U.S. PATENT LITERATURE SURVEY OF AGROBACTERIUM-MEDIATED TRANSFORMATION OF SWEET POTATO (*Ipomoea batatas*)

For:

Public Intellectual Property Resource for Agriculture

(PIPRA)

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CA

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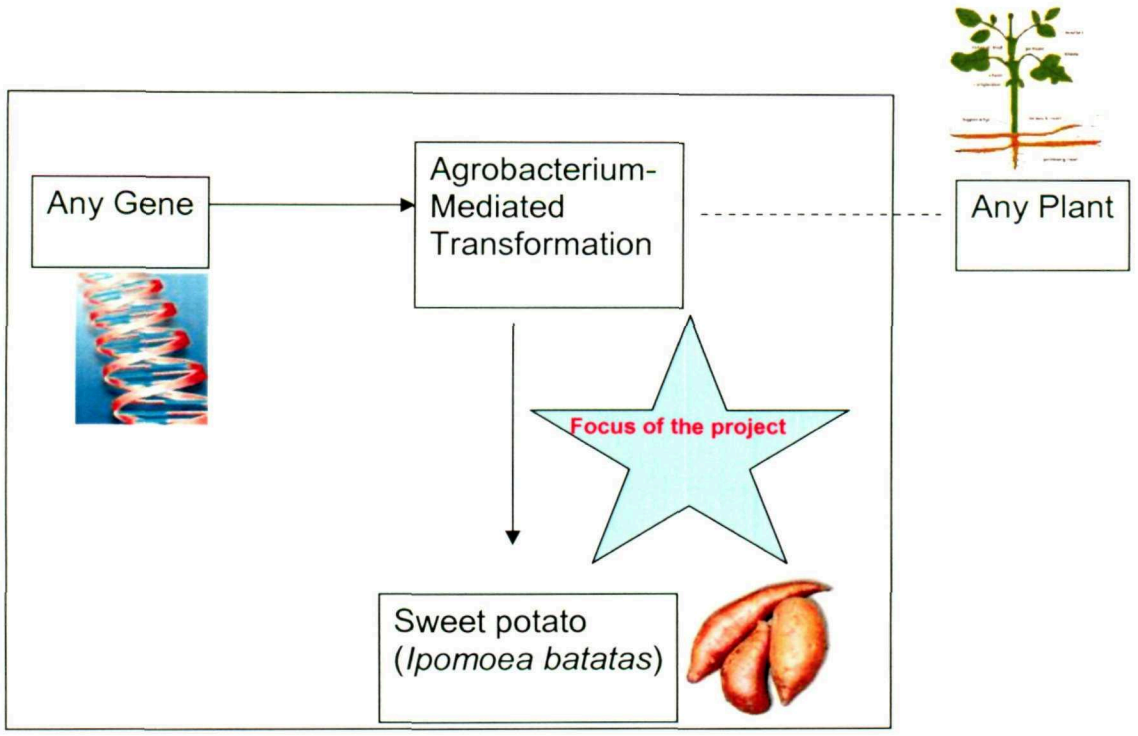
14 May 2007

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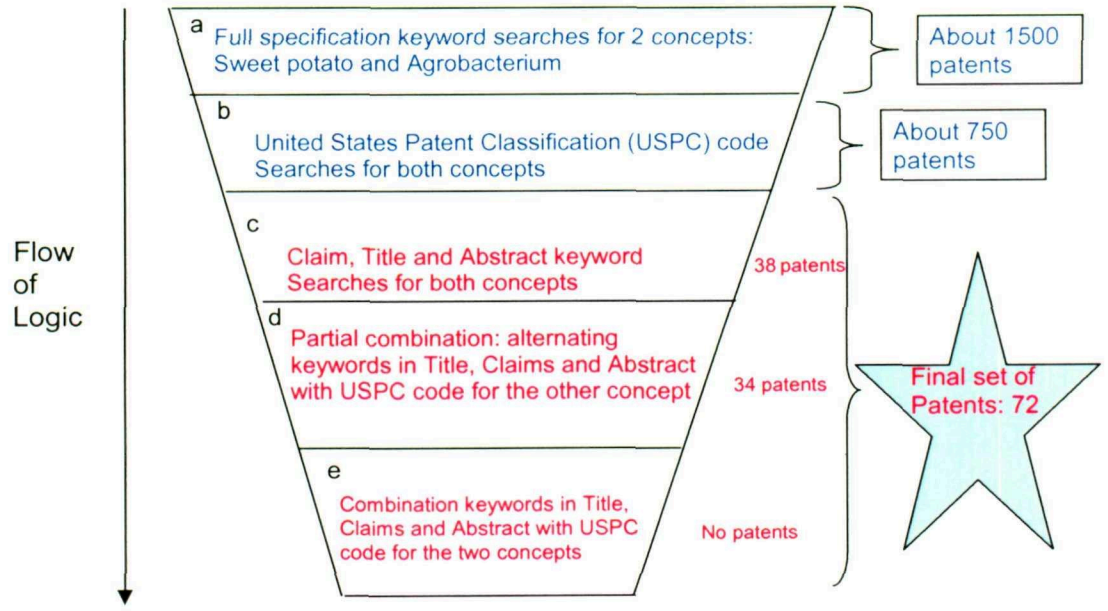
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I. EXECUTIVE SUMMARY

a. Scope of project:



Schematic 1



Schematic 2

The present search has been restricted to the search of the U.S. patents as well as U.S. patent applications which encompass Agrobacterium-mediated transformation in sweet potato (*Ipomoea batatas*). There is no restriction to a particular gene; our analysis extends to any genes which are transferred via Agrobacterium-mediated transformation. A particular emphasis is on *Agrobacterium tumefaciens*, although general Agrobacterium-mediated transformation is also covered. The search was limited to a specific plant, sweet potato (*Ipomoea batatas*). A general search for the plant cannot be done, since it would result in innumerable of patents, many of which would be irrelevant. (Refer to Schematic 1).

b. What was done?

The search strategy was devised so as to generate a broad set of patents which cover the general art along with the specific concepts. The concepts used were Agrobacterium and sweet potato. The synonymous keywords and corresponding United States Patent Classification (hereinafter USPC) were used to derive the optimal search strategy. Further refining of the search terms was done to weed out the non relevant patents and patent applications so as to limit the results to the patent and patent applications concerned with the Agrobacterium-mediated transformation.

Another round of search refining was done to limit the patents and patent applications relating only to sweet potato plant wherein the transformation is Agrobacterium-mediated.

Finally a combination of the searches using the classification codes along with the keywords was done to arrive at the most relevant set of patents and publications. The

search has been conducted only for the U.S. patents and publications in the Micropatent platform. (Refer to Schematic 2).

c. How the searches were conducted:

The search strategy includes various stages of searches to arrive at the most relevant set.

1. The general search using the keywords was first conducted to search for the keywords "Agrobacterium" in the specifications.

2. The general search using the keywords was conducted to search for the keywords "Sweet Potato" in the specifications.

3. The general search using the combination of keywords was conducted to search for the keywords "Agrobacterium" & "Sweet Potato" in the specifications.

4. A second set of searches using United States Patent Classification codes was conducted for the Genus – Agrobacterium. [USPC 426/637]

5. A further search using United States Patent Classification codes was conducted for the plant sweet potato. [USPC 435/469]

6. A further search was conducted using the combination of the classifications of the second set and the combination of the keywords of the first set.

7. Finally a search was conducted to include the sets of classifications with the set of keywords in the claims so as to weed out the general state of the art.

(Refer to Appendix 2).

d. Overview of Results

a. The general set of the search which included the keywords and the combination of keywords gave a result set of more than 1500 patents and publications.

b. The general set of search for the classifications gave a result set of about 1000 patents.

c. The search for the concepts in Title, Claims and Abstracts gave 38 patents

d. The combination set of keywords in the claims, abstract and the specifications, and one of the classifications gave a result set of 34 patents.

e. The combination of the keywords and the classifications gave *no hits*.

(Refer to Schematic 2)

Disclaimer:

This is an educational report. This report is neither inclusive nor extensive. It is not a Freedom to Operate (FTO) opinion. Rather, it is an information resource to facilitate a better understanding of the broad USPTO patent literature landscape with regard to Agrobacterium-mediated transformation technologies in sweet potato.

II. INTRODUCTION

A team of researchers and patent information scientists at Franklin Pierce Law Center were asked to evaluate the patent and literature landscape related to the Agrobacterium-mediated transformation in sweet potato with respect to the U.S. patents and patent applications.

This report provides a patent landscape of the Agrobacterium-mediated transformation of sweet potato. The report includes the applicable methods of transformation and has also included certain patents and patent applications which claim a transformed plant by virtue of these methods. In certain cases, the claim structure covers Agrobacterium-mediated transformation technology via system and composition of matter claims and not the more prevalent method claims.

Sweet potato plant (*Ipomoea batatas*) is adaptable to a broad range of agro-ecological conditions and fits in low input agriculture. It is highly productive even under adverse farming conditions. Sweet potato is grown in more than 100 countries as a valuable source of food, animal feed and industrial raw material. It is a staple crop in many South East Asian and African countries.

Traditional plant breeding has contributed to the improvement of sweet potato, especially in developed countries such as the U.S.A. and Japan. Because of the biological complexities of sweet potato, sexual hybridization strategies have not been very effective in developing improved cultivars.

Therefore, biotechnological tools, such as gene transfer, are very attractive in sweet potato improvement, as they enable direct introduction of desirable genes from other sources into preadapted cultivars.[1]

Sweet potato fact file:

Sweet potato is an ancient crop, originating in South America. Archaeological evidence from Peru shows that domestication of sweet potato dates back to 6000 BC. Sweet potato is in many ways an ideal crop for farmers, as it grows on low nitrogen soils, tolerates droughts well, crowds out weeds and suffers from relatively few pests.

Sweet potato provides nutritionally significant quantities of ascorbic acid, riboflavin, iron, calcium and protein. In addition, the orange fleshed sweet potatoes are rich in ß-carotene, a nutrient which may be effective in preventing certain types of cancer. Among the food crops, sweet potato has the highest recorded net protein utilization (based on percentage of food nitrogen retained in the body).

Among the major insect problems of sweet potato, sweet potato weevil (*Cylas formicarius* F.) is the most destructive one, especially in the tropics (Horton and Ewell, 1991). Although the sweet potato weevil damage is the most important constraint, damage brought about by plant diseases such as plant virus caused by sweet potato feathery mottle virus (SPFMV) can also be significant.

The most effective management strategies to minimize losses include the use of resistant cultivars, crop rotation, natural enemies, and insecticides. The excessive use of

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[1] Prakash, C.S., "Sweet Potato Biotechnology: Progress and Potential." Biotechnology and Development Monitor, 1994 http://www.biotech-monitor.nl/1811.htm .

insecticides is harmful to the environment and human health. The lack of effective yet inexpensive insecticides has made the use of resistant cultivars an attractive option. This so far is the most economical and ecological sound strategy available to farmers. Unfortunately, there is very little source of resistance to weevil and SPFMV in the sweet potato germplasm. Although there is extensive genetic variability in sweet potato, it is hexaploid and thus, difficult to improve through conventional breeding. Furthermore, there are problems of cross incompatibility, as well as instability in hybrid offspring.[2]

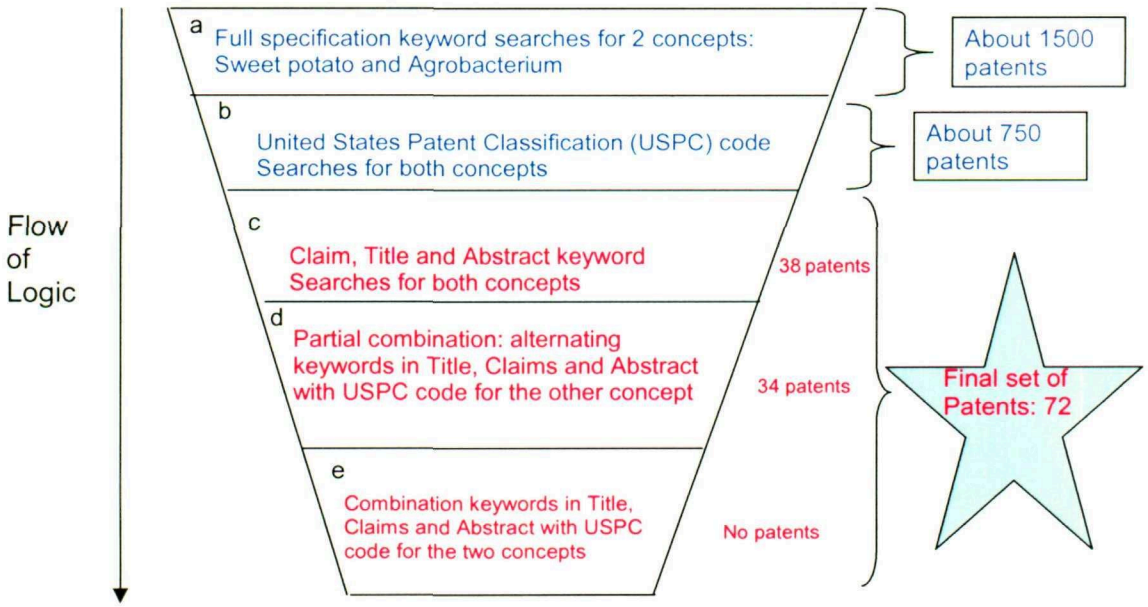
This report includes a search of all the USPTO patents and patent applications to search and identify those which are directly related to the Agrobacterium-mediated transformation of sweet potato. Traditional keyword searches using the appropriate combinations along with the combinations with relevant U.S. patent classification codes were conducted to identify and weed out the general state of the art patents.

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2 http://www.eseap.cipotato.org/MF-ESEAP/Publications/PSP-2003/18-Herman-Transgenic%20sweetpotato.pdf

III. SEARCH APPROACHES

a. Scope:



Schematic 2

a. The general set of the search which included the keywords and the combination of keywords gave a result set of more than 1500 patents and publications.

b. The general set of search for the classifications gave a result set of about 1000 patents.

c. The search for the concepts in Title, Claims and Abstracts gave 38 patents

d. The combination set of keywords in the claims, abstract and the specifications, and one of the classifications gave a result set of 34 patents.

e. The combination of the keywords and the classifications gave *no hits*.

b. Search methodology:

The searching methodology consists of two phases:

i) Defining the search scope:

The search scope was defined by PIPRA's interest in the methods of transforming sweet potato using Agrobacterium-mediated transformation. The search scope as defined limited the searches to the U.S. patents and patent applications filed in the USPTO. Consequently, the search includes:

1. Only the U.S. patents and patent applications filed at the USPTO
2. Only the patents and patent applications relating to the methods of transformation of sweet potato plant.
3. Only the patent and patent applications relating to the methods of transformation of sweet potato plant which are Agrobacterium-mediated transformation.

ii) The Search Phase.

