	9/18/2018		TRANSCRIPTION FACTORS THAT REGULATE NICOTINE BIOSYNTHESIS IN TOBACCO	17	Licensed	North Carolina State University	
045952-0451	Colombia	2/27/2034	NC2017/010210	34310	Inactive	5/23/2017	9/18/2018		TRANSCRIPTION FACTORS THAT REGULATE NICOTINE BIOSYNTHESIS IN TOBACCO	17	Licensed	North Carolina State University	
045952-0450	Colombia	2/27/2034	NC2017/010209	34301	Inactive	5/23/2017	9/18/2018		TRANSCRIPTION FACTORS THAT REGULATE NICOTINE BIOSYNTHESIS IN TOBACCO	17	Licensed	North Carolina State University	
045952-0334	Guatemala	2/27/2034	A-2015000245		Inactive	8/31/2015			TRANSCRIPTION FACTORS THAT REGULATE NICOTINE BIOSYNTHESIS IN TOBACCO	17	Licensed	North Carolina State University	
045952-0335	Honduras	2/27/2034	2001/2015		Inactive	8/31/2015			TRANSCRIPTION FACTORS THAT REGULATE NICOTINE BIOSYNTHESIS IN TOBACCO	17	Licensed	North Carolina State University	
045952-0336	India	2/27/2034	5342/CHE NP/2015		Inactive	9/3/2015			TRANSCRIPTION FACTORS THAT REGULATE NICOTINE BIOSYNTHESIS IN TOBACCO	17	Licensed	North Carolina State University	

045952-0337	Mexico	2/27/2034	MX/A/2015/011325	381380	Granted	8/31/2015	4/9/2021	TRANSCRIPTION FACTORS THAT REGULATE NICOTINE BIOSYNTHESIS IN TOBACCO	17	Licensed	North Carolina State University	
045952-0653	Mexico	2/27/2034	MX/A/2021/004097		Pending	4/8/2021		TRANSCRIPTION FACTORS THAT REGULATE NICOTINE BIOSYNTHESIS IN TOBACCO	17	Licensed	North Carolina State University	
045952-0435	Mozambique	2/27/2034	428/2015	428/2015	Granted	10/1/2015	2/15/2016	TRANSCRIPTION FACTORS THAT REGULATE NICOTINE BIOSYNTHESIS IN TOBACCO	17	Licensed	North Carolina State University	
045952-0338	Thailand	2/27/2034	1501004990		Inactive	8/31/2015		TRANSCRIPTION FACTORS THAT REGULATE NICOTINE BIOSYNTHESIS IN TOBACCO	17	Licensed	North Carolina State University	
045952-0436	Turkey	2/27/2034	2015/12401		Inactive	10/7/2015		TRANSCRIPTION FACTORS THAT REGULATE NICOTINE BIOSYNTHESIS IN TOBACCO	17	Licensed	North Carolina State University	
045952-0350	Ukraine		201509436		Inactive	9/30/2015		TRANSCRIPTION FACTORS THAT REGULATE NICOTINE BIOSYNTHESIS IN TOBACCO	17	Licensed	North Carolina State University	
045952-0567	Ukraine		a201902572		Inactive	3/18/2019		TRANSCRIPTION FACTORS THAT REGULATE NICOTINE BIOSYNTHESIS IN TOBACCO	17	Licensed	North Carolina State University	
045952-0566	Ukraine		a201902573		Inactive	3/18/2019		TRANSCRIPTION FACTORS THAT REGULATE NICOTINE BIOSYNTHESIS IN TOBACCO	17	Licensed	North Carolina State University	
045952-0565	Ukraine		a201902576		Inactive	3/18/2019		TRANSCRIPTION FACTORS THAT REGULATE NICOTINE BIOSYNTHESIS IN TOBACCO	17	Licensed	North Carolina State University	
045952-0437	United States of America	5/14/2034	14/192730	9580722	Granted	2/27/2014	2/28/2017	TRANSCRIPTION FACTORS THAT REGULATE NICOTINE BIOSYNTHESIS IN TOBACCO	17	Licensed	North Carolina State University	
045952-0439	United States of America	2/27/2034	15/412443	10072270	Granted	1/23/2017	9/11/2018	TRANSCRIPTION FACTORS THAT REGULATE	17	Licensed	North Carolina State University	

									NICOTINE BIOSYNTHESIS IN TOBACCO				
045952-0524	United States of America	2/27/2034	16/059696	10724045	Granted	8/9/2018	7/28/2020		TRANSCRIPTION FACTORS THAT REGULATE NICOTINE BIOSYNTHESIS IN TOBACCO	17	Licensed	North Carolina State University	
045952-0632	United States of America	6/24/2034	16/915206	11306321	Granted	6/29/2020	4/19/2022		TRANSCRIPTION FACTORS THAT REGULATE NICOTINE BIOSYNTHESIS IN TOBACCO	17	Licensed	North Carolina State University	
045952-0733	United States of America		17/714504		Pending	4/6/2022			TRANSCRIPTION FACTORS THAT REGULATE NICOTINE BIOSYNTHESIS IN TOBACCO	17	Licensed	North Carolina State University	
045952-INV-172611/CA	Canada	8/4/2030	2770774	2770774	Granted	2/10/2012	7/14/2020		AROMATIC PRENYLTRANSFERASE FROM CANNABIS	18	No 22nd C Rights in Canada		
045952-INV-172611/PCTX	P.C.T.		PCT/CA2010/001222		Inactive	8/4/2010			AROMATIC PRENYLTRANSFERASE FROM CANNABIS	18	Licensed	North Carolina State University	
045952-INV-172611/1X	United States of America		61/272057		Inactive	8/12/2009			AROMATIC PRENYLTRANSFERASE FROM CANNABIS	18	Licensed	Anandia	
045952-INV-172611/2X	United States of America		61/272117		Inactive	8/18/2009			AROMATIC PRENYLTRANSFERASE FROM CANNABIS	18	Licensed	Anandia	
045952-0652	United States of America	8/4/2030	14/510232	9765308	Granted	10/9/2014	9/19/2017		AROMATIC PRENYLTRANSFERASE FROM CANNABIS	18	Licensed	Anandia	
045952-0678	United States of America	8/4/2030	13/389815	8884100	Granted	10/9/2014	11/11/2014		AROMATIC PRENYLTRANSFERASE FROM CANNABIS	18	Licensed	Anandia	
045952-INV-174990/CA	Canada	4/15/2031	2796465	2796465	Granted	10/15/2012	10/19/2021		GENES AND PROTEINS FOR AROMATIC POLYKETIDE SYNTHESIS	19	No 22nd Rights in Canada		
045952-INV-174990/CADIV	Canada	4/15/2031	3130705		Inactive	9/13/2021			GENES AND PROTEINS FOR AROMATIC POLYKETIDE SYNTHESIS	19	Licensed	Anandia	
045952-INV-174990/PCTX	P.C.T.		PCT/CA2011/000428		Inactive	4/15/2011			GENES AND PROTEINS FOR AROMATIC POLYKETIDE SYNTHESIS	19	Licensed	Anandia	
045952-INV-174990/P RVX	United States of America		61/324343		Inactive	4/15/2010			GENES AND PROTEINS FOR AROMATIC POLYKETIDE SYNTHESIS	19	Licensed	Anandia	
045952-0674	United States of America	9/12/2032	13/641272	9611460	Granted	10/15/2012	4/4/2017		GENES AND PROTEINS FOR AROMATIC POLYKETIDE SYNTHESIS	19	Licensed	Anandia	
045952-0675	United States of	4/15/2031	15/438291	10059971	Granted	2/21/2017	8/28/2018		GENES AND PROTEINS FOR	19	Licensed	Anandia	