The search phase consists of choosing appropriate search strings and combinations to arrive at the search scope. The search phase aims at focusing on the defined scope rather than attempting to cover the search scope. A search is intended to lead a researcher towards his goal by restricting the searches and the search results to be channeled towards the object of research. The search is conducted usually by an information scientist, who provides the best set of search results so as to eliminate the innumerable patents and patent applications which could be retrieved by an untrained person.

The Pierce Law team having obtained the defined scope of search from PIPRA conducted searches in the USPTO using keywords as well as classification codes to arrive at the optimal result set.

c. Search strings:

The database used for this search was Micropatent from the years 1836-2007. Searches were conducted in order to assess the number of patent applications and granted patents and also by limiting the search only to the claims, title and abstract along with the combinations with the USPC codes. The search strings used for the searches to get the results are provided in the Table I:

Table I

Keywords	Section: USPC / Title, Claims, Abstract	
(sweet near2 potato OR yam OR Ipomoea adj batatas OR batatas) AND (agrobacterium OR agrobacteria OR A. tumefaciens OR organogenesis OR embryogenesis)	426637 AND 435469	Title, Claims, Abstract
(sweet near2 potato OR yam OR Ipomoea adj batatas OR batatas)	426637	Title, Claims, Abstract
(agrobacterium OR agrobacteria OR A. tumefaciens OR tumefaciensOR organogenesis OR embryogenesis)	435469	Title, Claims, Abstract
(sweet near2 potato OR yam OR Ipomoea adj batatas OR batatas) AND (agrobacterium OR agrobacteria OR A. tumefaciens OR organogenesis OR embryogenesis)	None	Title, Claims, Abstract

Note: Table I describes the search strings used in sections c, d and e of Schematic 2.

d. Graphical representations:

Four graphical representations of the results have been generated. The following schematics have been generated only for the *relevant patent literature*:

1. Three dimensional bar chart (3D Bar Chart Patent Count vs. Assignee vs. Publication Date, Figure 1) shows the number of patents (Patent Count) per assignee in a given year (publication date): 32 patents / patent applications;

2. Pie Chart Patent count vs. Assignee (Figure 2): 22 relevant patents;

3. Two dimensional bar chart (2D Bar Chart Patent count vs. Assignee, Figure 3): 22 relevant patents; and

4. Two dimensional bar chart (2D Bar Chart Patent Count vs. Year, Figure 4)

Figure 1:

3D Bar Chart (Patent count vs. Assignee vs. Publication Date)

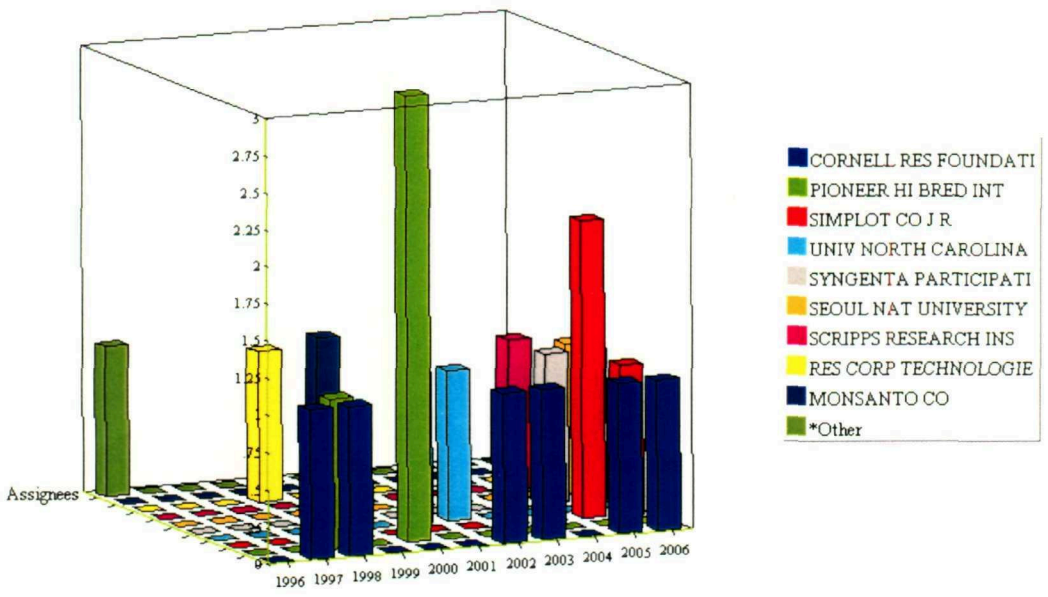


Figure 2:

Pie Chart (Patent count vs. Assignee)

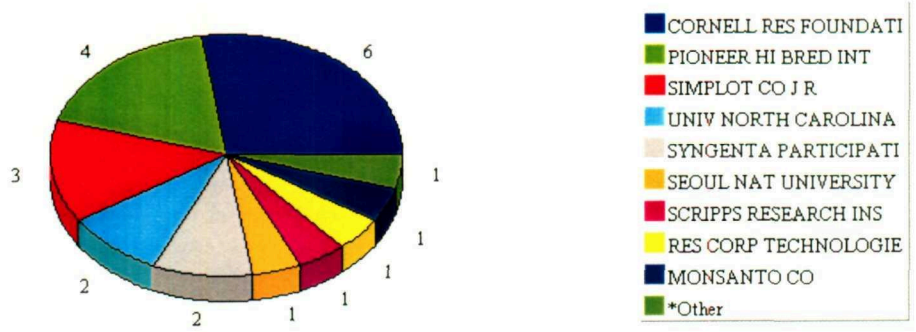


Figure 3:

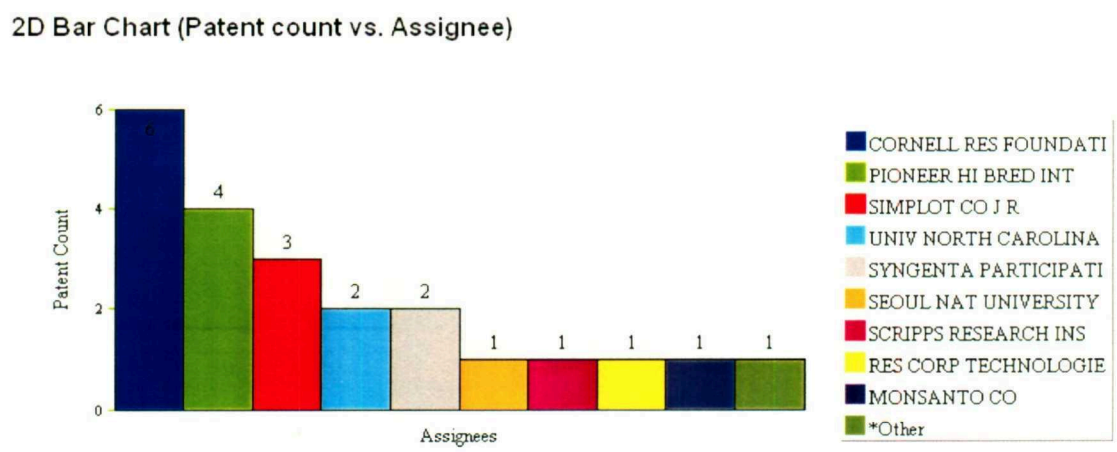
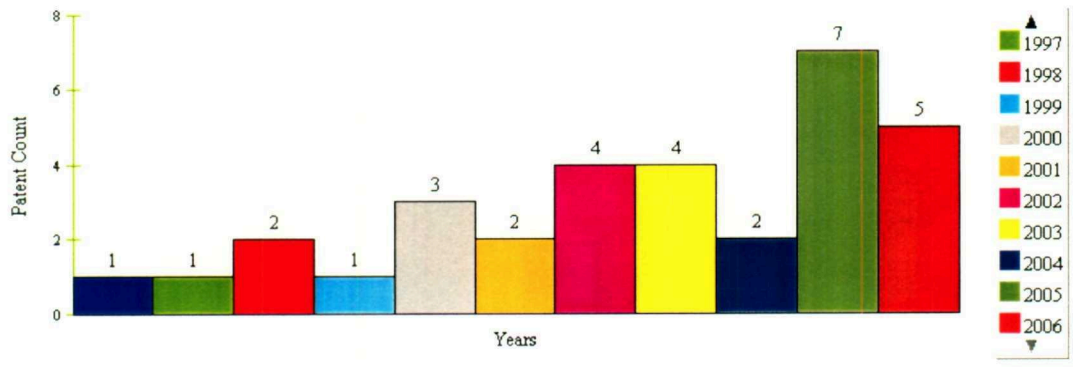


Figure 4:



IV. RESULTS & DISCUSSION

a. Tables

Table I indicates that the scope of the search can be as broad as the information scientist wishes. However, a focused search eliminates numerous irrelevant search results and this is evident from the final set selected for the analysis.

Hence, the final set selected for analysis has eliminated irrelevant search results and has encompassed the searches conducted by using combinations of keywords in titles, abstracts, claims and the classification codes.

b. Graphical representations

It has been observed from the graphical representations of the results that:

1. Three dimensional bar graph (Figure 1): Pioneer Hi Bred International has accounted for more than 3% of the total filings in 2000. Cornell has been observed to be the consistent patentee over the last 10 years;

2. Pie chart (Figure 2): The main patent assignee has been observed to be Cornell (six patents), followed by Pioneer Hi Bred International (four patents).

3. Two dimensional bar graph (Figure 3): is a bar graph representation of the pie chart above.

4. Two dimensional bar graph (Figure 4): patent filing spread over the last 10 years shows a significant rise in patent filings since 2004. There were seven filings in 2005.

c. Red/Yellow/Green Categorization Scheme

i) **Red** = Patent literature categorized here include (Agrobacterium-mediated transformation + Sweet Potato) concepts in claims (specific). In other words, both of these concepts are linked to each other within the same claim structure (an independent claim + its dependent claims). The total number of patents retrieved was 15.

Representative observations of interest include;

1. System claims interweaving a process:

For example, US5648599:

A process of conferring disease resistance to plants comprising: growing plant host cells transformed with a recombinant DNA expression system comprising an expression vector into which is inserted a heterologous DNA conferring bacterial disease resistance to plants by responding to an avirulence gene in bacterial plant pathogens, wherein said DNA encodes for a plant serine/threonine kinase; and expressing the heterologous DNA in the host cells to confer disease resistance on the host cells.

2. Pertinent technology covered by these **red** patents and patent applications include;

a. Starch: For example, Paper production in US6127603A

b. Hepatitits B vaccine production in US20040057969A1

c. Disease, virus resistance. (Numerous **red** patents and patent applications)

ii) **Yellow** = Patent literature categorized here could be arguably in claims (less specific)

Both concepts are present in the claims, but not necessarily linked within the same claim structure (an independent claim + its dependent claims). A detailed study found that the keywords in the claims are part of a laundry list of dicotyledonous plants, of which sweet potato was in the list. The total number of such patent retrieved was 17.

For example, US 6222098:

Claim 8: The plant of claim 1, comprising a potato plant, a maize plant, a rice plant, a wheat plant, a tomato plant, a barley plant, a sugarbeet plant, *a sweet potato plant*, a

peanut plant, a sugarcane plant, a grape plant, a pear plant, an apple plant, an orange plant, a cassava plant, a banana plant, a plantain plant, or a peach plant.

iii) **Green** = does not claim

Most of these patents retrieved during the search had none of the keywords in the claims, either as a laundry list or otherwise. Most of such patents were retrieved since they belonged to the broad class of search. Some of these were also retrieved, since one of the keywords was found in the claims but not both, and therefore this did not encompass the scope of the search leading to Agrobacterium-mediated transformation.

V. CONCLUSION

a. Findings:

Through the course of this research study, we did not locate any patents or patent applications that appeared to specifically claim Agrobacterium-mediated transformation of sweet potato. However, we found some "biotechnological applications" that may be of interest to PIPRA. These have been discussed in the Results and Discussion section above.

b. Future Scope:

The scope of the present project was restricted to U.S. patents and patent applications only. Depending upon the future scope and requirements of PIPRA's project, the scope can be broadened to cover other geographical areas.

In addition, the technical scope can also be broadened to include other aspects of genetic transformation of sweet potato and/or specific genes that are transformed into sweet potato. As such, this project forms part of the foundation on which further projects can be built.

APPENDICES

1. Excel sheet of the color coded patents.


Color coded patents

2. Search strings used.

The database used was Micropatent (Thomson Corp.). The optimal search strategies were designed by conducting keyword searches in the claims, title and abstract along with a combination of USPC codes. The specific collections used were U.S. patents and patent applications [1836-2007].

Notes:

Sr. No. 1 of Table II is the broad search strings for each of the concepts: Agrobacterium and sweet potato.

Sr. No. 2 – 5 of Table II describes the search strings used in sections a - e of Schematic 2.