	America								AROMATIC POLYKETIDE SYNTHESIS				
045952-0676	United States of America	4/15/2031	16/051701	10718000	Granted	8/1/2018	7/21/2020		GENES AND PROTEINS FOR AROMATIC POLYKETIDE SYNTHESIS	19	Licensed	Anandia	
045952-0677	United States of America	7/30/2031	16/917362	11306335	Granted	6/30/2020	4/19/2022		GENES AND PROTEINS FOR AROMATIC POLYKETIDE SYNTHESIS	19	Licensed	Anandia	
045952-0732	United States of America		17/691933		Pending	3/10/2022			GENES AND PROTEINS FOR AROMATIC POLYKETIDE SYNTHESIS	19	Licensed	Anandia	
045952-0655	Australia	7/13/2032	2012283708	2012283708	Granted	2/10/2014	6/8/2017		GENES AND PROTEINS FOR ALKANOYL-COA SYNTHESIS	20	Licensed	Anandia	
045952-0656	Brazil	7/13/2032	1120140007357		Pending	1/13/2014			GENES AND PROTEINS FOR ALKANOYL-COA SYNTHESIS	20	Licensed	Anandia	
045952-0642	Canada	7/13/2032	2851316	2851316	Granted	4/7/2014	10/19/2021		GENES AND PROTEINS FOR ALKANOYL-COA SYNTHESIS	20	No 22nd C Rights in Canada		
045952-0642/DIV	Canada	7/13/2032	3130623		Inactive	9/13/2021			GENES AND PROTEINS FOR ALKANOYL-COA SYNTHESIS	20	Licensed	Anandia	
045952-INV-171629/CL	Chile		2014-00096		Inactive	1/13/2014			GENES AND PROTEINS FOR ALKANOYL-COA SYNTHESIS	20	Licensed	Anandia	
045952-0658	China	7/13/2032	201280044678.9	ZL201280044678.8	Granted	3/13/2012	6/8/2016		GENES AND PROTEINS FOR ALKANOYL-COA SYNTHESIS	20	Licensed	Anandia	
045952-0659	Czech Republic	7/13/2032	12811112.7	2732037	Granted	7/13/2012	12/6/2017		GENES AND PROTEINS FOR ALKANOYL-COA SYNTHESIS	20	Licensed	Anandia	
045952-0661	Denmark	7/13/2032	12811112.7	2732037	Granted	7/13/2012	12/6/2017		GENES AND PROTEINS FOR ALKANOYL-COA SYNTHESIS	20	Licensed	Anandia	
045952-INV-171629/EPX	European Patent Office	7/13/2032	12811112.7	2732037	Inactive	2/13/2014	12/6/2017		GENES AND PROTEINS FOR ALKANOYL-COA SYNTHESIS	20	Licensed	Anandia	
045952-0663	France	7/13/2032	12811112.7	2732037	Granted	7/13/2012	12/6/2017		GENES AND PROTEINS FOR ALKANOYL-COA SYNTHESIS	20	Licensed	Anandia	
045952-0660	Germany	7/13/2032	12811112.7	2732037	Granted	7/13/2012	12/6/2017		GENES AND PROTEINS FOR ALKANOYL-COA SYNTHESIS	20	Licensed	Anandia	
045952-0665	Hong Kong	7/13/2032	14111838.7	1198298	Granted	11/21/2014	12/6/2017		GENES AND PROTEINS FOR ALKANOYL-COA SYNTHESIS	20	Licensed	Anandia	

045952-INV-171629/IN	India		239/MUM NP/2014		Inactive	2/5/2014		GENES AND PROTEINS FOR ALKANOYL-COA SYNTHESIS	20	Licensed	Anandia	
045952-INV-171629/ID	Indonesia		P00201400756		Inactive	2/10/2014		GENES AND PROTEINS FOR ALKANOYL-COA SYNTHESIS	20	Licensed	Anandia	
045952-0643	Israel	7/13/2032		230439	Granted		10/31/2020	GENES AND PROTEINS FOR ALKANOYL-COA SYNTHESIS	20	Licensed	Anandia	
045952-0666	Italy	7/13/2032	12811112.7	2732037	Granted	7/13/2012	12/6/2017	GENES AND PROTEINS FOR ALKANOYL-COA SYNTHESIS	20	Licensed	Anandia	
045952-0667	Japan	7/13/2032	2014-519356	6177774	Granted	1/14/2014	7/21/2017	GENES AND PROTEINS FOR ALKANOYL-COA SYNTHESIS	20	Licensed	Anandia	
045952-0669	Mexico	7/13/2032	MX/a/2014/000535	346923	Granted	1/13/2014	4/5/2017	GENES AND PROTEINS FOR ALKANOYL-COA SYNTHESIS	20	Licensed	Anandia	
045952-0670	Netherlands	7/13/2032	12811112.7	2732037	Granted	7/13/2012	12/6/2017	GENES AND PROTEINS FOR ALKANOYL-COA SYNTHESIS	20	Licensed	Anandia	
045952-INV-171629/NZ	New Zealand	7/13/2032	621037	621037	Inactive	2/10/2014	5/27/2016	GENES AND PROTEINS FOR ALKANOYL-COA SYNTHESIS	20	Licensed	Anandia	
045952-INV-171629/PCTX	P.C.T.		PCT/CA2012/000656		Inactive	7/13/2012		GENES AND PROTEINS FOR ALKANOYL-COA SYNTHESIS	20	Licensed	Anandia	
045952-INV-171629/PH	Philippines	7/13/2032	1-2014-500348	1-2014-500348	Inactive	7/13/2012	7/10/2018	GENES AND PROTEINS FOR ALKANOYL-COA SYNTHESIS	20	Licensed	Anandia	
045952-0671	Russian Federation	7/13/2032	2014104668	2014104668	Granted	5/6/2014	3/1/2018	GENES AND PROTEINS FOR ALKANOYL-COA SYNTHESIS	20	Licensed	Anandia	
045952-INV-171629/ZA	South Africa	7/13/2032	2014/01089	2014/01089	Inactive	2/13/2014	12/20/2017	GENES AND PROTEINS FOR ALKANOYL-COA SYNTHESIS	20	Licensed	Anandia	
045952-0668	South Korea	7/13/2032	10-2014-7003736	10-2031022	Granted	2/13/2014	10/4/2019	GENES AND PROTEINS FOR ALKANOYL-COA SYNTHESIS	20	Licensed	Anandia	
045952-0662	Spain	7/13/2032	12811112.7	2732037	Granted	7/13/2012	12/6/2017	GENES AND PROTEINS FOR ALKANOYL-COA SYNTHESIS	20	Licensed	Anandia	
045952-0657	Switzerland	7/12/2032	12811112.7	2732037	Granted	7/13/2012	12/6/2017	GENES AND PROTEINS FOR ALKANOYL-COA SYNTHESIS	20	Licensed	Anandia	
045952-0664	United Kingdom	7/13/2032	12811112.7	2732037	Granted	7/13/2012	12/6/2017	GENES AND PROTEINS FOR ALKANOYL-	20	Licensed	Anandia	

									COA SYNTHESIS				
045952-INV-171629/USX	United States of America		61/507331		Inactive	7/13/2011			GENES AND PROTEINS FOR ALKANOYL-COA SYNTHESIS	20	Licensed	Anandia	
045952-0672	United States of America	7/13/2032	14/232465	9546362	Granted	1/13/2014	1/17/2017		GENES AND PROTEINS FOR ALKANOYL-COA SYNTHESIS	20	Licensed	Anandia	
045952-0673	Vietnam	7/13/2032	1201400442	25356	Granted	2/12/2014	7/29/2020		GENES AND PROTEINS FOR ALKANOYL-COA SYNTHESIS	20	Licensed	Anandia	
045952-0679	Australia	6/29/2035	2015281729	2015281729	Granted	12/23/2016	3/10/2022		CANNABICH ROMENIC ACID SYNTHASE FROM CANNABIS SATIVA	21	Licensed	Anandia	
045952-INV-155975/CA1	Canada	6/29/2035	2957953	2957953	Inactive	12/22/2016	10/19/2021		CANNABICH ROMENIC ACID SYNTHASE FROM CANNABIS SATIVA	21	No 22nd C Rights in Canada		
045952-INV-155975/CADIV	Canada	6/29/2035	3130696		Inactive	9/13/2021			CANNABICH ROMENIC ACID SYNTHASE FROM CANNABIS SATIVA	21	No 22nd C Rights in Canada		
045952-0641	China	6/29/2035	201580045617.8	ZL201580045617.8	Granted	2/24/2017	4/19/2022		CANNABICH ROMENIC ACID SYNTHASE FROM CANNABIS SATIVA	21	Licensed	Anandia	
045952-0649	European Patent Office	6/29/2035	15811089.0		Pending	1/24/2017			CANNABICH ROMENIC ACID SYNTHASE FROM CANNABIS SATIVA	21	Licensed	Anandia	
045952-0680	Israel		249749		Pending	12/25/2016			CANNABICH ROMENIC ACID SYNTHASE FROM CANNABIS SATIVA	21	Licensed	Anandia	
045952-0682	Mexico	6/29/2035	MX/a/2016/017296	awaiting	Granted	12/20/2016	9/2/2022		CANNABICH ROMENIC ACID SYNTHASE FROM CANNABIS SATIVA	21	Licensed	Anandia	
045952-INV-155975/NZ	New Zealand	6/29/2035	727933		Inactive	12/23/2016			CANNABICH ROMENIC ACID SYNTHASE FROM CANNABIS SATIVA	21	Licensed	Anandia	
045952-INV-155975/PCTX	P.C.T.		PCT/CA2015/000423		Inactive	6/29/2015			CANNABICH ROMENIC ACID SYNTHASE FROM CANNABIS SATIVA	21	Licensed	Anandia	
045952-0683	Russian Federation	6/29/2035	2017102045	2708144	Inactive	1/26/2017	12/4/2019		CANNABICH ROMENIC ACID SYNTHASE FROM CANNABIS SATIVA	21	Licensed	Anandia	
045952-0681	South Korea	6/29/2035	10-2017-7001010		Pending	1/12/2017			CANNABICH ROMENIC ACID SYNTHASE	21	Licensed	Anandia	

									FROM CANNABIS SATIVA				
045952-INV-155975/P ROVX	United States of America		62/018128		Inactive	6/27/2014			CANNABICH ROMENIC ACID SYNTHASE FROM CANNABIS SATIVA	21	Licensed	Anandia	
045952-0568	United States of America	6/29/2035	15/321585	10364416	Granted	12/22/2016	7/30/2019		CANNABICH ROMENIC ACID SYNTHASE FROM CANNABIS SATIVA	21	Licensed	Anandia	
045952-0597	United States of America	6/29/2035	16/443217	10724009	Granted	6/17/2019	7/28/2020		CANNABICH ROMENIC ACID SYNTHASE FROM CANNABIS SATIVA	21	Licensed	Anandia	
045952-0487	ARIPO	12/2/2036	AP/P/2018/010864		Pending	7/4/2018			Targeted Mutagenesis of Tobacco Berberine Bridge Enzyme-Like Nucleic Acids	22	Licensed	North Carolina State University	
045952-0763	ARIPO	12/2/2036	AP/P/2022/014166		Pending	6/24/2022			TARGETED MUTAGENESIS OF TOBACCO BERBERINE BRIDGE ENZYME-LIKE NUCLEIC ACIDS	22	Licensed	North Carolina State University	
045952-0488	Australia	12/2/2036	2016362578	2016362578	Granted	6/13/2018	11/17/2022		Targeted Mutagenesis of Tobacco Berberine Bridge Enzyme-Like Nucleic Acids	22	Licensed	North Carolina State University	
045952-0769	Australia	12/2/2036	2022218597		Pending	8/19/2022			Targeted Mutagenesis of Tobacco Berberine Bridge Enzyme-Like Nucleic Acids	22	Licensed	North Carolina State University	
045952-0503	Botswana	12/2/2036	AP/P/2018/010864		Pending	12/2/2016			Targeted Mutagenesis of Tobacco Berberine Bridge Enzyme-Like Nucleic Acids	22	Licensed	North Carolina State University	
045952-0478	Brazil	12/2/2036	112018011050-7		Pending	5/30/2018			Targeted Mutagenesis of Tobacco Berberine Bridge Enzyme-Like Nucleic Acids	22	Licensed	North Carolina State University	
045952-0623	Brazil	12/2/2036	122020009078-2		Pending	5/7/2020			Targeted Mutagenesis of Tobacco Berberine Bridge Enzyme-Like Nucleic Acids	22	Licensed	North Carolina State University	
045952-0479	Canada	12/2/2036	3006996		Pending	5/30/2018			Targeted Mutagenesis of Tobacco Berberine Bridge Enzyme-Like Nucleic Acids	22	Licensed	North Carolina State University	
045952-0480	China	12/2/2036	201630078771.X	ZL201680078771.X	Granted	7/12/2018	8/26/2022		Targeted Mutagenesis of Tobacco Berberine Bridge Enzyme-Like Nucleic Acids	22	Licensed	North Carolina State University	
045952-0765	China	12/2/2036	202211012834.5		Pending	8/23/2022			Targeted Mutagenesis of Tobacco Berberine	22	Licensed	North Carolina State University	

									Bridge Enzyme-Like Nucleic Acids				
045952-0516	Eswatini	12/2/2036	AP/P/2018/010864		Pending	12/2/2016			Targeted Mutagenesis of Tobacco Berberine Bridge Enzyme-Like Nucleic Acids	22	Licensed	North Carolina State University	
045952-0489	European Patent Office	12/2/2036	16871634.8		Pending	6/25/2018			Targeted Mutagenesis of Tobacco Berberine Bridge Enzyme-Like Nucleic Acids	22	Licensed	North Carolina State University	
045952-0504	Gambia	12/2/2036	AP/P/2018/010864		Pending	12/2/2016			Targeted Mutagenesis of Tobacco Berberine Bridge Enzyme-Like Nucleic Acids	22	Licensed	North Carolina State University	
045952-0505	Ghana	12/2/2036	AP/P/2018/010864		Pending	12/2/2016			Targeted Mutagenesis of Tobacco Berberine Bridge Enzyme-Like Nucleic Acids	22	Licensed	North Carolina State University	
045952-0534	Hong Kong	12/2/2036	19101318.2		Pending	1/25/2019			Targeted Mutagenesis of Tobacco Berberine Bridge Enzyme-Like Nucleic Acids	22	Licensed	North Carolina State University	
045952-0491	India		201847024305		Inactive	6/29/2018			Targeted Mutagenesis of Tobacco Berberine Bridge Enzyme-Like Nucleic Acids	22	Licensed	North Carolina State University	
045952-0490	Indonesia	12/2/2036	201804736	IDP000077637	Granted	7/2/2018	6/28/2021		Targeted Mutagenesis of Tobacco Berberine Bridge Enzyme-Like Nucleic Acids	22	Licensed	North Carolina State University	
045952-0492	Japan	12/2/2036	2018-528711	6956084	Granted	6/1/2018	10/6/2021		Targeted Mutagenesis of Tobacco Berberine Bridge Enzyme-Like Nucleic Acids	22	Licensed	North Carolina State University	
045952-0707	Japan	12/2/2036	2021-161318		Pending	9/30/2021			Targeted Mutagenesis of Tobacco Berberine Bridge Enzyme-Like Nucleic Acids	22	Licensed	North Carolina State University	
045952-0506	Kenya	12/2/2036	AP/P/2018/010864		Pending	12/2/2016			Targeted Mutagenesis of Tobacco Berberine Bridge Enzyme-Like Nucleic Acids	22	Licensed	North Carolina State University	
045952-0507	Lesotho	12/2/2036	AP/P/2018/010864		Pending	12/2/2016			Targeted Mutagenesis of Tobacco Berberine Bridge Enzyme-Like Nucleic Acids	22	Licensed	North Carolina State University	
045952-0508	Liberia	12/2/2036	AP/P/2018/010864		Pending	12/2/2016			Targeted Mutagenesis of Tobacco Berberine Bridge Enzyme-Like Nucleic Acids	22	Licensed	North Carolina State University	
045952-0509	Malawi	12/2/2036	AP/P/2018/010864		Pending	12/2/2016			Targeted Mutagenesis of Tobacco Berberine Bridge Enzyme-Like Nucleic Acids	22	Licensed	North Carolina State University	