Table II

Sr. No.	Search String	Search within	USPC	Classification code explanation	Results
1	Keyword Searches for single concepts				
	agrobacterium OR agrobacteria OR A. tumefaciens OR organogenesis OR embryogenesis	Full specification			23518
	agrobacterium OR agrobacteria	Full specification			16739
	"sweet potato" OR yam OR "Ipomoea batatas" OR batatas	Full Specification			1795
2	Keyword Searches for both concepts together				
	(sweet near2 potato OR yam OR Ipomoea adj batatas OR batatas) AND (agrobacterium OR agrobacteria OR A. tumefaciens OR organogenesis OR embryogenesis OR tumefaciens)	Full specification			1473
	sweet near2 potato OR yam OR Ipomoea adj batatas OR batatas) AND (agrobacterium OR agrobacteria OR A. tumefaciens OR organogenesis OR embryogenesis)	Claims or Title or abstract			38
3	Classification searches				
			435/469	**Introduction via Agrobacterium**: This subclass is indented under subclass 468. Processes wherein the nucleic acid is introduced into the plant cell by means of an Agrobacterium	254
			426/637	**Potato:** This subclass is indented under subclass 615. Subject matter involving material derived from an edible tuber, i.e., white potato, sweet potato and yam.	465
			435/469 AND 426/637		0
4	Combination searches				
	agrobacterium OR agrobacteria OR A. tumefaciens OR organogenesis OR embryogenesis	Full specifications	426/637		18
	sweet near2 potato OR yam OR Ipomoea adj batatas OR batatas) AND (agrobacterium OR agrobacteria OR A. tumefaciens OR organogenesis OR embryogenesis)	Full Specification	426/637 AND 435/469		0
	sweet near2 potato OR yam OR Ipomoea adj batatas OR batatas	Full specification	435/469		16
5	Final search: combination of above 3 categories of searches, keyword, classification and combination searches with the removal of duplicates.				
	Combination of the keywords in the specifications and the USPC				72

Key	
Red Highlight	Relevant Art
Yellow Highlight	Interesting Art
Green Highlight	Broadly Related Art

Publication Number	Assignee	Title	Abstract	Technical Summary	Application Date	Application No.	Inventor(s)	Date of Publication	Priority Data	US Classes	IPC Classes
US7041876B2	Cornell Research Foundation, Inc.	Oomycete-resistant transgenic plants by virtue of pathogen-induced expression of a heterologous hypersensitive response elicitor	The present invention relates to a chimeric gene that includes a first DNA molecule encoding a hypersensitive response elicitor protein or polypeptide, a promoter operably linked 5' to the first DNA molecule to induce transcription of the first DNA molecule in response to activation of the promoter by an oomycete, and a 3' regulatory region operably linked to the first DNA molecule. Also disclosed are an expression system and a host cell containing the chimeric gene. The present invention also relates to a transgenic plant resistant to disease resulting from oomycete infection, the transgenic plant including the chimeric gene, wherein the promoter induces transcription of the first DNA molecule in response to infection of the plant by an oomycete. Transgenic seeds and transgenic cultivars obtained from the transgenic plant are also disclosed. Additional aspects of the present invention include methods of making a recombinant plant cell and a transgenic plant.	The invention revolves around making transgenic plants oomycete-resistant by a hypersensitive response. The resistance is brought into effect by intorducing a chimeric gene using a host cell, eg. Agrobacterium. The technique is effective in a variety of plants including sweet potato.	1/26/2001	US2001770693A	Beer, Steven V. | Bauer, David W.	5/9/2006	US US2001770693A 20010126 | US US2000178565P 20000126	800301 | 4240932 | 4352522 | 4353201 | 435418 | 800279 | 800288 | 800293 | 800294 | 8003173	A01H000500 | C07K001421 | C07K001427 | C12N000121 | C12N001582 | C12N000504
US6852907B1	The Scripps Research Institute	Resistance in plants to infection by ssDNA virus using inoviridae virus ssDNA-binding protein, compositions and methods of use	The invention describes methods for producing plant resistance to a ssDNA virus, particularly a geminivirus such as mastrevirus, curtovirus or begomovirus. The method comprises introducing a ssDNA-binding protein of the Inoviridae virus into the plant, and includes a phage coat protein, particularly, a coliphage gene 5 protein. The invention also describes a transgenic plant comprising a gene that expresses the ssDNA-binding protein and vectors for expressing the protein in plants.	Method of introducing infection resistance to plants by introducing a gene binding protein. The carrier vector is an Agrobacterium and the plant is selected from a group including sweet potato.	8/17/2000	US200096225A	Padidam, Malla | Beachy, Roger N. | Fauquet, Claude M.	2/8/2005	US WO1999US4716A 19990303 | US US199876627P 19980303 | US US2000622500A 20000817	800280 | 4350691 | 4353201 | 435410 | 435418 | 435419 | 435468 | 53602372 | 800278 | 800279 | 800288 | 800295 | 800298 | 800301	C12N001582
US6441273B1	Cornell Research Foundation, Inc.	Constitutive and inducible promoters from coffee plants	The present invention relates to the isolation of two DNA promoters from a coffee plant. The isolated promoters, one inducible and one constitutive, are capable of inducing the expression of a second DNA operably linked to the promoter. The present invention also relates to host cells, expression systems and transgenic plants containing the promoters of the invention.	DNA construct using a DNA promoter. A host cell,eg. Agrobacterium cell is wherein the transgenic plant selected is from a group including sweet potato.	4/7/2000	US2000545686A	Aldwinckle, Herbert S. | Gaitan, Alvaro L.	8/27/2002	US US2000545686A 20000407 | US US2000184934P 20000225	800278 | 435232 | 4352522 | 4352523 | 435411 | 435412 | 435414 | 435415 | 435416 | 435417 | 435419 | 435427 | 435469 | 435470 | 5360232 | 5360236 | 5360241 | 800293 | 800294 | 800298 | 800305 | 800306 | 800313 | 800314 | 8003172 | 800320 | 8003201 | 80032	C07K0014415 | C12N001582 | C12N000988
US6127603A	Pioneer Hi Bred International, Inc.	Plant cells and plants transformed with streptococcus mutans gene encoding glucosyltransferase C enzyme	The present invention provides methods of making paper utilizing glucans, produced by the glucosyltransferase C enzyme of the species Streptococcus mutans, instead of modified starches. The present glucans are functionally similar to the hydroxethyl modified starch and are particularly useful in the coating step of paper manufacture. The present glucans also exhibit thermoplastic properties and impart gloss to the paper during the coating step. In particular, the present invention provides plant cells and plants transformed with the Streptococcus mutans gene encoding the glucosyltransferase C enzyme.	Transgenic plant cell like sweet potato containing a DNA molecule, wherein the plant cell is transformed by A. tumefaciens.	1/20/1998	US19989620A	Nichols, Scott E.	10/3/2000	US US1995485243A 19950607 | US US19989620A 19980120	800284 | 4350697 | 4350698 | 435101 | 435193 | 435412 | 435417 | 435418 | 435419 | 435468 | 435469 | 435470 | 800287 | 800288 | 800292 | 800293 | 800294 | 8003172 | 800320 | 8003201 | 8003202 | 8003203	C07H000100 | C12N001582 | C12N000910

US6127602A	Pioneer Hi Bred International, Inc.	Plant cells and plants transformed with streptococcus mutans genes encoding wild-type or mutant glucosyltransferase D enzymes	The present invention provides methods of making paper utilizing glucans, produced by glucosyltransferase D enzymes of the species Streptococcus mutans, instead of modified starches. The present glucans are functionally similar to the hydroxethyl modified starch and are particularly useful in the sizing and coating steps of paper manufacture. The present glucans also exhibit thermoplastic properties and impart gloss to the paper during the coating step. In particular, the present invention provides plant cells and plants transformed with Streptococcus mutans genes encoding wild-type or mutant glucosyltransferase D enzymes.	Transgenic plant cell like sweet potato containing a DNA molecule, wherein the plant cell is transformed by A. tumefaciens.	1/16/1998	US19988172A	Nichols, Scott E.	10/3/2000	US US1995482711A 19950607 | US US19988172A 19980116	800284 | 435101 | 435193 | 435412 | 435417 | 435419 | 435440 | 435468 | 435469 | 435470 | 800276 | 800287 | 800288 | 800292 | 800293 | 800294 | 8003172 | 800320 | 8003201 | 8003202 | 8003203	C12N001582 | C12N000910
US6087559A	Pioneer Hi Bred International, Inc.	Plant cells and plants transformed with Streptococcus mutans genes encoding wild-type or mutant glucosyltransferase B enzymes	The present invention provides methods of making paper utilizing glucans, produced by glucosyltransferase B enzymes of the species Streptococcus mutans, instead of modified starches. The present glucans are functionally similar to the hydroxethyl modified starch and are particularly useful in the sizing and coating steps of paper manufacture. The present glucans also exhibit thermoplastic properties and impart gloss to the paper during the coating step. In particular, the present invention provides plant cells and plants transformed with Streptococcus mutans genes encoding wild-type or mutant glucosyltransferase B enzymes.	Transgenic plant cell like sweet potato containing a DNA molecule, wherein the plant cell is transformed by A. tumefaciens.	1/16/1998	US19987999A	Nichols, Scott E.	7/11/2000	US US1995478704A 19950607 | US US19987999A 19980116	800284 | 4350697 | 4350698 | 435100 | 435101 | 435193 | 435412 | 435417 | 435419 | 435468 | 435469 | 435470 | 800278 | 800287 | 800288 | 800292 | 800293 | 800294 | 800298 | 8003172 | 800320 | 8003201 | 8003202 | 8003203	C12N001582 | C12N000910
US5712107A	Pioneer Hi Bred International, Inc.	Substitutes for modified starch and latexes in paper manufacture	The present invention provides methods of making paper utilizing glucans, produced by the glucosyltransferase C enzyme of the species Streptococcus mutans, instead of modified starches. The present glucans are functionally similar to the hydroxethyl modified starch and are particularly useful in the coating step of paper manufacture. The present glucans also exhibit thermoplastic properties and impart gloss to the paper during the coating step.	A method of manufacturing paper which involves glucan produced by transformation with agrobacterium tume-faciens , microparticle injection, electroporation, bombardment or retroviruses in various plants including sweet potato is disclosed.	6/7/1995	US1995485243A	Nichols, Scott Edward	1/27/1998	US US1995485243A 19950607	435015 | 162100 | 435004 | 435018 | 435170 | 435278 | 435885 | 435886 | 53600111 | 5360185 | 53612312 | 536124 | 536128	C07H000100 | C12N001582 | C12N000910
US5648599A	Cornell Research Foundation, Inc.	Gene conferring disease resistance to plants by responding to an avirulence gene in plant pathogens	The present invention relates to an isolated gene fragment which confers disease resistance to plants by responding to an avirulence gene in plant pathogens. The gene fragment encodes for protein kinase, particularly serine/threonine kinase. The gene can be cloned into an expression vector to produce a recombinant DNA expression system suitable for insertion into cells to form a transgenic plant transformed with that gene fragment. Also disclosed is a process of conferring disease resistance to plants by growing plant host cells transformed with that expression system and expressing the gene conferring disease resistance to impart such resistance to the host cells.	A process is disclosed wherein bacterial disease resistance in plants is due to the transformation by insertion of a heterelogous DNA into the expression vector of the DNA expression system of the host cell.The plant may be sweet potato among others.The heterologous DNA encodes for a plant serine/threonine kinase and confers bacterial resistance by responding to a an antivirulence gene in bacterial plant pathogens.	5/22/1995	US1995447185A	Tanksley, Steven D. | Martin, Gregory B.	7/15/1997	US US1993111078A 19930824 | US US1995447185A 19950522	800279 | 4350691 | 4350701 | 435194 | 4352523 | 4353201 | 435411 | 435412 | 435414 | 435415 | 435417 | 435418 | 435419 | 5360232 | 5360236 | 800301	C12N001582 | C12N000912

US5990388A	Research Corporation Technologies, Inc.	Resistance to viruses and viroids in transgenic plants and animals expressing dsRNA-binding protein	The invention provides a method for imparting resistance in animals to viruses, and in plants to viruses and viroids, that express double-stranded RNA-like structures (dsRNAs). This method enables the binding of pathogenic dsRNAs during the infection process by expression of dsRNA-binding protein in transgenic animal and plant hosts, thus interrupting the infection cycle and inhibiting disease. The presence of a dsRNA-binding protein in a transgenic host renders the transgenic host resistant to the phenotypic symptoms of viral infection and/or decreased pathogen replication. Accordingly, the present invention provides a genetically engineered animal and plant, stably transformed to express a dsRNA-binding protein, such that the transgenic host displays resistance to virus and/or viroid challenge.	A transgenic plant resisiting to infecting virus is developed by a method of binding of pathogen double-stranded RNA-like structures during the infection process by specific dsRNA-binding proteins expressed in transgenic hosts. The transgenic plant may include sweet potato.	6/7/1995	US1995482286A	Roth, Don Allen | Langland, Jeffrey Olaf	11/23/1999	US US1995482286A 19950607	800301 | 4353201 | 800280 | 8003172 | 8003173	C07K001407 | C07K001414 | C12N001582 | C12N001585 | A61K003800 | A61K004800
US20060168681A1	SEOUL NATIONAL UNIVERSITY INDUSTRY FOUNDATION	Method for enhancing environmental stress resistance of plant using environmental stress controlling gene	The present invention relates to a method for enhancing the environmental stress resistance of plants using an environmental stress resistance-controlling gene. More specifically, the invention relates to a method for enhancing the environmental stress resistance of plants and a method for producing environmental stress-resistant plants, each of the methods comprising introducing into the plants an environmental stress resistance-controlling gene derived from Arabidopsis thaliana, as well as environmental stress-resistant plants produced by the method.	A method of enhancing environmental stress resistance of plants is taught. The method involves introduction of recombinant vector using agrobacterium mediated transformation. The plants include sweet potato.	1/26/2006	US2006339585A	Kim, Min Kyun | Jung, Jin Wook	7/27/2006	KR KR20057534A 20050127 | US US2006339585A 20060126	800278 | 800289 | 800294 | 800320 | 8003201 | 8003202 | 8003203	A01H000100 | A01H000500 | C12N001582
US20060294618A1	None	Recessive plant viral resistance results from mutations in translation initiation factor elf4e	The present invention relates to methods of imparting virus resistance to plants. In one aspect, this method involves silencing a gene encoding a translation initiation factor eIF4E in the plant. In another aspect, this method involves overexpressing a heterologous translation initation factor eIF4E in a plant. The present invention further relates to a genetic construct containing a nucleic acid molecule encoding a heterologous translation initiation factor eIF4E, as well as to an expression system containing the genetic construct and a host cell transformed with the genetic construct. The present invention also relates to transgenic plants, seeds, and plant parts transformed with the genetic construct. The present invention also relates to an isolated nucleic acid molecule encoding a mutant translation initiation factor eIF4E that is effective in imparting virus resistance in plants. The present invention also relates to a mutant translation initiation factor eIF4E and a method for making the mutant.	A method of transformation of a plant like sweet potato by agrobacterium mediation, biolistic transformation or electroporation is disclosed. The method involves imparting virus resistance to plants by silencing a gene encoding translation initiation factor in the plant by providing a heterogenous nucleic acid molecule.	7/31/2006	US2006538434A	Jahn, Margaret, M. | Kang, Byoung Cheorl	12/28/2006	US US2002434220P 20021217 | US WO2003US40184 A 20031217 | US US2006538434A 20060731	800279 | 800285 | 435419 | 435468 | 4352522	A01H000100 | C12N000120 | C12N001582 | C12N000504

US20050229267A1	J.R. Simplot Company	Precise breeding	The present invention relates to a new plant breeding process. The process improves the agronomic performance of crop plants by using genetic material that is also used in classical breeding. Instead of sexually recombining entire genomes at random, as is done in classical breeding, specific genetic elements are rearranged in vitro and inserted back into individual plant cells. Plants obtained through this new plant breeding process do not contain foreign nucleic acid but only contain nucleic acid from the plant species selected for transformation or plants that are sexually compatible with the selected plant species. Plants developed through this new plant breeding process are provided. In particular, potato plants displaying improved tuber storage and health characteristics are provided.	A Method of modifying a trait of plants like sweet potato by agrobacterium mediated transformation with a polynucleotide consisting of sequence that is native to the selected plant such as sweet potato.	3/7/2005	US2005505079A	Rommens, Caius | Ye, Jingson | Yan, Hua | Swords, Kathy | Menendez Humara, Jaime | Brinkerhoff, W. Leigh | Richael, Craig	10/13/2005	US US2002357661P 20020220 | US WO2003US4947A 20030220 | US US2005505079A 20050307 | US US2002377602P 20020506	800278 | 435468 | 5360236 | 800294	A01H000100 | A01H000100 | C07H002104 | C07H002104 | C12N001582 | C12N001582
US20040057969A1	None	Compositions containing stabilized hepatitis antigen and methods of their use	The present invention relates to a composition, which includes a hepatitis B surface antigen stabilized with a milk protein and/or a milk protein component. This composition can be used in an oral vaccine for treatment of hepatitis B. The present invention further relates to methods of immunizing a subject against hepatitis, methods of administrating the composition of the present invention, and methods of producing a stabilized hepatitis B surface antigen protein.	A method of producing a stabilized hepatitis B surface antigen by using a plant cell culture suspension, eg. Sweet potato, by using a transformation of particle bombardment and the bacteria used is Agrobacterium tumefaciens.	9/20/2002	US2002251167A	Smith, Mark, L. | Shuler, Michael, L.	3/25/2004	US US2002251167A 20020920	4242251 | 4242271 | 435005 | 435006	A61K003912 | A61K003929 | A61K003939 | C12N001582
US20030147902A1	Henry M. Jackson Foundation for the Advancement of Military Medicine	Method of stimulating and immune response by administration of host organisms that express intimin alone of as a fusion protein with one of more other antigens	This invention satisfies needs in the art by providing intimin, the Enterohemorrhagic Escherichia coli (EHEC) adherence protein, alone or as a fusion protein with one or more other antigens, expressed by transgenic plants and the use of those plants as vehicles for stimulating a protective immune response against EHEC and the one or more other antigens. Various plant species are transformed to protect various animal species and also humans against EHEC, against pathogens expressing intimin-like proteins, and against pathogens expressing any of the one or more other antigens to which intimin may be fused. The eae gene encoding intimin, a functional portion thereof, or a recombination that encodes a fusion protein is put under the control of a constitutive plant promoter in a plasmid and the plasmid is introduced into plants by the type of transformation appropriate for the particular plant species. The engineered plants expressing intimin or the intimin fusion protein are then fed to animals and/or humans to elicit the production of antibodies, which protect the animals/humans against EHEC colonization and infection, and against pathogens expressing the one or more other antigens and any cross-reactive antigens. The invention may also be practiced by expressing the intimin or intimin fusion protein in other host organisms such as bacteria, yeast, and fungi.	A Method of stimulating an immune response by transformation of a plant like sweet potato with a vector encoding intimin. A DNA construct is also disclosed that codes for the expression of a heterologous DNA in a plant wherein the transformation vector is an agropbacterium vector.	5/20/2002	US2002150058A	Stewart, C., Neal | McKee, Marian, L. | O'Brien, Alison, D. | Wachtel, Marian, R.	8/7/2003	US US199615657P 19960419 | US US199615938P 19960422 | US US1997840466A 19970418 | US US2002150058A 20020520 | US US2000696188A 20001026	4241851	A61K0039112 | A61K004748 | C07K001424 | C07K0014245 | C07K001612 | C12N001582 | A61K003800

US20020069434A1	None	Oomycete-resistant transgenic plants by virtue of pathogen-induced expression of a heterologous hypersensitive response elicitor	The present invention relates to a chimeric gene that includes a first DNA molecule encoding a hypersensitive response elicitor protein or polypeptide, a promoter operably linked 5' to the first DNA molecule to induce transcription of the first DNA molecule in response to activation of the promoter by an oomycete, and a 3' regulatory region operably linked to the first DNA molecule. Also disclosed are an expression system and a host cell containing the chimeric gene. The present invention also relates to a transgenic plant resistant to disease resulting from oomycete infection, the transgenic plant including the chimeric gene, wherein the promoter induces transcription of the first DNA molecule in response to infection of the plant by an oomycete. Transgenic seeds and transgenic cultivars obtained from the transgenic plant are also disclosed. Additional aspects of the present invention include methods of making a recombinant plant cell and a transgenic plant.	The invention revolves around making transgenic plants oomycete-resistant by a hypersensitive response. The resistance is brought into effect by intorducing a chimeric gene using a host cell, eg. Agrobacterium. The technique is effective in a variety of plants including sweet potato.	1/26/2001	US2001770693A	Beer, Steven, V. | Bauer, David, W.	6/6/2002	US US2000178565P 20000126 | US US2001770693A 20010126	800301 | 4353201 | 435419 | 800279	C07K001421 | C07K001427

US20020069434A1	None	Oomycete-resistant transgenic plants by virtue of pathogen-induced expression of a heterologous *hypersensitive* response elicitor	The present invention relates to a chimeric gene that includes a first DNA molecule encoding a hypersensitive response elicitor protein or polypeptide, a promoter operably linked 5' to the first DNA molecule to induce transcription of the first DNA molecule in response to activation of the promoter by an oomycete, and a 3' regulatory region operably linked to the first DNA molecule. Also disclosed are an expression system and a host cell containing the chimeric gene. The present invention also relates to a transgenic plant resistant to disease resulting from oomycete *infection, the transgenic plant including the* chimeric gene, wherein the promoter induces transcription of the first DNA molecule in response to infection of the plant by an oomycete. Transgenic seeds and transgenic cultivars obtained from the transgenic plant are also disclosed. Additional aspects of the present invention include methods of making a recombinant plant cell and a transgenic plant.	The invention revolves around making transgenic plants oomycete-resistant by a hypersensitive response. The resistance is brought into effect by intorducing a chimeric gene using a host *cell, eg. Agrobacterium. The* technique is effective in a variety of plants including sweet potato.	1/26/2001	US2001770693A	Beer, Steven, V. | Bauer, David, W.	6/6/2002	US US2000178565P 20000126 | US US2001770693A 20010126	800301 | 4353201 | 435419 | 800279	C07K001421 | C07K001427

Publication Number	Assignee	Title	Abstract	Technical Summary	Application Date	Application No.	Inventor(s)	Date of Publication	Priority Data	US Classes	IPC Classes
US6222098B1	Monsanto Company	Expression of sucrose phosphorylase in plants	Introducing sucrose phosphorylase activity into plants by transformation with a gene for the enzyme increases the rate of sucrose hydrolysis, leading to increased starch, oil, and protein levels. The preferred gene is from Streptococcus mutans. Surprisingly, in potatoes transformed to express this gene in tubers, reduced bruise discoloration susceptibility and increased uniformity of starch deposition throughout the tuber are achieved.	Transgenic plant like sweet potato containing a recombinant double stranded DNA molecule encoding a sucrose phosphorylase enzyme obtained from eg. Agrobacterium.'	2/9/1998	US199820818A	Barry, Gerard Francis | de Weerd, Jan Willem | Kishore, Ganesh Murthy | Weldon, Marcia Lee	4/24/2001	US US1996596024A 19960206 | US US1995386860A 19950210 | US US199820818A 19980209	800284 | 435194 | 435468 | 5360237 | 800278 | 800287 | 800288 | 800290 | 800315 | 800316 | 8003172 | 8003174 | 800320 | 8003201 | 8003202 | 8003203	C12N001582 | C12N000910
US6239328B1	North Carolina State University	Method for reducing expression variability of transgenes in plant cells	A method of reducing gene silencing, increasing expression, and/or reducing expression variability of foreign DNA in plants or plant cells comprises providing a plant cell capable of regeneration; and then transforming the plant cell with a DNA construct comprising an expression cassette, which construct comprises, in the 5' to 3' direction, a first matrix attachment region, a transcription initiation region, a structural gene positioned downstream from the transcription initiation region and operatively associated therewith, and a second matrix attachment region, wherein the first and second matrix attachment regions are different.	Method of making recombinant plants with reduced silencing of expression of foreign genes including a transformation step using Agrobacterium. Sweet potato can be such a recombinant plant.	6/2/1998	US199889003A	Thompson, William F.	5/29/2001	US US1992956420A 19921005 | US US1995424229A 19950419 | US US199748418P 19970603 | US US199889003A 19980602	800278 | 435468 | 435469 | 5360241 | 800260 | 800268 | 800294 | 800320	C07K0014395 | C12N001582
US6433248B1	North Carolina State University	Trans-activation of transcription from viral RNA	A method of activating transcription of an RNA of interest in a cell (e.g., a dicot plant cell) includes the steps of: (a) providing a host cell containing a heterologous construct, the heterologous construct comprising an RNA virus subgenomic promoter operatively associated with a heterologous RNA of interest, wherein the promoter does not initiate transcription of the heterologous RNA in the absence of a corresponding RNA virus trans-activating RNA segment, and wherein the RNA virus trans-activating RNA segment is absent from the host cell; and then (b) introducing a trans-activating nucleic acid segment into the host cell so that transcription of the heterologous RNA is initiated. The trans-activating segment may be introduced into the cell by any suitable means, such as by infecting the cell with a virus, which virus expresses the trans-activating RNA.	RNA transcription activation method, including a plant transformation, viral infection by Agrobacterium vector. The plant invloved can be sweet potato.	6/1/1998	US199888274A	Lommel, Steven A. | Sit, Timmy L.	8/13/2002	US US199888274A 19980601	800278 | 4350691 | 4353201 | 435468 | 435469 | 435470 | 5360231 | 800288 | 800292 | 800293 | 800294 | 800298 | 800301 | 977804	C12N001582
US5589625A	Kemira Oy, Biotech	Transgenic plants displaying multiple virus resistance and a process for their production	This invention discloses transgenic plants, such as transgenic tobacco and potato, having resistance to multiple viral taxonomic groups using parts of the 2,5A oligoadenylate pathway. In particular, said plants are genetically engineered to contain a DNA sequence encoding at least one polypeptide having a 2,5A synthetase activity. By this means a step in the 2,5A oligoadenylate pathway heretofore believed to be missing in all plants is provided so that viral infection in the transgenic plants is inhibited via a 2,5A dependent endonuclease. Moreover, this invention relates to a process for the production of said transgenic plants by transfection with a genetically engineered DNA sequence encoding at least one polypeptide having a 2,5A synthetase activity.	A transgenic plant displaying resistance to multiple virus taxonomic groups using the 2,5 A oligoadenylate pathway due to a geneticaly engineered DNA sequence encoding a polypeptide having 2,5 A synthase activity is disclosed. The transgenic plant includes sweet potato among others and the transformation involves agrobacterium system.	1/18/1995	US1995374229A	Saarma, Mart | Kelve, Merikke | Truve, Erkki | Teeri, Teemu	12/31/1996	EP EP1992104676A 19920318 | US US1992965343A 19921023 | US US1995374229A 19950118	800279 | 4350691 | 435418 | 800301	C12N001582 | C12N000912