045952-0484	Malaysia	12/2/2036	PI2018702137		Pending	6/1/2018		Targeted Mutagenesis of Tobacco Berberine Bridge Enzyme-Like Nucleic Acids	22	Licensed	North Carolina State University	
045952-0481	Mexico	12/2/2036	MX/A/2018/006709	388423	Granted	5/31/2018	12/2/2021	Targeted Mutagenesis of Tobacco Berberine Bridge Enzyme-Like Nucleic Acids	22	Licensed	North Carolina State University	
045952-0709	Mexico	12/2/2036	MX/A/2021/014746		Pending	11/30/2021		Targeted Mutagenesis of Tobacco Berberine Bridge Enzyme-Like Nucleic Acids	22	Licensed	North Carolina State University	
045952-0510	Mozambique	12/2/2036	AP/P/2018/010864		Pending	12/2/2016		Targeted Mutagenesis of Tobacco Berberine Bridge Enzyme-Like Nucleic Acids	22	Licensed	North Carolina State University	
045952-0511	Namibia	12/2/2036	AP/P/2018/010864		Pending	12/2/2016		Targeted Mutagenesis of Tobacco Berberine Bridge Enzyme-Like Nucleic Acids	22	Licensed	North Carolina State University	
045952-0494	New Zealand	12/2/2036	743325		Inactive	6/13/2018		Targeted Mutagenesis of Tobacco Berberine Bridge Enzyme-Like Nucleic Acids	22	Licensed	North Carolina State University	
045952-0482	Nigeria		NG/PT/C/2018/2947		Inactive	6/1/2018		Targeted Mutagenesis of Tobacco Berberine Bridge Enzyme-Like Nucleic Acids	22	Licensed	North Carolina State University	
045952-0447	P.C.T.		PCT/US2016/064758		Inactive	12/2/2016		Targeted Mutagenesis of Tobacco Berberine Bridge Enzyme-Like Nucleic Acids	22	Licensed	North Carolina State University	
045952-0483	Philippines	12/2/2036	1-2018-501162		Inactive	6/1/2018		Targeted Mutagenesis of Tobacco Berberine Bridge Enzyme-Like Nucleic Acids	22	Licensed	North Carolina State University	
045952-0495	Russian Federation		2018123563		Inactive	6/28/2018		Targeted Mutagenesis of Tobacco Berberine Bridge Enzyme-Like Nucleic Acids	22	Licensed	North Carolina State University	
045952-0512	Rwanda	12/2/2036	AP/P/2018/010864		Pending	12/2/2016		Targeted Mutagenesis of Tobacco Berberine Bridge Enzyme-Like Nucleic Acids	22	Licensed	North Carolina State University	
045952-0513	Sao Tome and Principe	12/2/2036	Base PCT/US2016/064758		Pending	12/2/2016		Targeted Mutagenesis of Tobacco Berberine Bridge Enzyme-Like Nucleic Acids	22	Licensed	North Carolina State University	
045952-0514	Sierra Leone	12/2/2036	AP/P/2018/010864		Pending	12/2/2016		Targeted Mutagenesis of Tobacco Berberine Bridge Enzyme-Like Nucleic Acids	22	Licensed	North Carolina State University	
045952-0496	South Africa	12/2/2036	2018/03851		Inactive	6/8/2018		Targeted Mutagenesis of Tobacco Berberine	22	Licensed	North Carolina State University	

									Bridge Enzyme-Like Nucleic Acids				
045952-0493	South Korea	12/2/2036	2018-7018806		Pending	7/2/2018			Targeted Mutagenesis of Tobacco Berberine Bridge Enzyme-Like Nucleic Acids	22	Licensed	North Carolina State University	
045952-0515	Sudan	12/2/2036	AP/P/2018/010864		Pending	12/2/2016			Targeted Mutagenesis of Tobacco Berberine Bridge Enzyme-Like Nucleic Acids	22	Licensed	North Carolina State University	
045952-0517	Tanzania	12/2/2036	AP/P/2018/010864		Pending	12/2/2016			Targeted Mutagenesis of Tobacco Berberine Bridge Enzyme-Like Nucleic Acids	22	Licensed	North Carolina State University	
045952-0518	Uganda	12/2/2036	AP/P/2018/010864		Pending	12/2/2016			Targeted Mutagenesis of Tobacco Berberine Bridge Enzyme-Like Nucleic Acids	22	Licensed	North Carolina State University	
045952-0497	Ukraine		a201807116		Inactive	6/25/2018			Targeted Mutagenesis of Tobacco Berberine Bridge Enzyme-Like Nucleic Acids	22	Licensed	North Carolina State University	
045952-0446	United States of America		62/263151		Inactive	12/4/2015			TARGETED MUTAGENESIS OF TOBACCO BERBERINE BRIDGE ENZYME-LIKE NUCLEIC ACIDS	22	Licensed	North Carolina State University	
045952-0485	United States of America	12/2/2036	15/780354	10590429	Granted	5/31/2018	3/17/2020		Targeted Mutagenesis of Tobacco Berberine Bridge Enzyme-Like Nucleic Acids	22	Licensed	North Carolina State University	
045952-0624	United States of America	12/2/2036	16/778780	11214813	Granted	1/31/2020	1/4/2022		TARGETED MUTAGENESIS OF TOBACCO BERBERINE BRIDGE ENZYME-LIKE NUCLEIC ACIDS	22	Licensed	North Carolina State University	
045952-0713	United States of America		17/532438		Pending	11/22/2021			TARGETED MUTAGENESIS OF TOBACCO BERBERINE BRIDGE ENZYME-LIKE NUCLEIC ACIDS	22	Licensed	North Carolina State University	
045952-0519	Zambia	12/2/2036	AP/P/2018/010864		Pending	12/2/2016			Targeted Mutagenesis of Tobacco Berberine Bridge Enzyme-Like Nucleic Acids	22	Licensed	North Carolina State University	
045952-0520	Zimbabwe	12/2/2036	AP/P/2018/010864		Pending	12/2/2016			Targeted Mutagenesis of Tobacco Berberine Bridge Enzyme-Like Nucleic Acids	22	Licensed	North Carolina State University	
045952-0537	ARIPO	8/31/2037	AP/P/2019/011402		Inactive	3/7/2019			TRANSCRIPTION FACTOR NIERF241 AND	23	Owned		

								METHODS OF USING THE SAME				
045952-0538	Australia	8/31/2037	2017318597		Inactive	2/28/2019		TRANSCRIPTION FACTOR NIERF241 AND METHODS OF USING THE SAME	23	Owned		
045952-0537/BW	Botswana	8/31/2037	AP/P/2019/011402		Inactive	8/31/2017		TRANSCRIPTION FACTOR NIERF241 AND METHODS OF USING THE SAME	23	Owned		
045952-0539	Brazil	8/31/2037	112019004010-2		Inactive	2/27/2019		TRANSCRIPTION FACTOR NIERF241 AND METHODS OF USING THE SAME	23	Owned		
045952-0540	Canada	8/31/2037	3034473		Inactive	2/20/2019		TRANSCRIPTION FACTOR NIERF241 AND METHODS OF USING THE SAME	23	Owned		
045952-0541	China		2017800648088		Inactive	4/19/2019		TRANSCRIPTION FACTOR NIERF241 AND METHODS OF USING THE SAME	23	Owned		
045952-0537/SZ	Eswatini		AP/P/2019/011402		Inactive	8/31/2017		TRANSCRIPTION FACTOR NIERF241 AND METHODS OF USING THE SAME	23	Owned		
045952-0542	European Patent Office	8/31/2037	17847533.1		Inactive	3/26/2019		TRANSCRIPTION FACTOR NIERF241 AND METHODS OF USING THE SAME	23	Owned		
045952-0537/GM	Gambia	8/31/2037	AP/P/2019/011402		Inactive	8/31/2017		TRANSCRIPTION FACTOR NIERF241 AND METHODS OF USING THE SAME	23	Owned		
045952-0537/GH	Ghana	8/31/2037	AP/P/2019/011402		Inactive	8/31/2017		TRANSCRIPTION FACTOR NIERF241 AND METHODS OF USING THE SAME	23	Owned		
045952-0544	India		201947013097		Inactive	4/2/2019		TRANSCRIPTION FACTOR NIERF241 AND METHODS OF USING THE SAME	23	Owned		
045952-0543	Indonesia		PID201902764		Inactive	3/29/2019		TRANSCRIPTION FACTOR NIERF241 AND METHODS OF USING THE SAME	23	Owned		
045952-0554	Japan		2019-512605		Inactive	2/27/2019		TRANSCRIPTION FACTOR	23	Owned		