US20030232041A1	None	Recombinant bacterial phytases and uses thereof	A purified recombinant phytase enzyme derived from Escherichia coli B. The enzyme has a molecular weight of about 47.1 kilodaltons and has phytase activity. The enzyme can be produced from native or recombinant host cells and can be used to aid in the digestion of phytate where desired. In particular, the phytase of the present invention can be used in foodstuffs to improve the feeding value of phytate rich ingredients.	A plant cell of a plant like sweet potato is transformed by a vector comprising nucleic acid of a specific sequence. The method of introducing phytase activity into a plant or a vector into a plant by calcium/polyethylene glycol method , electroporation , microinjection or particle bombardment is disclosed. The vector may include a viral vector , a bacterial vector or a vector from genus agrobacterium.	5/5/2003	US2003430356A	Short, Jay, M. | Kretz, Keith	12/18/2003	US US1999291931A 19990413 | US US1997910798A 19970813 | US US2000580515A 20000525 | US US1999259214A 19990301 | US US200134985A 20011221 | US US2003430356A 20030505 | US US1999318528A 19990525	42409461 | 426020 | 4350691 | 435196 | 43525233 | 4353201 | 435419 | 5360232	A21D000804 | A23J000314 | A23K000114 | A23K0001165 | A23L0001015 | A23L000103 | A23L0001105 | A23L0001211 | C12N000916 | A61K003800
US20050198712A1	Syngenta Participations AG	Glutamine-rich maize seed protein and promoter	Provided is a nucleotide sequence encoding a 55 kDa maize prolamin family protein. Also provided is a nucleotide sequence derived from the promoter of the 55 kDa maize gene that can be used to express heterologous sequences in plants, and methods of using the disclosed nucleotide sequences.	A transgenic plant is generated by an expression cassette expressing a nucleotide sequence by transformation via binary agrobacterium vector. The plant may include a sweet potato.	3/8/2005	US200574522A	Betts, Scott | Skalla, Dale | Voltrath, Sandra | Hendrickx, Koen	9/8/2005	US US2004551286P 20040308 | US US200574522A 20050308	800294 | 435468 | 8003201	A01H000100 | A01H000500 | C12N001582
US20050034188A1	J. R. Simplot Company	Refined plant transformation	The present invention provides methods for producing transgenic plants based on an optimized transfer of DNA from Agrobacterium to plant cells, and/or on an optimized integration of the transferred DNAs into plant cell genomes. It also provides Agrobacterium-transformation vectors that can be used to limit or eliminate the transfer of undesirable DNA. The present invention can be applied to essentially any species of plants, including many recalcitrant plant species. The present invention also provides new cyanamide resistance marker genes and proteins for enhancing plant cell transformation.	A transgenic plant is produced by infecting a germinating plant like sweet potato with an agrobacterium transformation vector which eliminates transfer of undesirable DNA and transfers desirable DNA from Agrobacterium to plant Cells.	9/22/2003	US2003667145A	Weeks, J., Troy | Rommens, Caius	2/10/2005	US US2002377597P 20020506 | US US2002365527P 20020320 | US US2003392301A 20030320 | US US2003667145A 20030922	800278 | 5360232 | 53602374 | 800260 | 800266 | 800279 | 800288 | 800290	C12N001582
US20040003434A1	None	Refined plant transformation	The present invention provides methods for producing transgenic plants based on an optimized transfer of DNA from Agrobacterium to plant cells, and/or on an optimized integration of the transferred DNAs into plant cell genomes. It also provides Agrobacterium-transformation vectors that can be used to limit or eliminate the transfer of undesirable DNA. The present invention can be applied to essentially any species of plants, including many recalcitrant plant species.	A transgenic plant is produced by infecting a germinating plant like sweet potato with an agrobacterium transformation vector which eliminates transfer of undesirable DNA and transfers desirable DNA from Agrobacterium to plant Cells.	3/20/2003	US2003392301A	Weeks, J., Troy | Rommens, Caius	1/1/2004	US US2002377597P 20020506 | US US2002365527P 20020320 | US US2003392301A 20030320	800294 | 800320	C12N001582
US20050155113A1	None	Vectors and methods for immunization against Norwalk virus using transgenic plants	The present invention relates to a synthetic plant-optimized nucleic acid molecule having a Norwalk virus capsid protein coding nucleotide sequence, and nucleic acid constructs, host cells, expression systems, and plants having the plant-optimized Norwalk virus nucleic acid molecule. The present invention also relates to a method of producing Norwalk virus capsid protein virus-like particles in a transgenic plant or transgenic plant seed transformed with a plant-optimized nucleic acid molecule encoding Norwalk virus capsid protein. The plant or a component thereof can be administered to a subject under conditions effective to immunize the subject against disease resulting from infection by a Norovirus, including Norwalk virus. An oral vaccine for immunization of a subject against Norwalk virus infection is also disclosed.	A plant cell of a plant like sweet potato is transformed with a nucleic acid construct . The nucleic acid construct has a synthetic nucleic acid molecule allowing for expression of the Norwalk virus capsid protein in a plant. The transformation is agrobacterium mediated , biolistic transformation or electroporation.	7/21/2004	US2004895791A	Hamilton, William | Hellendoorn, Koen | Jones, Timothy | Kirk, Dwayne | Mason, Hugh | Zhang, Xiuren | Arntzen, Charles	7/14/2005	US US2003489005P 20030721 | US US2004895791A 20040721	800288 | 4242041 | 435005 | 4352351 | 435468	A01H000100 | A61K003912 | C12N001582 | C12N000700 | C12Q000170

US20020059658A1	None	Methods of improving the effectiveness of transgenic plants	The present invention relates to methods of improving the effectiveness of transgenic plants, either by maximizing the benefit of a transgenic trait in transgenic plants or overcoming deleterious effects on growth, stress tolerance, disease resistance, or insect resistance in transgenic plants expressing a transgenic trait. By applying a hypersensitive response elicitor protein or polypeptide to a transgenic plant expressing a transgene which confers a transgenic trait, or by preparing a transgenic plant expressing both a transgene which confers a transgenic trait and a second transgene which confers hypersensitive response elicitor expression, it is possible to realize the maximum benefit of the transgenic trait or overcome deleterious effects on growth, stress tolerance, disease resistance, or insect resistance which result from or accompany expression of the transgene conferring the transgenic trait.	A method of transforming a plant cell by providing a transgene conferring a transgenic trait to the plant and applying a hypersensitive response elicitor protein or polypeptide. The transformation is agrobacterium mediated and the plant maybe transgenic swet potato	6/13/2001	US2001880371A	Wei, Zhong Min | DeRocher, Jay, Ernest	5/16/2002	US US2000211585P 20000615 | US US2001880371A 20010613	800278 | 5041161 | 800279	A01N003746 | A01N006302 | A01N006304 | C12N001582
US6613960B1	Cornell Research Foundation, Inc.	Phloem-loading-specific promoter	The present invention relates to DNA promoters which, in nature, drive expression of an enzyme of the raffinose family oligosaccharide pathway and are capable of inducing expression of a protein encoded by a DNA molecule operably associated with such promoters. These DNA promoters cause the protein to be expressed in minor vein phloem of a mature plant leaf, with substantially no expression of the protein elsewhere in the leaf of the plant. The present invention also relates to the use of such DNA promoters in transgenic plants or plant seeds.	DNA promoter which induces expression of a protein and a host cell comprising the DNA construct. The host cell can be sweet potato.	2/15/2000	US2000503890A	Turgeon, E. Robert	9/2/2003	US US2000503890A 20000215	800278 | 4353201 | 435410 | 5360241	C12N001582 | C12N000910
US6903247B2	Cornell Research Foundation, Inc.	Constitutive α-Tubulin promoter from coffee plants and uses thereof	The present invention relates to the isolation and characterization of a constitutive α-tubulin promoter from a coffee plant. The isolated promoter of the present invention is capable of inducing the expression of a protein encoded by a DNA molecule that is operably linked to the promoter in a DNA construct. The present invention also relates to DNA constructs expression systems, host cells, and transgenic plants and plant seeds containing the promoter of the invention. The present invention also relates to a method of making a transgenic plant and a method of directing protein expression in plants that involve transforming a plant cell with a DNA construct containing the promoter of the invention.	DNA promoter for coffee plants involving a DNA construct. The host cell for the construct can be an Agrobacterium cell. The transgenic plants that can be used for transformation using the host cell includes sweet potato.	7/16/2002	US2002197280A	Aldwinckle, Herbert S. | Gaitan, Alvaro L.	6/7/2005	US US2000180934P 20000208 | US US2000545686A 20000407 | US US2002197280A 20020716	800298 | 4352523 | 4353201 | 435419 | 5360241 | 800278	C07K0014415 | C12N001582 | C12N000988
US7119255B2	Syngenta Participations, AG	Promoter from maize prolamin seed storage protein and uses thereof	Provided is a nucleotide sequence of a promoter from a gene encoding a 55 kDa maize prolamin family protein. Also provided are methods that utilize the 55 kDa maize prolamin family gene promoter to express heterologous sequences in plants, expression cassettes that include the 55 kDa maize prolamin family gene promoter, and plants transformed with expression cassettes that include the 55 kDa maize prolamin family gene promoter.	A nucleotide plant sequence method that uses a transformation technique: the vector is a binary Agrobacterium. The transgenic plant is selected from a group including sweet potato. The focus of the invention is around a promoter from maize prolamin seed storage protein.	3/8/2005	US200574522A	Betts, Scott | Skalla, Dale Wayne | Voltrath, Sandra Lynn | Hendrickx, Koen	10/10/2006	US US200574522A 20050308 | US US2004551286P 20040308	800287 | 5360241 | 435419 | 435468 | 4353201 | 435471 | 800293 | 800294	A01H000100 | A01H000500 | C07H002104 | C12N001582 | C12N001590

US20030163837A1	None	Constitutive and inducible promoters from coffee plants	The present invention relates to the isolation of two DNA promoters from a coffee plant. The isolated promoters, one inducible and one constitutive, are capable of inducing the expression of a second DNA operably linked to the promoter. The present invention also relates to host cells, expression systems and transgenic plants containing the promoters of the invention.	A host cell comprising a DNA construct is an Agrobacterium cell, A. tumefaciens. The transgenic plant comprising the DNA construct is sweet potato.	7/16/2002	US2002197280A	Aldwinckle, Herbert, S. | Gaitan, Alvaro, L.	8/28/2003	US US2000180934P 20000208 | US US2000545686A 20000407 | US US2002197280A 20020716	800278 | 4353201 | 435419	C07K0014415 | C12N001582 | C12N000988
US20050014269A1	None	Plants with enhanced ability to produce starch and methods for obtaining them	The subject invention concerns materials and methods for enhancing starch production in plants. Starch production is enhanced, relative to levels observed in wildtype or control plants, by reduction of the plant 14-3-3 protein(s) which subsequently results in increased accumulation of starch in the plant. In one embodiment, the 14-3-3 protein expression is reduced using polynucleotides that are antisense to the 14-3-3 gene sequences expressed in the plant. In another embodiment, the 14-3-3 protein expression is reduced by knockout" of a 14-3-3 gene or gene sequences. The subject invention also pertains to transformed and transgenic plants that have polynucleotides that are antisense to the 14-3-3 gene sequences expressed in the plant	A polynucleotide encoding a plant 14-3-3 protein is introduced into a plant cell by Agrobacterium infection, biolistic transfection, electroporation , microinjection or virus mediated transformation. This method results in enhanced starch production by inhibiting the expression of 14-3-3 protein.	8/26/2004	US2004928689A	Ferl, Robert, J. | Sehnke, Paul, C. | Chung, Hwa, Jee | Wu, Ke | Hannah, L., Curtis	1/20/2005	US US2001859822A 20010517 | US US2000204746P 20000517 | US US2004928689A 20040826	435468 | 800285 | 800286 | 800294	C12N001582
US5850015A	Cornell Research Foundation, Inc.	Hypersensitive response elicitor from Erwinia chrysanthemi	The present invention relates to an isolated protein or polypeptide corresponding to a protein or polypeptide in Erwinia chrysanthemi which elicits a hypersensitive response in plants. The encoding DNA molecule alone in isolated form or either in an expression system, a host cell, or a transgenic plant are also disclosed. Another aspect of the present invention relates to a method of imparting pathogen resistance to plants by transforming a plant with the DNA molecule of the present invention.	DNA molecule encoding corresponding to a protein or polypeptide in Erwinia chrysanthemi, which elicits a hypersensitive response in transgenic plants, like sweet potato. The method used for imparting pathogen resistance to plants is Agrobacterium mediated. The transforming is effected by particle bombardment.	6/7/1995	US1995484358A	Bauer, David | Collmer, Alan	12/15/1998	US US1995484358A 19950607	800279 | 4350691 | 4353201 | 435419 | 435470 | 5360237 | 5360241 | 800301	C07K001427 | C12N001582
US20060070137A1	J.R. SIMPLOT COMPANY	Plant-specific genetic elements and transfer cassettes for plant transformation	The present invention provides nucleic acid molecules and sequences, particularly those identified and obtained from plants, that are useful for transferring and integrating one polynucleotide into another via plant transformation techniques.	A plant transformation casette comprising three polynucleotides of plant DNA are dislcosed. A method of transformation of a plant by infecting a plant with a bacterium strain from a group including Agrobacterium Tumefaceins is also disclosed.	9/7/2005	US2005220408A	Rommens, Caius | Bougri, Oleg, V. | Yan, Hua	3/30/2006	US US2004607586P 20040908 | US US2005698938P 20050714 | US US2005684525P 20050526 | US US2005220408A 20050907	800278 | 4353201 | 800294	A01H000100 | C12N001582

Publication Number	Assignee	Title	Abstract	Technical Summary	Application Date	Application No.	Inventor(s)	Date of Publication	Priority Data	US Classes	IPC Classes
US20040018607 A1	DIVERSA CORP	Amylases, nucleic acids encoding them and methods for making and using them	In one aspect, the invention is directed to polypeptides having an amylase activity, polynucleotides encoding the polypeptides, and methods for making and using these polynucleotides and polypeptides. In one aspect, the polypeptides of the invention can be used as amylases, for example, alpha amylases, to catalyze the hydrolysis of starch into sugars.	An expression cassette is disclosed having a specific nucleic acid sequence is linked toa plant promoter derived from T-DNA of Agrobacterium tumefaceins A method of producing high maltose or high glucose syrup using sweet potato is also disclosed.	3/6/2003	US2003385305A	Callen, Walter | Richardson, Toby | Frey, Gerhard | Gray, Kevin, A. | Kerovuo, Janne, S. | Slupska, Malgorzata | Barton, Nelson, R. | O'Donoghue, Eileen | Mathur, Eric, J. | Short, Jay, M.	1/29/2004	US US2001270496P 20010221 | US US20028187 2A 20020221 | US US2001270495P 20010221 | US US2002423626P 20021031 | US US2001291122P 20010514 | US US200281739A 20020221 | US US2003385305A 20030306 | US WO2002US5068A 20020221 | US US2002105733A 20020322	435201 | 4350691 | 435105 | 4353201 | 435325 | 5360232	A21D000804 | A23K0001165 | A23L000103 | A23L000109 | C11D0003386 | C12C000500 | C12N000928 | C12N000944
US20060228400 A1	SYNGENTA PARTICIPATIONS AG	Thermotolerant phytase for animal feed	The invention provides a synthetic phytase polynucleotide which is optimized for expression in plants and which encodes at thermotolerant phytase, as well as isolated thermotolerant phytase enzyme. Also provided are feed or food products comprising a thermotolerant phytase, and transgenic plants which express the thermotolerant phytase. Further provided are methods for making and using thermotolerant phytases, e.g., a method of using a thermotolerant phytase in feed and food processing.	A transformed plant which expresses a thermotolerant phytase is prepared by introducing an expression cassette comprising a promoter linked to nucleic acid molecule encoding a thermotolerant phytase.	4/26/2006	US2006412185A	Lanahan, Michael, B. | Betts, Scott	10/12/2006	US US2002334671A 20021230 | US US2006412185A 20060426 | US US2001344476P 20011228	424442 | 800278 | 435419 | 435468 | 435196 | 5360232 | 426635	A01H000100 | A23K000100 | A23K0001165 | A23K000118 | C07H002104 | C12N001582 | C12N000504 | C12N000916 | C12N000918
US20060137038 A1	SYNGENTA PARTICIPATIONS AG	Thermotolerant phytase for animal feed	The invention provides a synthetic phytase polynucleotide which is optimized for expression in plants and which encodes at thermotolerant phytase, as well as isolated thermotolerant phytase enzyme. Also provided are feed or food products comprising a thermotolerant phytase, and transgenic plants which express the thermotolerant phytase. Further provided are methods for making and using thermotolerant phytases, e.g., a method of using a thermotolerant phytase in feed and food processing.	A transformed plant which expresses a thermotolerant phytase is prepared by introducing an expression cassette comprising a promoter linked to nucleic acid molecule encoding a thermotolerant phytase.	2/10/2006	US2006351594A	Lanahan, Michael, B. | Betts, Scott	6/22/2006	US US2006351594A 20060210 | US US2002334671A 20021230 | US US2001344476P 20011228	800278 | 426635 | 435199 | 435419 | 435468	A01H000100 | A23K000100 | A23K0001165 | A23K000118 | C12N001582 | C12N000504 | C12N000918 | C12N000922

US5712112A	NAT SCIENCE COUNCIL OF R O C	Gene expression system comprising the promoter region of the alpha-amylase genes	The present invention is directed to a method for producing a gene product by expressing a gene encoding the gene product in angiosperm host cells, comprising the steps of constructing a vector expressible in angiosperm host cells, the vector comprising a promoter region derived from an alpha-amylase gene of a plant, and a gene encoding a desired gene product, transforming a compatible angiosperm host cell with the vector; cultivating the resultant transformant host cell, subjecting the cultivated transformant host cell to a sugar-depleted or sugar-free condition to promote the expression of the gene under the control of the promoter region, and recovering the expressed gene product. The present invention also is directed to a method for the production of a transgenic plant of rice crop comprising the steps of infecting an immature embryo of rice crop with the genus Agrobacterium for transformation, co-culturing the infected embryo with a dicot suspension culture during the step of transformation, allowing the transformed embryo to grow into a callus in a selective medium comprising a sufficient amount of a plant growth hormone for the growth of rice crop, and allowing the cultured callus to regenerate root and shoot in a regeneration medium comprising a pre-determined amount of nutrients for the growth of rice crop. The invention is further directed to a transformed rice plant made by methods of this invention.	A method of producing a gene product by expressing a gene encoding the gene product in host cells by transforming a host cell with a vector having a promotor region derived from an alpha amylase gene of the plant. The transfer of vector to host cell is agrobacterium mediated.	11/22/1994	US1994343380A	Yu, Su May | Liu, Li Fei | Chan, Ming Tsair	1/27/1998	US US1994343380A 19941122 | US US1992973324A 19921104	4350691 | 4350697 | 4350698 | 4350701 | 435410 | 435420 | 435469 | 5360231 | 5360236 | 5360241	C12N001582
US3804715A	HAYASHIBARA CO	Process for preparing sugar containing maltose of high purity	The present invention relates to a process for preparing sugar containing maltose of high purity from starches. More particularly, the invention relates to a process for preparing syrup having a high maltose content or pure maltose by using a beta.-amylase enzyme which is a maltose-producing enzyme together with various alpha.-1,6-glucosidases to increase maltose content to higher than 50 percent.	A process of producing sugar solutions having greater than 80% maltose content is disclosed. The process involves the use of 1,6-glucosidase which is produced from various sources including agrobacterium tumefaciens.	4/8/1970	US197026552A	Sugimoto, Kaname | Hirao, Mamoru	4/16/1974	JP JP196927543A 19690409 | US US197026552A 19700408	435095 | 426010 | 435201 | 435202 | 435210 | 435822 | 435826 | 435831 | 435834 | 435838 | 435847 | 435848 | 435853 | 435862 | 435863 | 435866 | 435872 | 435874 | 435880 | 435883 | 435885 | 435886 | 435894	C12N000928 | C12P001922
US6855365B2	DIVERSA CORP	Recombinant bacterial phytases and uses thereof	A purified and modified phytase enzyme from Escherichia coli K12 appA phytase is provided. The enzyme has phytase activity and improved thermal tolerance as compared with the wild-type enzyme. In addition, the enzyme has improved protease stability at low pH. Glycosylation of the modified phytase provided a further improved enzyme having improved thermal tolerance and protease stability. The enzyme can be produced from native or recombinant host cells and can be used to aid in the digestion of phytate where desired. In particular, the phytase of the present invention can be used in foodstuffs to improve the feeding value of phytate rich ingredients.	A method of improving the nutritional food value of a phytate containing food stuff is disclosed which involves a substantially pure or recombinant phytase enzyme.	5/24/2001	US2001866379A	Short, Jay M | Kretz, Keith A | Gray, Kevin A | Barton, Nelson Robert | Garrett, James B | O'Donoghue, Eileen | Mathur, Eric J.	2/15/2005	US US1999291931A 19990413 | US US1999318528A 19990525 | US US1999259214A 19990301 | US US2000580515A 20000525 | US US2001866379A 20010524 | US US1997910798A 19970813	426656 | 435018 | 435195 | 435196 | 4352523 | 4353201 | 530350 | 5360232	A21D000804 | A23J000314 | A23K000114 | A23K0001165 | A23L0001015 | A23L000103 | A23L0001105 | A23L0001211 | C12N000916 | A61K003800

US20030150023 A1	{n/a}	Starch	This invention relates to a method of producing a starch with unique functionality in plants through mutagenesis, and/or using biotechnology, and/or breeding practices. Further the invention relates to the starch from maize plants and/or other plants which produce starch storing organs which contain low amylose starch which has an amylose content between 1.5% and 15% and preferrably between 1.5% and 10% and most preferrably 1.5 and 8%. The invention includes starch extracted from such grain due to at least one mutation induced by ethyl methanesulfonate. Additionally, the invention uses a biotechnology approach involving controlling the activity of the granule bound starch synthase enzyme in starch storing organ. The invention includes the use of the starch for its cooking, paste, and gel properties.	Methods are disclosed for generating beneficial traits in donor as well as mutant receipient plants producing or storing starch. The donor nucleic acid sequence is incorporated into the receipient plants by transformation using agrobacterium tumefaciens, electroporation, microinjection.	10/17/2002	US2002272291A	Klucinec, Jeffrey, D. | Keeling, Peter, L. | Commuri, Padma | Chang, Ming Tang	8/7/2003	US US2001329525P 20011017 | US US2002272291A 20021017	800284 | 426661 | 435101 | 536102	A23L00010522 | C08B003000
US20070003668 A1	{n/a}	Lactobacillus acidophilus nucleic acid sequences encoding carbohydrate utilization-related proteins and uses therefor	Carbohydrate utilization-related and multidrug transporter nucleic acids and polypeptides, and fragments and variants thereof, are disclosed in the current invention. In addition, carbohydrate utilization related and multidrug transporter fusion proteins, antigenic peptides, and anti-carbohydrate utilization-related and anti-multidrug transporter antibodies are encompassed. The invention also provides vectors containing a nucleic acid of the invention and cells into which the vector has been introduced. Methods for producing the polypeptides and methods of use for the polypeptides of the invention are further disclosed.	A lactobacillus strain is modified to accumulate and transport carbohydrate into or out of a cell or utilize the carbohydrate as an energy source due to the expresion of polypeptide selected from a specific group.	3/7/2005	US200574226A	Klaenhammer, Todd, R. | Altermann, Eric | Barrangou, Rodolphe | Russell, W., Michael | Duong, Tri	1/4/2007	US US200574226A 20050307 | US US2004551121P 20040308	426043 | 4350691 | 4352529 | 435471 | 435200 | 5360232	A23C000912 | C07H002104 | C12N000121 | C12N001574 | C12N000924 | C12P002106
US5955269A	UNIV RUTGERS	Methods of screening foods for nutraceuticals	The invention relates to an assay system for screening nutraceuticals, i.e., foods or food substances that occur naturally, or that are produced during processing which are capable of modulating in a subject the expression of one or more genes associated with a disease or undesirable physical condition. The nutraceuticals identified by the screening assays can be incorporated into compositions which may be administered to a subject to treat or prevent a disease or undesirable condition, or otherwise to improve the health of the subject. The invention further provides methods for modifying the amount of nutraceuticals in raw and processed foods or food substances.	Compositions for identifying foods which are capable of modulating into a subject the expression of genes resulting in prevention of a disease	6/20/1996	US1996670826A	Ghai, Geetha | Boyd, Charles | Csiszar, Katalin | Ho, Chi Tang | Rosen, Robert T.	9/21/1999	US US1996670826A 19960620	435006 | 426478 | 435004 | 4350912	A23L000130 | C12N001582 | C12Q000168 | G01N003350
US20070006351 A1	The Scotts Company	Method for regenerating and transforming St. Augustinegrass from embryogenic callus	Method of initiating, proliferating, and regenerating embryogenic callus from immature inflorescence explants of St. Augustinegrass, and method of transforming and regenerating the embryogenic callus to produce transgenic St. Augustinegrass. The invention also encompasses St. Augustinegrass callus and adult plants produced by the method.	A method of producing transgenic St. Augustinegrass plant by transforming callus tissue with a DNA vector comprising a transgene. The transformation is agrobacterium mediated DNA transfer.	5/26/2006	US2006441344A	Torisky, Rebecca | Cobb, Della | Lee, Lisa | Van Eck, Joyce	1/4/2007	US US2006441344A 20060526 | US US2004777769A 20040213	800320 | 435419	A01H000400 | A01H000500 | C12N001582 | C12N000504

US20050183150 A1	None	Method for regenerating and transforming St Augustinegrass from embryogenic callus	Method of initiating, proliferating, and regenerating embryogenic callus from immature inflorescence explants of St Augustinegrass, and method of transforming and regenerating the embryogenic callus to produce transgenic St Augustinegrass The invention also encompasses St Augustinegrass callus and adult plants produced by the method	ABANDONED APPLICATION A method of producing transgenic St Augustinegrass plant by transforming callus tissue with a DNA vector comprising a transgene The transformation is agrobacterium mediated DNA transfer	2/13/2004	US2004777769A	Torisky, Rebecca | Cobb, Della | Lee, Lisa | Van Eck, Joyce	8/18/2005	US US2004777769A 20040213	800278 | 800320	A01H000400 | C12N001582
US7078035B2	Diversa Corporation	Phytases, nucleic acids encoding them and methods for making and using them	The invention provides isolated and recombinant phytase enzymes In one aspect, the phytases are produced by modification of the wild type appA of E coli The enzyme can be produced from recombinant host cells The phytases of the invention can be used to aid in the digestion of phytate where desired In particular, the phytases of the invention can be used in foodstuffs to improve the feeding value of phytate rich ingredients The phytases of the invention can be thermotolerant and/or thermostable Also provided are methods for obtaining a variant polynucleotide encoding a phytase and for obtaining a phytase with thermostability or thermotolerant at high or low temperatures	An isolated or recombinant polypeptide having a phytase activity is incorporated ina food composition wherein the phytase protein is thermotolerant or thermostable	5/24/2002	US2002156660A	Short, Jay M | Gray, Kevin A | Barton, Nelson R | Garrett, James B | O'Donoghue, Eileen	7/18/2006	US US1999291931A 19990413 | US US1997910798A 19970813 | US US2000580515A 20000525 | US US2002156660A 20020524 | US US1999318528A 19990525 | US US1999259214A 19990301 | US US2001866379A 20010524	4240946 | 426656 | 435019 | 4350691 | 435174 | 435176 | 435180 | 435195 | 435196 | 530350 | 5360232	A21D000804 | A23J000100 | A23J000314 | A23K000114 | A23K0001165 | A23L0001015 | A23L000103 | A23L0001105 | A23L0001211 | A61K003846 | C07H002104 | C07K000100 | C12N000121 | C12N000906 | C12N000916 | A61K003800
US5959187A	None	Expression of oxygen-binding proteins in plants	The present invention relates to genetic-engineering of plants for enhanced oxygen assimilation and utilization More particularly, this invention relates to producing transgenic plants engineered to express oxygen-binding proteins such as, for example, hemoglobin, myoglobin, and hemoproteins The engineered plants of the invention achieve quicker germination, are faster growing or maturing crops, produce higher crop yields, and/or contain higher levels of desired plant metabolites, particularly alkaloids	A plant has been genetically engineered by agrobacterium mediated transformation with a polynucleotide which hybridizes to encode an oxygen binding protein	9/26/1996	US1996720260A	Bailey, James E | Bulow, Leif	9/28/1999	US US1996720260A 19960926	8003173 | 4353201 | 435419 | 435468 | 435469 | 435470 | 5360237 | 800278 | 800282 | 800287 | 800298 | 800306 | 800312 | 8003172 | 8003174 | 8003201 | 8003202 | 8003203 | 800322 | 800323 | 8003231	C07K0014805 | C12N001582
US20050273879 A1	Pioneer Hi Bred International, Inc	Phytate polynucleotides and methods of use	Compositions and methods are provided for modulating the level of phytate in plants More specifically, the invention relates to methods of modulating the level of phytate utilizing nucleic acids comprising Ins (1,3,4,5,6)P52-kinase (IP2K) nucleotide sequences to modulate the expression of IP2K in a plant of interest The compositions and methods of the invention find use in agriculture for improving the nutritional quality of food and feed by reducing the levels of phytate and/or increasing the levels of non-phytate phosphorus in food and feed The invention also finds use in reducing the environmental impact of animal waste	A method for producing food with reduced amount of phytate by transforming a plant with a nucleic acid of a specific sequence	2/9/2005	US200554168A	Shi, Jinrui | Sleister, Heidi	12/8/2005	US US2004543079P 20040209 | US US200554168A 20050209	800278 | 426053 | 4350691 | 435194 | 435419 | 435468 | 5360232	A01H000100 | A23B000710 | C07H002104 | C12N000504 | C12N000912