									NIERF241 AND METHODS OF USING THE SAME				
045952-0537/KE	Kenya	8/31/2037	AP/P/2019/011402		Inactive	8/31/2017			TRANSCRIPTION FACTOR NIERF241 AND METHODS OF USING THE SAME	23	Owned		
045952-0537/LS	Lesotho	8/31/2037	AP/P/2019/011402		Inactive	8/31/2017			TRANSCRIPTION FACTOR NIERF241 AND METHODS OF USING THE SAME	23	Owned		
045952-0537/LR	Liberia	8/31/2037	AP/P/2019/011402		Inactive	8/31/2017			TRANSCRIPTION FACTOR NIERF241 AND METHODS OF USING THE SAME	23	Owned		
045952-0537/MW	Malawi	8/31/2037	AP/P/2019/011402		Inactive	8/31/2017			TRANSCRIPTION FACTOR NIERF241 AND METHODS OF USING THE SAME	23	Owned		
045952-0547	Malaysia		PI2019001086		Inactive	2/27/2019			TRANSCRIPTION FACTOR NIERF241 AND METHODS OF USING THE SAME	23	Owned		
045952-0546	Mexico		MX/a/2019/002298		Inactive	2/26/2019			TRANSCRIPTION FACTOR NIERF241 AND METHODS OF USING THE SAME	23	Owned		
045952-0537/MZ	Mozambique	8/31/2037	AP/P/2019/011402		Inactive	8/31/2017			TRANSCRIPTION FACTOR NIERF241 AND METHODS OF USING THE SAME	23	Owned		
045952-0537/NA	Namibia	8/31/2037	AP/P/2019/011402		Inactive	8/31/2017			TRANSCRIPTION FACTOR NIERF241 AND METHODS OF USING THE SAME	23	Owned		
045952-0549	New Zealand	8/31/2037	751159		Inactive	2/28/2019			TRANSCRIPTION FACTOR NIERF241 AND METHODS OF USING THE SAME	23	Owned		
045952-0548	Nigeria	8/31/2037	F/P/2019/00024	F/P/2019/24	Inactive	2/20/2019	3/25/2019		TRANSCRIPTION FACTOR NIERF241 AND METHODS OF USING THE SAME	23	Owned		
045952-0459	P.C.T.		PCT/US2017/049555		Inactive	8/31/2017			TRANSCRIPTION FACTOR NIERF241 AND METHODS OF USING THE SAME	23	Owned		

045952-0550	Philippines	8/31/2037	1-2019-500398		Inactive	2/26/2019		TRANSCRIPTION FACTOR NIERF241 AND METHODS OF USING THE SAME	23	Owned		
045952-0551	Russian Federation		2019106462		Inactive	3/6/2019		TRANSCRIPTION FACTOR NIERF241 AND METHODS OF USING THE SAME	23	Owned		
045952-0537/RW	Rwanda	8/31/2037	AP/P/2019/011402		Inactive	8/31/2017		TRANSCRIPTION FACTOR NIERF241 AND METHODS OF USING THE SAME	23	Owned		
045952-0537/ST	Sao Tome and Principe		AP/P/2019/011402		Inactive	8/31/2017		TRANSCRIPTION FACTOR NIERF241 AND METHODS OF USING THE SAME	23	Owned		
045952-0537/SL	Sierra Leone		AP/P/2019/011402		Inactive	8/31/2017		TRANSCRIPTION FACTOR NIERF241 AND METHODS OF USING THE SAME	23	Owned		
045952-0553	South Africa	8/31/2037	2019/01473		Inactive	3/8/2019		TRANSCRIPTION FACTOR NIERF241 AND METHODS OF USING THE SAME	23	Owned		
045952-0545	South Korea		10-2019-7007546		Inactive	3/14/2019		TRANSCRIPTION FACTOR NIERF241 AND METHODS OF USING THE SAME	23	Owned		
045952-0537/SD	Sudan	8/31/2037	AP/P/2019/011402		Inactive	8/31/2017		TRANSCRIPTION FACTOR NIERF241 AND METHODS OF USING THE SAME	23	Owned		
045952-0460	Taiwan		106130192		Inactive	9/4/2017		TRANSCRIPTION FACTOR NIERF241 AND METHODS OF USING THE SAME	23	Owned		
045952-0537/TZ	Tanzania	8/31/2037	AP/P/2019/011402		Inactive	8/31/2017		TRANSCRIPTION FACTOR NIERF241 AND METHODS OF USING THE SAME	23	Owned		
045952-0537/UG	Uganda	8/31/2037	AP/P/2019/011402		Inactive	8/31/2017		TRANSCRIPTION FACTOR NIERF241 AND METHODS OF USING THE SAME	23	Owned		
045952-0552	Ukraine		201901974		Inactive	2/27/2019		TRANSCRIPTION FACTOR NIERF241 AND METHODS	23	Owned		

								OF USING THE SAME				
045952-0423	United States of America		62/382895		Inactive	9/2/2016		TRANSCRIPTION FACTOR NIERF241 AND METHODS OF USING THE SAME	23	Owned		
045952-0536	United States of America		16/329755		Inactive	2/28/2019		TRANSCRIPTION FACTOR NIERF241 AND METHODS OF USING THE SAME	23	Owned		
045952-0648	United States of America		17/138688		Pending	12/30/2020		TRANSCRIPTION FACTOR NIERF241 AND METHODS OF USING THE SAME	23	Owned		
045952-0537/ZM	Zambia	8/31/2037	AP/P/2019/011402		Inactive	8/31/2017		TRANSCRIPTION FACTOR NIERF241 AND METHODS OF USING THE SAME	23	Owned		
045952-0537/ZW	Zimbabwe	8/31/2037	AP/P/2019/011402		Inactive	8/31/2017		TRANSCRIPTION FACTOR NIERF241 AND METHODS OF USING THE SAME	23	Owned		
045952-0557	Australia	9/14/2037	2017332638		Pending	3/19/2019		TRICHOME SPECIFIC PROMOTERS FOR THE MANIPULATION OF CANNABINOIDS AND OTHER COMPOUNDS IN GLANDULAR TRICHOMES	24	Owned		
045952-0786	Bosnia and Herzegovina	9/14/2037	222080590		Pending	9/14/2017		TRICHOME SPECIFIC PROMOTERS FOR THE MANIPULATION OF CANNABINOIDS AND OTHER COMPOUNDS IN GLANDULAR TRICHOMES	24	Owned		
045952-0573	Bosnia and Herzegovina	9/14/2037			Not yet filed			TRICHOME SPECIFIC PROMOTERS FOR THE MANIPULATION OF CANNABINOIDS AND OTHER COMPOUNDS IN GLANDULAR TRICHOMES	24	Owned		
045952-0558	Canada	9/14/2037	3036968		Pending	3/14/2019		TRICHOME SPECIFIC PROMOTERS FOR THE MANIPULATION OF CANNABINOIDS AND OTHER COMPOUNDS IN GLANDULAR TRICHOMES	24	Owned		

045952-0559	China	9/14/2037	201780070846.4		Pending	5/16/2019		TRICHOME SPECIFIC PROMOTERS FOR THE MANIPULATION OF CANNABINOIDS AND OTHER COMPOUNDS IN GLANDULAR TRICHOMES	24	Owned		
045952-0561	Eurasian Pat. Convention	9/14/2037	201990549	041426	Granted	3/20/2019	10/21/2022	TRICHOME SPECIFIC PROMOTERS FOR THE MANIPULATION OF CANNABINOIDS AND OTHER COMPOUNDS IN GLANDULAR TRICHOMES	24	Owned		
045952-0764	Eurasian Pat. Convention	9/14/2037	202292309		Pending	9/8/2022		TRICHOME SPECIFIC PROMOTERS FOR THE MANIPULATION OF CANNABINOIDS AND OTHER COMPOUNDS IN GLANDULAR TRICHOMES	24	Owned		
045952-0560	European Patent Office	9/14/2037	17853690.0		Pending	4/8/2019		TRICHOME SPECIFIC PROMOTERS FOR THE MANIPULATION OF CANNABINOIDS AND OTHER COMPOUNDS IN GLANDULAR TRICHOMES	24	Owned		
045952-0708	European Patent Office	9/14/2037	22208059.0		Pending	11/17/2022		TRICHOME SPECIFIC PROMOTERS FOR THE MANIPULATION OF CANNABINOIDS AND OTHER COMPOUNDS IN GLANDULAR TRICHOMES	24	Owned		
045952-0623	Hong Kong	9/14/2037	62020001431.9		Pending	1/14/2020		TRICHOME SPECIFIC PROMOTERS FOR THE MANIPULATION OF CANNABINOIDS AND OTHER COMPOUNDS IN GLANDULAR TRICHOMES	24	Owned		
045952-0562	Japan	9/14/2037	2019-515321		Pending	3/18/2019		TRICHOME SPECIFIC PROMOTERS FOR THE MANIPULATION OF CANNABINOIDS AND OTHER COMPOUNDS IN GLANDULAR TRICHOMES	24	Owned		