US20050278803 A1	Pioneer Hi Bred International, Inc	Compositions and methods for altering the disulfide status of proteins	Compositions and methods for the alteration of the disulfide status of plant proteins are provided. Novel nucleotide molecules, comprising nucleotide sequences for thioredoxin h and NADPH-thioredoxin reductase, and the proteins encoded thereby are provided. The nucleotide sequences can be used to transform plants alone or in combination with other sequences, such as sequences encoding NADPH generating enzymes, to manipulate the thioredoxin h system and alter the protein disulfide status in plants. Transformed plants, plant cells, plant tissues, seed and grain are provided.	An nucleotide construct is used for agrobacterium mediated transformation in plants like sweet potato	8/2/2005	US2005195459A	Sewalt, Vincent | Hastings, Craig | Meeley, Robert | Hantke, Sabine | Jung, Rudolf | Everard, John | Allen, Stephen	12/15/2005	US US2005195459A 20050802 | US US2000250703P 20001201 | US US20015429A 20011203	800278 | 426053 | 435412 | 435468 | 8003201	A01H000100 | A01H000500 | A23B000710 | A23K000114 | A23K000302 | A23L000110 | A23L0001168 | C12N001582 | C12N000504 | C12N000902
US20040091968 A1	None	Recombinant phytases and methods of making and using them	A purified and modified phytase enzyme from Escherichia coli K12 appA phytase is provided. The enzyme has phytase activity and improved thermal tolerance as compared with the wild-type enzyme. In addition, the enzyme has improved protease stability at low pH. Glycosylation of the modified phytase provided a further improved enzyme having improved thermal tolerance and protease stability. The enzyme can be produced from native or recombinant host cells and can be used to aid in the digestion of phytate where desired. In particular, the phytase of the present invention can be used in foodstuffs to improve the feeding value of phytate rich ingredients.	A method for making a phytase is disclosed wherein a nucleic acid is derived from a bacteria encoding a polypeptide having a phytase activity is allowed for e3xpression in yeast	6/20/2003	US2003601319A	Short, Jay, M | Kretz, Keith | Gray, Kevin, A | Barton, Nelson, R | Garrett, James, B | O'Donoghue, Eileen | Mather, Eric, J	5/13/2004	US US2003601319A 20030620 | US US1999318528A 19990525 | US US1999291931A 19990413 | US US2001866379A 20010524 | US US1997910798A 19970813 | US US2000580515A 20000525 | US US1999259214A 19990301	4350691 | 426020 | 435196 | 4352542	A21D000804 | A23J000314 | A23K000114 | A23K0001165 | A23L0001015 | A23L000103 | A23L0001105 | A23L0001211 | C12N000916 | A61K003800
US5593963A	Mogen International | Gist brocades, B	Expression of phytase in plants	The present invention provides for the expression of phytase in transgenic plants or plant organs and methods for the production of such plants. DNA expression constructs are provided for the transformation of plants with a gene encoding phytase under the control of regulatory sequences which are capable of directing the expression of phytase. These regulatory sequences include sequences capable of directing transcription in plants, either constitutively, or stage and/or tissue specific, depending on the use of the plant or parts thereof. The transgenic plants and plant organs provided by the present invention may be applied to a variety of industrial processes either directly, e.g. in animal feeds or alternatively, the expressed phytase may be extracted and if desired, purified before application.	Expression of phytase in transgenic plants like sweet potato. DNA constructs are provided for the transformation and subcloned into a binary cvector, which is introduced into Agrobacterium tumefaciens containing a disarmed Ti plasmid. The plant parts or plants are convereted into a composition suitable for animal feed.	11/2/1993	US1993146424A	Van Ooijen, Albert J. J. | Rietveld, Krijn | Hoekema, Andreas | Pen, Jan | Sijmons, Peter C. | Verwoerd, Teunis C.	1/14/1997	US US1990586765A 19900921 | US US1993146424A 19931102 | US US1991756864A 19910911 | EP EP1991200687A 19910325	514012 | 42409321 | 426053 | 426054 | 426635 | 4350691 | 4350698 | 435196 | 4352523 | 4353201 | 435419 | 514044 | 53602374 | 5360241 | 800298 | 800306 | 8003173	A61K003846
US3691013A	HAYASHIBARA COMPANY	Process for reducing ketone	None	Lactose dehyrogenase producing strains are cultivated on a medium. Agrobacterium is is used as an enzyme producer and sweet potato is used to prepare a starch slurry.	25750	US197058146A	MIYAKE TOSHIO | SAKAI SHUZO | SATO YOSHINORI	26554	JP JP196959263A 19690727 | US USD3691013A 19700724 | JP JP196959262A 19690727	435095 | 426052 | 426549 | 426558 | 426565 | 426572 | 426579 | 426580 | 426587 | 426599 | 426635 | 426637 | 426664 | 435098 | 435100 | 435137 | 435190 | 435201 |	A23L0001236 | C12P001914 | C12P001922 | C12P000758

US5567600A	Mycogen Plant Sciences, Inc	Synthetic insecticidal crystal protein gene	Synthetic Bacillus thuringiensis toxin genes designed to be expressed in plants at a level higher than naturally-occurring Bt genes are provided. These genes utilize codons preferred in highly expressed monocot or dicot proteins.	Method of designing a synthetic gene Bacillus thuringiensis to be more expressed in plants. Plant expressions are utilized in disarmed Agrobacterium tumefaciens to introduce the synthetic gene into plant genomic DNA. Ipomoea batatas is used as during the design of synthetic insecticidal crystal protein gene	34705	US1995369835A	Adang, Michael J. | Rocheleau, Thomas A. | Merlo, Donald J | Murray, Elizabeth E	35360	US US1995369835A 19950106 | US US199357191A 19930503 | US US1988242482A 19880909 | US US1986848733A 19860404 | US US1983535354A 19830926 | US US1992827844A 19920128	53602371 | 4350691 | 435418 | 435468 | 435469 | 435470 | 800279	C07K0014325 | C12N001582
US5686649A	The Rockefeller University	Suppression of plant gene expression using processing-defective RNA constructs	Disclosed is a novel method of suppressing plant gene expression. The suppression is achieved by transforming a plant with a DNA construct encoding a processing-defective RNA (pd-RNA constructs). A pd-RNA construct comprises a plant active promoter operably linked to a pd-RNA encoding segment (pd-RNA segment), wherein the pd-RNA segment comprises a sequence substantially homologous to the target gene and a defective intron and/or a defective 3' termination and processing sequence (hereinafter 3' processing sequence). The pd-RNA constructs of the present invention are designed to express target-gene-homologous RNA transcripts that are defective for messenger RNA processing. Various types of pd-RNA constructs are disclosed, including those defective for endonucleolytic cleavage or polyadenylation at the 3' end of the pd-RNA transcript and/or intron splicing. A pd-RNA construct of the invention may used to suppress a single, specific target gene or multiple target genes. Further, the suppression effect of a pd-RNA construct can be modulated and controlled through the use of an appropriate promoter.	A method of suppressing plant gene expression, Agrobacterium tumefaciens is used to introduce a pd-RNA containing recombinant contruct into plants. Such transformed plant includes yam	34718	US1995375222A	Chua, Nam Hai | van der Krol, Alexander	35745	US US1995375222A 19950119 | US US1994216229A 19940322	800285 | 435419 | 435468 | 435469 | 8003231	A01H000502 | C12N001582
US20040088760 A1	None	Gossypium hirsutum tissue-specific promoters and their use	The present invention relates to an isolated DNA molecule selected from the group a promoter-effective DNA molecule of Gossypium which is operable in embryonic seed tissues and a promoter-effective DNA molecule of Gossypium which is operable in chlorophyllous tissues. Use of the promoter-effective DNA molecules in chimeric genes, and preparation of expression systems, host cells, transgenic plants, and transgenic plant seeds containing such chimeric gene is also disclosed. Methods of expressing a heterologous mRNA molecule or protein or polypeptide in chlorophyllous tissue of plants or embryonic seed tissues are also disclosed.	Isolated DNA molecule introduced into a host cell,eg Sweet potato, to make a chimeric gene. The transformation technique uses Agrobacterium tumefaciens	37918	US2003343810A	Allen, Randy, D | Song, Ping	38113	WO WO2001US24846A 20010807 | US US2003343810A 20031024	800282 | 4353201 | 435419 | 5360232 | 800314	C12N001582
US20030229925 A1	Meristem Therapeutics S.A	Recombinant lactoferrins, methods of production from plants and uses thereof	The invention concerns the use of a recombinant nucleotide sequence containing a cDNA coding for a lactoferrin, in particular human lactoferrin, or the derived proteins, and elements enabling a plant cell or produce lactoferrin or the derived proteins, coded by said cDNA, in particular a transcription promoter and terminator identified by the plant cell transcription machinery, to transform plant cells in order to obtain, from these cells, or plants obtained therefrom, lactoferrin or derived proteins.	Recombinant nucleotide sequence using sweet potato sporamine A as signal peptide. The cellular host used for transformation is Agrobacterium tumefaciens	37768	US2003446234A	Legrand, Dominique | Salmon, Valerie | Spik, Genevieve | Gruber, Veronique | Bournat, Philippe | Merot, Bertrand	37966	FR FR19975699A 19970502 | US US2003446234A 20030527 | US US2000423097A 20000321	800288 | 4350691 | 4353201 | 435419 | 530400 | 5360235	C07K001479 | C12N001582

US20030018993 A1	None	Methods of gene silencing using inverted repeat sequences	The present invention provides methods for inhibiting target gene expression, by expressing in a cell a nucleic acid construct comprising an inverted repeat and a sense or antisense region having substantial sequence identity to a target gene, wherein the inverted repeat is unrelated to the target gene.	Target gene inhibition using eg. Yam, plant cell. NOS gene from A. tumefaciens is used for heterologous repeat of the invention.	37110	US2001924197A	Gutterson, Neal | Oeller, Paul	37644	US US2000225508P 20000815 | US US2001924197A 20010807	800286 | 435455 | 800294	C12N001582
US20020004085 A1	Novozymes Biotech, Inc.	Methods for producing potato products	The present invention relates to methods for producing consumable products from potatoes, comprising: (a) treating a potato substance with an effective amount of one or more exogenous enzymes selected from the group consisting of an amyloglucosidase, glucose oxidase, laccase, lipase, maltogenic amylase, pectinase, pentosanase, protease, and transglutaminase, and (b) processing the enzyme-treated potato substance to produce a potato product. The invention also relates to consumable products obtained from potatoes by the methods of the present invention.	Production of consummable product from potatoes, involving enzyme treated processing, eg. Agrobacterium	36994	US2001834560A	Xu, Feng | Kofod, Lene, Venke | Olsen, Hans, Sejr	37266	US US2000704395A 20001101 | DK DK2000623A 20000414 | US US2001834560A 20010413	426052 | 426637	A23L0001217
US6833490B1	Mogen International N.V.	Regulating metabolism by modifying the level of trehalose-6-phosphate	The invention involves decreasing the intracellular availability of trehalose-6-phosphate by plant cell transformation with a gene encoding trehalose-6-phosphate phosphatase from E. coli. Phenotypic effects of plant transformation with this gene include stimulation of glycolysis, cell or tissue growth, and metabolism, and inhibition of photosynthesis and bolting.	A transgenic, eg. tobacco plant is produced by transforming with A. tumefaciens. Sweet potato is one of the optional plants that can also be transformed by using the Agrobacterium technique.	36278	US1999171937A	Goddijn, Oscar Johannes Maria | Pen, Jan | Smeekens, Josephus Christianus Maria	38342	EP EP1996202395A 19960829 | EP EP1996202128A 19960726 | EP EP1996201225A 19960503 | US US1999171937A 19990428 | EP WO1997EP2497A 19970502	800284 | 435101 | 435194 | 435468 | 435469 | 800278 | 800287 | 800288 | 800290 | 800294	C12N001582 | C12N000910 | C12N000912 | C12N000916 | C12N000924
US6261561B1	Henry M. Jackson Foundation for the Advancement of Military Medicine	Method of stimulating an immune response by administration of host organisms that express intimin alone or as a fusion protein with one or more other antigens	This invention satisfies needs in the art by providing intimin, the Enterohemorrhagic Escherichia coli (EHEC) adherence protein, alone or as a fusion protein with one or more other antigens, expressed by transgenic plants and the use of those plants as vehicles for stimulating a protective immune response against EHEC and the one or more other antigens. Various plant species are transformed to protect various animal species and also humans against EHEC, against pathogens expressing intimin-like proteins, and against pathogens expressing any of the one or more other antigens to which intimin may be fused. The eae gene encoding intimin, a functional portion thereof, or a recombination that encodes a fusion protein is put under the control of a constitutive plant promoter in a plasmid and the plasmid is introduced into plants by the type of transformation appropriate for the particular plant species. The engineered plants expressing intimin or the intimin fusion protein are then fed to animals and/or humans to elicit the production of antibodies, which protect the animals/humans against EHEC colonization and infection, and against pathogens expressing the one or more other antigens and any cross-reactive antigens. The invention may also be practiced by expressing the intimin or intimin fusion protein in other host organisms such as bacteria, yeast, and fungi.	Invention revolves around a method of stimulating an immune response using proteins. In an example, A. tumefaciens mediated transformation for expression of intimin is discussed. One of the plants that can be used for a transformation is sweet potato.	35538	US1997840466A	Stewart, Jr., C. Neal | McKee, Marian L. | O'Brien, Alison D. | Wachtel, Marian R.	37089	US US199615657P 19960419 | US US199615938P 19960422 | US US1997840466A 19970418	4241841 | 4242341 | 435006 | 4350691 | 4352523 | 435469 | 435470 | 53602371 | 800288	A61K0039112 | A61K004748 | C07K001424 | C07K0014245 | C07K001612 | C12N001582 | A61K003800