045952-0770	Japan	9/14/2037	2022-144986		Pending	9/13/2022		TRICHOME SPECIFIC PROMOTERS FOR THE MANIPULATION OF CANNABINOIDS AND OTHER COMPOUNDS IN GLANDULAR TRICHOMES	24	Owned		
045952-0563	Mexico	9/14/2037	MX/a/2019/003063		Pending	3/15/2019		TRICHOME SPECIFIC PROMOTERS FOR THE MANIPULATION OF CANNABINOIDS AND OTHER COMPOUNDS IN GLANDULAR TRICHOMES	24	Owned		
045952-0789	Moldova				Not yet filed			TRICHOME SPECIFIC PROMOTERS FOR THE MANIPULATION OF CANNABINOIDS AND OTHER COMPOUNDS IN GLANDULAR TRICHOMES	24	Owned		
045952-0576	Moldova				Not yet filed			TRICHOME SPECIFIC PROMOTERS FOR THE MANIPULATION OF CANNABINOIDS AND OTHER COMPOUNDS IN GLANDULAR TRICHOMES	24	Owned		
045952-0787	Montenegro	9/14/2037	22208059.0		Pending	9/14/2017		TRICHOME SPECIFIC PROMOTERS FOR THE MANIPULATION OF CANNABINOIDS AND OTHER COMPOUNDS IN GLANDULAR TRICHOMES	24	Owned		
045952-0574	Montenegro				Not yet filed			TRICHOME SPECIFIC PROMOTERS FOR THE MANIPULATION OF CANNABINOIDS AND OTHER COMPOUNDS IN GLANDULAR TRICHOMES	24	Owned		
045952-0788	Morocco	9/14/2037	22208059.0		Pending	9/14/2017		TRICHOME SPECIFIC PROMOTERS FOR THE MANIPULATION OF CANNABINOIDS AND OTHER COMPOUNDS IN GLANDULAR TRICHOMES	24	Owned		

045952-0575	Morocco				Not yet filed				TRICHOME SPECIFIC PROMOTERS FOR THE MANIPULATION OF CANNABINOIDS AND OTHER COMPOUNDS IN GLANDULAR TRICHOMES	24	Owned		
045952-0458	P.C.T.		PCT/US2017/051493		Inactive	9/14/2017			TRICHOME SPECIFIC PROMOTERS FOR THE MANIPULATION OF CANNABINOIDS AND OTHER COMPOUNDS IN GLANDULAR TRICHOMES	24	Owned		
045952-0564	Singapore	9/14/2037	11201902411	11201902411S	Granted	3/18/2019	8/6/2021		TRICHOME SPECIFIC PROMOTERS FOR THE MANIPULATION OF CANNABINOIDS AND OTHER COMPOUNDS IN GLANDULAR TRICHOMES	24	Owned		
045952-0619	Singapore	9/14/2037	10201913280U		Pending	12/26/2019			TRICHOME SPECIFIC PROMOTERS FOR THE MANIPULATION OF CANNABINOIDS AND OTHER COMPOUNDS IN GLANDULAR TRICHOMES	24	Owned		
045952-0461	Taiwan		106132189		Inactive	9/20/2017			TRICHOME SPECIFIC PROMOTERS FOR THE MANIPULATION OF CANNABINOIDS AND OTHER COMPOUNDS IN GLANDULAR TRICHOMES	24	Owned		
045952-0424	United States of America		62/397212		Inactive	9/20/2016			TRICHOME SPECIFIC PROMOTERS FOR CANNABIS PLANTS AND METHODS OF USING THE SAME	24	Owned		
045952-0556	United States of America	9/14/2037	16/334284	10787674	Granted	3/18/2019	9/29/2020		TRICHOME SPECIFIC PROMOTERS FOR THE MANIPULATION OF CANNABINOIDS AND OTHER COMPOUNDS IN GRANDULAR TRICHOMES	24	Owned		
045952-0631	United States of America		16/987078		Pending	8/6/2020			TRICHOME SPECIFIC PROMOTERS FOR THE MANIPULATION OF CANNABINOIDS AND	24	Owned		

								OTHER COMPOUNDS IN GLANDULAR TRICHOMES				
045952-0486	P.C.T.		PCT/US2018/035058		Inactive	5/30/2018		GENOME EDITING METHODS FOR PRODUCING LOW-NICOTINE TOBACCO PRODUCTS	25	Owned		
045952-0425	United States of America		62/513073		Inactive	5/31/2017		GENOME EDITING METHODS FOR PRODUCING LOW-NICOTINE TOBACCO PRODUCTS	25	Owned		
045952-0616	United States of America		16/617951		Inactive	11/27/2019		GENOME EDITING METHODS FOR PRODUCING LOW-NICOTINE TOBACCO PRODUCTS	25	Owned		
045952-0426	United States of America		62/508877		Inactive	5/19/2017		DOMINANT-NEGATIVE GENETIC MANIPULATION TO MAKE LOW-NICOTINE TOBACCO PRODUCTS	26	Owned		
045952-0475	United States of America		15/983704		Inactive	5/18/2018		DOMINANT-NEGATIVE GENETIC MANIPULATION TO MAKE LOW-NICOTINE TOBACCO PRODUCTS	26	Owned		
045952-0645	United States of America		17/132355		Pending	12/23/2020		DOMINANT-NEGATIVE GENETIC MANIPULATION TO MAKE LOW-NICOTINE TOBACCO PRODUCTS	26	Owned		
045952-0716	Canada	6/30/2040	3145253		Pending	12/23/2021		Cannabis Terpene Synthase Promoters for the Manipulation of Terpene Biosynthesis in Trichomes	27	Owned		
045952-0717	European Patent Office	6/30/2040	20835620.4		Pending	1/12/2022		Cannabis Terpene Synthase Promoters for the Manipulation of Terpene Biosynthesis in Trichomes	27	Owned		
045952-0633	P.C.T.		PCT/US2020/040339		Inactive	6/30/2020		Cannabis Terpene Synthase Promoters for the Manipulation of Terpene Biosynthesis in Trichomes	27	Owned		
045952-0582	United States of America		62/869353		Inactive	7/1/2019		Cannabis Terpene Synthase Promoters for the Manipulation of Terpene Biosynthesis in Trichomes	27	Owned		

045952-0715	United States of America		17/620971		Pending	12/20/2021		Cannabis Terpene Synthase Promoters for the Manipulation of Terpene Biosynthesis in Trichomes	27	Owned		
045952-0721	Brazil	8/4/2040	1120220019637		Pending	2/2/2022		TRANSCRIPTION FACTOR NIERF221 AND METHODS OF USING THE SAME	28	Co-Owned		University of Virginia Patent Foundation
045952-0719	Canada	8/4/2040	3149634		Pending	2/2/2022		TRANSCRIPTION FACTOR NIERF221 AND METHODS OF USING THE SAME	28	Co-Owned		University of Virginia Patent Foundation
045952-0723	China	8/4/2040	202080069789.X		Pending	4/1/2022		TRANSCRIPTION FACTOR NIERF221 AND METHODS OF USING THE SAME	28	Co-Owned		University of Virginia Patent Foundation
045952-0722	European Patent Office	8/4/2040	20849092.0		Pending	2/22/2022		TRANSCRIPTION FACTOR NIERF221 AND METHODS OF USING THE SAME	28	Co-Owned		University of Virginia Patent Foundation
045952-0724	Japan	8/4/2040	2022-507318		Pending	2/3/2022		TRANSCRIPTION FACTOR NIERF221 AND METHODS OF USING THE SAME	28	Co-Owned		University of Virginia Patent Foundation
045952-0720	Mexico	8/4/2040	MX/a/2022/001491		Pending	2/3/2022		TRANSCRIPTION FACTOR NIERF221 AND METHODS OF USING THE SAME	28	Co-Owned		University of Virginia Patent Foundation
045952-0634	P.C.T.		PCT/US2020/044831		Inactive	8/4/2020		TRANSCRIPTION FACTOR NIERF221 AND METHODS OF USING THE SAME	28	Co-Owned		University of Virginia Patent Foundation
045952-0725	South Korea	8/4/2040	10-2022-7006933		Pending	2/28/2022		TRANSCRIPTION FACTOR NIERF221 AND METHODS OF USING THE SAME	28	Co-Owned		University of Virginia Patent Foundation
045952-0581	United States of America		62/882860		Inactive	8/5/2019		TRANSCRIPTION FACTOR NIERF221 AND METHODS OF USING THE SAME	28	Co-Owned		University of Virginia Patent Foundation
045952-0726	United States of America		17/632652		Pending	2/3/2022		TRANSCRIPTION FACTOR NIERF221 AND METHODS OF USING THE SAME	28	Co-Owned		University of Virginia Patent Foundation
045952-0745	ARIPO	1/8/2041	AP/P/2022/014163		Pending	6/22/2022		A GENETIC APPROACH FOR ACHIEVING ULTRA LOW NICOTINE	29	Co-Owned		North Carolina State University

								CONTENT IN TOBACCO				
045952-0746	Australia	1/8/2041	2021205499		Pending	6/9/2022		A GENETIC APPROACH FOR ACHIEVING ULTRA LOW NICOTINE CONTENT IN TOBACCO	29	Co-Owned		North Carolina State University
045952-0747	Brazil	1/8/2041	112022013529-7		Pending	7/7/2022		A GENETIC APPROACH FOR ACHIEVING ULTRA LOW NICOTINE CONTENT IN TOBACCO	29	Co-Owned		North Carolina State University
045952-0748	Canada	1/8/2041	3165518		Pending	6/20/2022		A GENETIC APPROACH FOR ACHIEVING ULTRA LOW NICOTINE CONTENT IN TOBACCO	29	Co-Owned		North Carolina State University
045952-0749	China	1/8/2041	202180008646.2		Pending	7/8/2022		A GENETIC APPROACH FOR ACHIEVING ULTRA LOW NICOTINE CONTENT IN TOBACCO	29	Co-Owned		North Carolina State University
045952-0750	European Patent Office	1/8/2041	21738001.3		Pending	6/24/2022		A GENETIC APPROACH FOR ACHIEVING ULTRA LOW NICOTINE CONTENT IN TOBACCO	29	Co-Owned		North Carolina State University
045952-0791	Hong Kong				Not yet filed			A GENETIC APPROACH FOR ACHIEVING ULTRA LOW NICOTINE CONTENT IN TOBACCO	29	Co-Owned		North Carolina State University
045952-0751	Japan	1/8/2041	2022-542214		Pending	7/8/2022		A GENETIC APPROACH FOR ACHIEVING ULTRA LOW NICOTINE CONTENT IN TOBACCO	29	Co-Owned		North Carolina State University
045952-0752	Mexico	1/8/2041	MX/a/2022/008356		Pending	7/5/2022		A GENETIC APPROACH FOR ACHIEVING ULTRA LOW NICOTINE CONTENT IN TOBACCO	29	Co-Owned		North Carolina State University
045952-0753	New Zealand	1/8/2041	789243		Pending	6/9/2022		A GENETIC APPROACH FOR ACHIEVING ULTRA LOW NICOTINE CONTENT IN TOBACCO	29	Co-Owned		North Carolina State University
045952-0646	P.C.T.		PCT/US2021/012742		Inactive	1/8/2021		A GENETIC APPROACH FOR ACHIEVING ULTRA LOW NICOTINE CONTENT IN TOBACCO	29	Co-Owned		North Carolina State University
045952-0754	Russian Federation	1/8/2041	2022119736		Pending	7/19/2022		A GENETIC APPROACH FOR ACHIEVING ULTRA LOW NICOTINE CONTENT IN TOBACCO	29	Co-Owned		North Carolina State University
045952-0617	United States of		62/958505		Inactive	1/8/2020		A GENETIC APPROACH FOR	29	Co-Owned		North Carolina State

	America							ACHIEVING ULTRA LOW NICOTINE CONTENT IN TOBACCO				University
045952-0755	United States of America		17/785153		Pending	6/14/2022		GENETIC APPROACH FOR ACHIEVING ULTRA LOW NICOTINE CONTENT IN TOBACCO	29	Co-Owned		North Carolina State University
045952-0771	P.C.T.		PCT/US2022/075732		Pending	8/31/2022		Novel Molecular Markers for Sex Determination in Cannabis	30	Owned (KeyGene Assigned to 22nd Century)		
045952-0644	United States of America		63/239843		Inactive	9/1/2021		Novel Molecular Markers for Sex Determination in Cannabis	30	Owned (KeyGene Assigned to 22nd Century)		
045952-0785	United States of America		63/379804		Pending	10/17/2022		METHODS FOR PRODUCING LOW NICOTINE TOBACCO	31	Licensed		North Carolina State University
045952-0710	United States of America		63/301111		Pending	1/20/2022		METHODS FOR PRODUCING LOW NICOTINE TOBACCO	31	Licensed		North Carolina State University
045952-0706	United States of America		63/345808		Pending	5/25/2022		Method and Apparatus to Identify and/or Quantify Cannabinoids	32	Owned (KeyGene Inventors Assigned to 22nd Century)		
045952-0759	Australia	9/18/2038	2018337737		Pending	3/16/2020		CELL-BASED ASSAY FOR QUANTIFYING THE POTENCY AND EFFICACY OF CANNABINOIDS AND/OR TERPENOIDS, AND METHODS OF USE THEREOF	33	Licensed		CannaMetric
045952-0760	Canada	9/18/2038	3076199		Pending	3/17/2020		CELL-BASED ASSAY FOR QUANTIFYING THE POTENCY AND EFFICACY OF CANNABINOIDS AND/OR TERPENOIDS, AND METHODS OF USE THEREOF	33	Licensed		CannaMetric
045952-0761	European Patent Office	9/18/2038	18859704.1		Pending	4/16/2020		CELL-BASED ASSAY FOR QUANTIFYING THE POTENCY AND EFFICACY OF CANNABINOIDS AND/OR TERPENOIDS, AND METHODS OF USE THEREOF	33	Licensed		CannaMetric
045952-0762	Israel	9/18/2038	273345		Pending	3/17/2020		CELL-BASED ASSAY FOR QUANTIFYING THE POTENCY AND	33	Licensed		CannaMetric

								EFFICACY OF CANNABINOIDS AND/OR TERPENOIDS, AND METHODS OF USE THEREOF				
045952-0757	P.C.T.		PCT/US2018/051569		Inactive	9/18/2018		CELL-BASED ASSAY FOR QUANTIFYING THE POTENCY AND EFFICACY OF CANNABINOIDS AND/OR TERPENOIDS, AND METHODS OF USE THEREOF	33	Licensed	CannaMetric	
045952-0756	United States of America		62/560646		Inactive	9/19/2017		CELL-BASED ASSAY FOR QUANTIFYING THE POTENCY AND EFFICACY OF CANNABINOIDS AND/OR TERPENOIDS, AND METHODS OF USE THEREOF	33	Licensed	CannaMetric	
045952-0758	United States of America		16/648057		Pending	3/17/2020		CELL-BASED ASSAY FOR QUANTIFYING THE POTENCY AND EFFICACY OF CANNABINOIDS AND/OR TERPENOIDS, AND METHODS OF USE THEREOF	33	Licensed	CannaMetric	
045952-0766	United States of America				Not yet filed			G-ALPHA PROTEIN CHIMERAS TAILORED TO LINK CNR1 AND CNR2 RECEPTORS TO CALCIUM SIGNALING	34	Licensed	CannaMetric	
045952-0768	United States of America				Not yet filed			CANNABIS PLANT LINE/CLONE EXHIBITING STABLE HIGH CBD	35	Owned		
045952-0767	United States of America				Not yet filed			CANNABIS PLANT LINE/CLONE EXHIBITING STABLE LOW THC (ABACUS1_9)	35A	Owned		
045952-0781	United States of America		63/423451		Pending	11/7/2022		CANNABIS PLANT NAMED XXF1	35B	Owned		
045952-0778	United States of America		63/423428		Pending	11/7/2022		CANNABIS PLANT NAMED XXG1	35C	Owned		
045952-0780	United States of America		63/423449		Pending	11/7/2022		CANNABIS PLANT NAMED XXH1	35D	Owned		