US7056544B2	Novozymes, Inc | Novozymes A/S	Methods for producing potato products	The present invention relates to methods for producing consumable products from potatoes, comprising: (a) treating a potato substance with an effective amount of one or more exogenous enzymes selected from the group consisting of an amyloglucosidase, glucose oxidase, laccase, lipase, maltogenic amylase, pectinase, pentosanase, protease, and transglutaminase, and (b) processing the enzyme-treated potato substance to produce a potato product. The invention also relates to consumable products obtained from potatoes by the methods of the present invention.	Potato products by enzyme treatment. Brief mention of Agrobacterium as an enzyme provider.	36994	US2001834560A	Xu, Feng | Kofod, Lene Venke | Olsen, Hans Sejr	38874	US US2000704395A 20001101 | DK DK2000623A 20000414 | US US2001834560A 20010413	426052 | 426637	A23L0001216 | A23L0001217
US6720014B1	Diversa Corporation	Phytase-containing foodstuffs and methods of making and using them	A purified recombinant phytase enzyme derived from Escherichia coliB. The enzyme has a molecular light of about 47.1 kilodaltons and has phytase activity. The enzyme can be produced from native or recombinant host cells and can be used to aid in the digestion of phytate where desired. In particular, the phytase of the present invention can be used in foodstuffs to improve the feeding value of phytate rich ingredients.	Method to produce a foodstuff comprising a polypeptide having phytase activity, especially for monocots. Brief mention of use of A. tumefaciens for transformation of plants including sweet potato in the specification.	36671	US2000580515A	Short, Jay M. | Kretz, Keith A.	38090	US US1999291931A 19990413 | US US1997910798A 19970813 | US US1999259214A 19990301 | US US2000580515A 20000525 | US US1999318528A 19990525	426052 | 426053 | 426061 | 426615 | 426635 | 435018 | 4350691 | 435196 | 4353201 | 435410 | 435468 | 5360232 | 800278 | 800295	A21D000804 | A23K0001165 | A23L0001015 | A23L000103 | A23L0001211 | C12N000916 | A61K003800
US6288302B1	National Science Council of R O C	Application of α-amylase gene promoter and signal sequence in the production of recombinant proteins in transgenic plants and transgenic plant seeds	Disclosed is a method for producing a transgenic angiosperm plant, particularly a monocot, comprising the step of transforming an immature embryo of an angiosperm plant with a DNA fragment expressible in said angiosperm embryo, said DNA fragment comprising a promoter region derived from an α-amylase gene of a plant, and an exogenous gene encoding a desired gene product, said promoter region being inducible under a sugar-depleted or sugar-free condition to promote the expression of said gene, whereby at least a part of the resultant transgenic angiosperm plant has the ability to express said gene product. Transgenic angiosperm plants and transgenic angiosperm plant seeds are also disclosed. The transgenic angiosperm plant seeds may have application in the industrial production of alcohol, beer, glucose and the like.	A transgenic monocot plant is produced by agrobacterium mediated transformation of an immature embryo with a DNA expressible in cells. At least a part of the transgenci plant expresses gene product under sugar free condition.	35919	US199872917A	Yu, Su May | Liu, Li Fei | Chan, Ming Tsair	37145	US US1994343380A 19941122 | US US1995509962A 19950801 | US US199872917A 19980504 | US US1997947201A 19971008 | US US1992973324A 19921104	800287 | 4350691 | 435429 | 435468 | 435469 | 800278 | 800294 | 800320 | 8003202	C12N001582
US5914123A	Prodigene, Inc	Vaccines expressed in plants	The anti-viral vaccine of the present invention is produced in transgenic plants and then administered through standard vaccine introduction method or through the consumption of the edible portion of those plants. A DNA sequence encoding for the expression of a surface antigen of a viral pathogen is isolated and ligated to a promoter which can regulate the production of the surface antigen in a transgenic plant. This gene is then transferred to plant cells using a procedure that results in its integration into the plant genome, such as through the use of an Agrobacterium tumefaciens plasmid vector system. Preferably, the foreign gene is expressed in an portion of the plant that is edible by humans or animals. In a preferred procedure, the vaccine is administered through the consumption of the edible plant as food, preferably in the form of a fruit or vegetable juice.	Transgenic plants are developed which express recombinant immunogen derived from Hepatatis as well as Transmissible Gastroenteritis virus. He transgenic plant is edible and ingested for its nutritional value.	34857	US1995479742A	Arntzen, Charles Joel | Lam, Dominic Man Kit	36333	US US1993156508A 19931123 | US US199326393A 19930304 | US US1991750049A 19910826 | US US1995479742A 19950607 | US WO1994US2332A 19940304	424439 | 4240931 | 4242231 | 4242251 | 424442 | 426615 | 426637 | 800288 | 8003172 | 8003174	C07K001402 | C12N001582 | A61K003900

US20060281908 A1	None	Xylose isomerases, nucleic acids encoding them and methods for making and using them	In one aspect, the invention provides xylose isomerase enzymes, polynucleotides encoding the enzymes, methods of making and using these polynucleotides and polypeptides. The polypeptides of the invention can be used in a variety of agricultural and industrial contexts. For example, the polypeptides of the invention can be used for converting glucose to fructose or for manufacturing high content fructose syrups in large quantities. Other examples include use of the polypetides of the invention in confectionary, brewing, alcohol and soft drinks production, and in diabetic foods and sweetners.	An isolated synthetic or recombinant nucleic acid is linked to a plant promoter derived from T-DNA of Agrobacterium tumefaciens. A method is also disclosed for producing a high fructose syrup comprising Sweet potato	38919	US2006533241A	Callen, Walter	39065	US US2006533241A 20060721 | US WO2003US34008A 20031023 | US US2002424649P 20021106	5360232 | 435234 | 435105 | 4350691 | 4352523 | 4353201 | 435006	C07H002104 | C12N000121 | C12N000992 | C12P001902 | C12P002106 | C12Q000168
US6215051B1	National Science Council of R O C	Aarobacterium-mediated method for transforming rice	The present invention is directed to a method for the production of a transgenic plant of rice crop comprising the steps of infecting an immature embryo of rice crop with the genus Agrobacterium for transformation, co-culturing the infected embryo with a dicot suspension culture during the step of transformation, allowing the transformed embryo to grow into a callus in a selective medium comprising a sufficient amount of a plant growth hormone for the growth of rice crop, and allowing the cultured callus to regenerate root and shoot in a regeneration medium comprising a pre-determined amount of nutrients for the growth of rice crop. The invention is further directed to a transformed rice plant made by methods of this invention.	The invention is about a method of producing transgenic rice by using Agrobacterium tumefaciens for transformation. the details and various conditions are discussed. Needs to be compared with the transfromation technique used for sweet potato.	35919	US199872435A	Yu, Su May | Liu, Li Fei | Chan, Ming Tsair	36991	US US199872435A 19980504 | US US1997957305A 19971023 | US US1994343380A 19941122 | US US1996639792A 19960429 | US US1992973324A 19921104	8003202 | 4350698 | 435204 | 435429 | 4354301 | 435431 | 435469 | 800287 | 800294	C12N001582
US6716474B2	Monsanto Technology LLC	Expression of fructose 1,6 bisphosphate aldolase in transgenic plants	Fructose-1,6-bisphosphate aldolase (FDA) is an enzyme reversibly catalyzing the reaction converting triosephosphate into fructose-1,6-bisphosphate. In the leaf, this enzyme is located in the chloroplast (starch synthesis) and the cytosol (sucrose biosynthesis). Transgenic plants were generated that express the E. colifda gene in the chloroplast to improve plant yield by increasing leaf starch biosynthetic ability in particular and sucrose production in general. Leaves from plants expressing the fda transgene showed a significantly higher starch accumulation, as compared to control plants expressing the null vector, particularly early in the photoperiod, but had lower leaf sucrose. Transgenic plants also had a significantly higher root mass. Furthermore, transgenic potatoes expressing fda exhibited improved uniformity of solids.	Invention is a transgenic potato plant with a DNA construct. Promoters acitve in plant cells include A. tumefaciens. Plants that can have enhanced carbon assimilation include sweet potato.	37109	US2001923109A	Barry, Gerard F. | Cheikh, Nordine | Kishore, Ganesh M.	38083	US US199749955P 19970617 | US US199898219A 19980616 | US US2001923109A 20010806	426637	C12N001582 | C12N000988

US6025188A	Pioneer Hi Bred International, Inc	Fumonisin detoxification compositions and methods	Methods for identifying organisms capable of degrading fumonisin. Fumonisin can be incorporated into culture medium for selection of organisms resistant to fumonisin and/or capable of growing on fumonisin as a sole carbon source. Using this method, several organisms have been identified. These organisms can be used to isolate the enzymes and the genes responsible for conferring fumonisin-resistance. The gene can be cloned and inserted into a suitable expression vector so that the protein can be further characterized. Additionally, the DNA encoding for fumonisin degrading enzymes can be used to transform plant cells normally susceptible to Fusarium or other toxin-producing fungus infection. Plants can be regenerated from the transformed plant cells. In this way, a transgenic plant can be produced with the capability of degrading fumonisin, as well as with the capability of producing the degrading enzymes. Methods for detoxification in grain, grain processing, silage, food crops and in animal feed and rumen microbes are also disclosed.	A biodegradation method including an Agrobacterium mediated transformation	35618	US1997888949A	Duvick, Jonathan | Maddox, Joyce R | Rood, Tracy A | Wang, Xun | Bowen, Benjamin A | Gilliam, Jacob T	36571	US US1995484815A 19950607 | US US1994289595A 19940812 | US US1997888949A 19970707	435267 | 426044 | 426052 | 426053 | 435135 | 435136 | 435197 | 435262	A01N006300 | C12N001582 | C12N000900 | C12N000916 | C12N000918
US6569831B1	Meristem Therapeutics S.A.	Recombinant lactoferrin, methods of production from plants and uses	The invention concerns the use of a recombinant nucleotide sequence containing a cDNA coding for a lactoferrin, in particular human lactoferrin, or the derived proteins, and elements enabling a plant cell to produce lactoferrin or the derived proteins, coded by the cDNA, in particular a transcription promoter and terminator identified by the plant cell transcription machinery, to transform plant cells in order to obtain, from these cells, or plants obtained therefrom, lactoferrin or derived proteins.	Use of recombinant nucleotide sequence to transform plants, using A. tumefaciens. The signal peptide is that of sweet potato sporamin A.	36606	US2000423097A	Legrand, Dominique | Salmon, Valerie | Spik, Genevieve | Gruber, Veronique | Bournat, Philippe | Merot, Bertrand	37768	FR WO1998FR895A 19980504 | FR FR19975699A 19970502 | US US2000423097A 20000321	514012 | 4350691 | 4352523 | 4353201 | 435410 | 435419 | 514008 | 530350 | 5360231 | 5360241 | 800287 | 800288 | 800295	C07K001479 | C12N001582
US6399351B1	Novozymes A/S	Pectate lyases	A novel pectate lyase belonging to a novel family of polysaccharide lyases has good performance in industrial processes under neutral or alkaline conditions such as laundering and textile processing. The pectate lyase may be derivable from Bacillus species.	Isolated polypeptides having amino acid sequences and encoded by a DNA sequence	36600	US2000526416A	Bjørnvad, Mads Eskelund | Andersen, Jens Toenne | Schnorr, Kirk | Schulein, Martin | Kongsbak, Lars	37411	US US1999124969P 19990318 | DK DK1999367A 19990316 | US US2000526416A 20000315	435232 | 426592 | 426599 | 426656 | 435200 | 435262 | 435263 | 435264 | 435267 | 435277 | 435278 | 510320 | 510392 | 530350	A23K0001165 | C11D0003386 | C12N000988 | A23B000400
US6337431B1	Seminis Vegetable Seeds, Inc	Transgenic plants expressing DNA constructs containing a plurality of genes to impart virus resistance	The present invention provides a chimeric recombinant DNA molecule comprising a plurality of DNA sequences, each of which comprises a plant-functional promoter linked to a coding region, which encodes a virus-associated coat protein, wherein said DNA sequences are preferably linked in tandem so that they are expressed in virus-susceptible plant cells transformed with said recombinant DNA molecule to impart resistance to said viruses, as well as methods for transforming plants with the chimeric recombinant DNA molecule and for selecting plants which express at least one of said DNA sequences imparting viral resistance.	Method of imparting viral-resistance to a plant, wherein the DNA molecule is part of a binary Ti plasmid and the plant cells are transformed by A. tumefaciens mediated transformation.	35709	US1997860379A	Tricoli, David M | Carney, Kim J | Russell, Paul F | Quemada, Hector D | McMaster, Russell J | Reynolds, John F | Deng, Rosaline Z	37264	US WO1995US6261A 19950607 | US US1997860379A 19971006 | US US1994366991A 19941230	800280 | 4353201 | 435419 | 435468 | 435469 | 800288 | 800294 | 800301 | 800317	C07K001408 | C12N001582
US6297427B1	National Science Council	Insect resistant use of sweet potato sporamin gene and method for controlling pests using the gene	The present invention provides for the use of a sweet potato sporamin gene in insect-resistance, in which the gene is inserted into an appropriate vector, then the gene is transformed into plants to enhance the plant's insect resistance, for the purpose of controlling pests.	Transformation vector comprising of transformed Agrobacterium. Method of enhancing pest resistance by transforming the sporamin gene with Agrobacterium.	35865	US199838542A	Yeh, Kai Wun | Lin, Mei In | Tuan, Shu Jen | Chen, Yih Ming | Lin, Chu Yung | Kao, Suey Sheng	37166	TW TW1997103072A 19970311 | US US199838542A 19980311	800279 | 4352523 | 4353201 | 5360236 | 800294	A01N006500 | C07K0014415 | C07K001481 | C12N001582

US6528703B1	Ball Horticultural Company	Production of transgenic impatiens	Impatiens is a major ornamental bedding and potted plant, and is an important component of the U S floral industry Susceptibility to insect pests and diseases caused by pathogens remains a problem for Impatiens production, even under greenhouse conditions While chemical treatment can control certain insect pests and disease pathogens, such treatment can also have an adverse effect upon Impatiens The methods described herein provide a means to genetically engineer transgenic Impatiens that express macromolecules capable of protecting the plant against the insects and pathogens The production of transgenic plants can also be used to enhance the commercial value of Impatiens by controlling or enhancing native Impatiens characteristics	Method of producing transgenic Impatiens plants, including the step of introducing expression vectors like A tumefaciens via direct infection of co-cultivation	36664	US2000572323A	Chou, Tau San	37684	US US2000572323A 20000518 | US US1998151782A 19980911	800278 | 4350691 | 435200 | 435209 | 435430 | 435431 | 435468 | 435469 | 435470 | 800280 | 800281 | 800282 | 800283 | 800285 | 800286 | 800288 | 800290 | 800293 | 800294 | 800302 | 800323	A01H000502 | C12N001582
US6022846A	Mogen International and Gist brocades N	Expression of phytase in plants	The present invention provides for the expression of phytase in transgenic plants or plant organs and methods for the production of such plants DNA expression constructs are provided for the transformation of plants with a gene encoding phytase under the control of regulatory sequences which are capable of directing the expression of phytase These regulatory sequences include sequences capable of directing transcription in plants, either constitutively, or stage and/or tissue specific, depending on the use of the plant or parts thereof The transgenic plants and plant organs provided by the present invention may be applied to a variety of industrial processes either directly, e g in animal feeds or alternatively, the expressed phytase may be extracted and if desired, purified before application	Animal feed composition with a phytase recombinately produced in plants Plants including sweet potato and introduction of gene constructions into these plants with A tumefaciens	35961	US199897847A	Van Ooijen, Albert J J | Rietveld, Krun | Hoekema, Andreas | Pen, Jan | Sijmons, Peter Christian | Verwoerd, Teunis Cornelis	36564	US US1993146424A 19931102 | EP EP1991200687A 19910325 | US US1990586765A 19900921 | US US1991756864A 19910911 | US US199897847A 19980615 | US US1996693709A 19960807	512005 | 426630 | 435196 | 435375 | 800278 | 800290 | 800298	A01H000500 | C11B000900 | C12N001582 | C12N000504