045952-0779	United States of America		63/423439		Pending	11/7/2022		CANNABIS PLANT NAMED XX11	35E	Owned		
045952-0774	United States of America		63/423399		Pending	11/7/2022		CANNABIS PLANT NAMED XXA1	35F	Owned		
045952-0776	United States of America		63/423412		Pending	11/7/2022		CANNABIS PLANT NAMED XXB1	35G	Owned		
045952-0775	United States of America		63/423403		Pending	11/7/2022		CANNABIS PLANT NAMED XXC1	35H	Owned		
045952-0773	United States of America		63/423382		Pending	11/7/2022		CANNABIS PLANT NAMED XXD1	35I	Owned		

EXHIBIT C

Trademarks

Country	Status	App. No.	Application Date	Reg. No.	Registration Date	Trademark	Goods
Albania	Pending	AL/T/2022/001133	12/16/2022			PINNACLE	CLASS 34: Cigarettes, filtered cigars, moist snuff.
Albania	Pending	AL/T/2022/505	6/3/2022			VLN	CLASS 34: Cigarettes; tobacco; roll- your-own tobacco; cigars; cigarette and cigar rolling papers and tubes.
Canada	Pending	2228816	12/16/2022			PINNACLE	CLASS 34: Cigarettes, Filtered cigars, Moist Snuff.
Canada	Pending	2167466	2/17/2022			VLN	CLASS 34: Cigarettes; tobacco; roll- your-own tobacco; cigars; cigarette and cigar rolling papers and tubes.
China	Pending	68912791	12/19/2022			PINNACLE	CLASS 34: Cigarettes, Filtered cigars, Moist Snuff.
China	Registered	62696092	2/18/2022	62696092	8/7/2022	VLN	CLASS 34: Cigarettes; tobacco; roll- your-own tobacco; cigars and tubes; cigarette paper.
European Union	Pending	018812340	12/17/2022			PINNACLE	CLASS 34: Cigarettes, filtered cigars, moist snuff.
European Union	Pending	018811614	12/18/2022			VLN	CLASS 34: Cigarettes; tobacco; roll- your-own tobacco; cigars; cigarette and cigar rolling papers and tubes.
Hong Kong	Pending	306132915	12/16/2022			PINNACLE	CLASS 34: Cigarettes, Filtered cigars, Moist Snuff.
Hong Kong	Registered	306070608	9/28/2022	306070608	2/9/2023	VLN KING	CLASS 34: Cigarettes; tobacco; roll- your-own tobacco; cigars; cigarette and cigar rolling papers and tubes.

Hong Kong	Registered	306070617	9/28/2022	306070617	2/9/2023	VLN MENTHOL KING	CLASS 34: Cigarettes; tobacco; roll- your-own tobacco; cigars; cigarette and cigar rolling papers and tubes.
Israel	Pending	359208	12/18/2022			PINNACLE	CLASS 34: Cigarettes, filtered cigars, Moist Snuff; all included in Class 34.
Israel	Registered	351757	5/8/2022	351757	1/2/2023	VLN	CLASS 34: Cigarettes; tobacco; roll- your-own tobacco; cigars; cigarette and cigar rolling papers and tubes; all included in Class 34.
Japan	Pending	2022-144299	12/19/2022			PINNACLE	CLASS 34: Cigarettes, Filtered cigars, Moist Snuff.
Japan	Registered	2022-018451	2/18/2022	6598283	8/8/2022	VLN	CLASS 34: Cigarettes; Tobacco; Roll- your-own tobacco; Cigars; Cigarette and cigar rolling papers and tubes; Smokers' articles.
Malaysia	Pending	TM2022034296	12/20/2022			PINNACLE	CLASS 34: Cigarettes, Filtered cigars, Moist Snuff.
Malaysia	Pending	TM2022011544	5/10/2022			VLN	CLASS 34: Cigarettes; tobacco; roll- your-own tobacco; cigars; cigarette and cigar rolling papers and tubes.
Mexico	Pending	2865201	12/16/2022			PINNACLE	CLASS 34: Cigarettes, Filtered cigars, Moist Snuff.
Mexico	Registered	2099414	9/13/2018	1950701	11/23/2018	VLN	CLASS 34: Cigarettes; tobacco; roll- your-own tobacco; cigars; cigarette and cigar rolling papers and tubes.
Saudi Arabia	Pending	392369	12/20/2022			PINNACLE	CLASS 34: Cigarettes,

							cigarette filters, snuff.
South Korea	Pending	40-2022-0231354	12/16/2022			PINNACLE	CLASS 34: Cigarettes, Filtered cigars, Moist Snuff.
South Korea	Registered	40-2018-0130065	9/17/2018	40-1509804	8/13/2019	VLN	CLASS 34: Cigarettes; tobacco; roll-your-own tobacco; cigars; cigarette and cigar rolling papers and tubes.
Switzerland	Pending	16299/2022	12/19/2022			PINNACLE	CLASS 34: Cigarettes, Filtered cigars, Moist Snuff.; CLASS 34: Zigaretten, Filterzigarren, feuchter Schnupftabak.
Switzerland	Registered	09122/2019	7/8/2019	743231	2/20/2020	VLN	CLASS 34: Cigarettes; tobacco; roll-your-own tobacco; cigars; cigarette and cigar rolling papers and tubes.; CLASS 34: Zigaretten; Tabak; Tabak zum Selberdrehen oder -rollen; Zigarren; Papiere und Hülsen zum Drehen von Zigaretten und Zigarren.
Taiwan	Pending	111090774	12/16/2022			PINNACLE	CLASS 34: Cigarettes, Filtered cigars, Moist Snuff.
Taiwan	Registered	111031597	5/6/2022	02273086	1/1/2023	VLN	CLASS 34: Cigarettes; tobacco; roll-your-own tobacco; cigars; cigarette and cigar rolling papers and tubes.
United Arab Emirates	Pending	389136	12/20/2022			PINNACLE	CLASS 34: Cigarettes, Filtered cigars, Moist Snuff.
United Arab Emirates	Pending	382522	9/1/2022			VLN	CLASS 34: Cigarettes; tobacco; roll-your-own tobacco; cigars; cigarette and cigar rolling papers and tubes.

United States of America	Registered	87/080568	6/22/2016	5219829	6/6/2017	BACK PORCH	CLASS 34: Filtered cigars; tobacco.
United States of America	Pending	97/441839	6/3/2022			HELPS YOU SMOKE LESS	CLASS 34: Cigarettes; tobacco; roll-your-own tobacco; cigars; cigarette and cigar rolling papers and tubes.
United States of America	Pending	97/128690	11/17/2021			MAGIC	CLASS 34: Cigarettes; tobacco.
United States of America	Registered	85/157109	10/20/2010	4576149	7/29/2014	MOONLIGHT	CLASS 34: Cigarettes; tobacco.
United States of America	Registered	86/723845	8/13/2015	5561408	9/11/2018	PARE	CLASS 34: Cigarettes; tobacco; roll-your-own tobacco; cigars; cigarette and cigar rolling papers and tubes.
United States of America	Pending	88/664052	10/22/2019			PINNACLE	CLASS 34: Cigarettes.
United States of America	Pending	97/466081	6/20/2022			PINNACLE	CLASS 34: Cigarettes, Filtered cigars, Moist Snuff.
United States of America	Registered	85/157080	10/20/2010	4071725	12/13/2011	RED SUN	CLASS 34: Cigarettes; tobacco.
United States of America	Registered	85/157096	10/20/2010	4036259	10/4/2011	SPECTRUM	CLASS 34: Cigarettes; tobacco.
United States of America	Registered	87/092802	7/5/2016	5247638	7/18/2017	TURTLE CREEK	CLASS 34: Filtered cigars; tobacco.
United States of America	Registered	87/958907	6/12/2018	5822999	7/30/2019	VLN	CLASS 34: Cigarettes; tobacco; roll-your-own tobacco; cigars; cigarette and cigar rolling papers and tubes.