TECHNOLOGIES

HEALTH

Protozoan Variant-Specific Surface Proteins as Carriers for Oral or Mucosal Drug Delivery

Technology description

The present invention describes the use of polypeptides derived from VSP (Giardia variant-specific surface proteins) as oral drug delivery ligands or formulation additives. The VSPs are resistant to degradation in the gastro intestinal tract contain, and can protect the attached drug material from degradation, which increases their utility for use in orally delivered drug formulations. This technology allows the oral drug delivery of bioactive peptides that, at present, are being delivered by injection. Both oral and mucosal administration routes were tested.

Applications

- Oral delivery of therapeutic and diagnostic drugs.
- Increases the solubility of poorly soluble drugs for oral delivery.

Keywords: Metabolic diseases | Bioactive agents

Advantages

• Injectable compositions can be made suitable for oral administration.
• Oral delivery represents the ideal means of delivering prophylactic and therapeutic agents because of ease of administration, patient compliance and cost with respect to injectables.
• Bioactive peptides are not covalently bound to VSPs, making the pharmaceutical preparations simple to perform.

Development status

• Recombinant production of VSP was optimised.
• Increasing of the resistance of different active biopeptides to low pH and enzyme degradation was demonstrated in vitro and in vivo when they are combined with VSP.
• Attachment of VSP to enteric mucosa after oral administration was demonstrated.
• The pharmacological activity of some active biopeptides combined with VSP administered orally was demonstrated.

Patent status

Priority date: 02/07/2012. Application number: US13/843,766, filing date: 15/03/2013. Pending in: USA, Argentina.

Scientific leader

Hugo Daniel Luján, PhD

Novel Vaccine for the Prevention of Bordetella pertussis and Bordetella parapertussis Infections

Technology description

The present invention refers to the elaboration of vaccines against B. pertussis and B. parapertussis (etiologic agents of the disease known as whooping cough) by immunization with outer membrane vesicles (OMVs) combinations from both strains. The OMVs include protein and non-protein components and its use is proposed either as monovalent vaccines or as multivalent vaccine formulations (i.e. diphtheria and tetanus toxoids combination). The OMVs obtention biotechnology process does not need cloning steps.

Applications

Development of immunogenic formulations against B. pertussis y B. parapertussis bacterial pathogens, both for human and animal health. OMVs can be used to produce vaccines to be applied through both mucous membrane and parenteral administration. The proposed formulations containing B. parapertussis OMVs or a combination of B. parapertussis and B. pertussis OMVs protect against both species, in contrast to any of the current vaccines that have a reduced protection capacity against B. parapertussis.

Keywords: Nanomedicine | Human health | Bacteriology | Whooping cough

Advantages

In reference to acellular (purified proteins) vaccines: • OMVs present a greater diversity of antigens.
• Vesicle proteins conformation is closer to that of the causative agent of disease.
• The biotechnological process for the obtention of OMVs consists of a few steps that are less than those required to purify one by one the components of current acellular vaccines.
• Assays made on murine model demonstrated that the proposed formulations induce an immune response profile mainly of Th1-Type. In relation to acellular vaccines: Assays made on murine model demonstrated that any of the proposed formulations exhibit a reduced toxicity, lower than cellular formulations and similar to those of acellular formulations.

Development status

From the point of view of safety and efficacy, in vivo tests were performed using the accepted animal model (mouse) obtaining satisfactory results in relation to the protective capacity of OMVs and their biosafety. From the technological point of view, OMVs production was satisfactorily made at laboratory reactor-scale.

Patent status

Priority date: 27/03/2013. Priority number: AR2013P101023. Priority application country: Argentina.

Scientific leader

Martín Rumbo, PhD

Pharmaceutical Excipient for Orally Disintegrating Tablets

Technology description

This technology describes the use of an excipient, consisting of a polyalcohol and a water soluble polymer, which favours disintegration/dissolution of oral tablets in the mouth cavity in just a few seconds, with no need to ingest water.

Applications

Use in the formulation of active ingredients either alone or with the addition of flavourings and colourings, in the pharmaceutical industry.

Keywords: Human health | Adjuvant | ODT | Food

Advantages

- Fast disintegration and dissolution, maintaining the hardness of the tablet.
- Pleasant taste.
- Easy compacting and uniform size.
- Simple to obtain, avoiding the use of organic solvents.
- Easy to scale up.
- Water soluble.
- Low cost and easy accessibility.

Development status

Proof of concept has been accomplished and the product is ready for scale-up.

Patent status

Priority date: 21/05/2012. Application number: AR2012P101793. PCT application number: PCT/IB2013/054188. Priority application country: Argentina. Pending in: Argentina.

Scientific leader

María Verónica Ramírez Rigo, PhD

Ophthalmic Drug Delivery Film that improves Drug Bioavailability

Technology description

The present technology consists of a controlled release system for topic administration of ophthalmological active ingredient that contains in particular a mucoadhesive film carrier including an ophthalmological active ingredient. This technology presents better properties than classical formulations in terms of mucoadherence, biodisponibilidad, and incidence of toxic or irritating effects.

Applications

Use in the treatment of ophthalmic pathologies.

Keywords: Human health | Glaucoma

Advantages

• Allows the effective eye topic administration of drugs, reducing adverse effects generated by the systemic administration of these compounds.
• Enhances the drug bioavailability at the site of action reducing the number of applications and the amount of drug needed for an effective result.
• Polycationic polymer, biodegradable, non-toxic and widely available.

Development status

In vitro tests and preclinical data in rabbits over several film formulations.

Patent status

Priority date: 24/01/2013. Application number: AR2013P100221. Priority application country: Argentina.

Scientific leader

Juan Manuel Llabot, PhD

Penicillin Derivatives with Antiproliferative Effects

Technology description

The present technology refers to a chemical method based on the "click reaction" for the synthesis of triazolyl aminoacyl penicillins. Using this technique, 29 new penicillin derivatives were synthesized. These new molecules display antiproliferative effects over malignant cells. The mechanism by which these molecules work would be related with inhibition of tubulin polymerisation and subsequent G2/M arrest of the cell cycle.

Applications

Chemotherapeutic agents against a variety of tumours.

Keywords: Drug discovery | Oncology | Organic chemistry | Synthetic penicillin

Advantages

• New technology that allows the building of libraries of compounds, in particular penicillin derivatives.
• Compounds with low toxic effects over normal cells.
• Compounds present ing antiproliferative effects over tumour cells.
• Pharmaceutical formulation of these compounds adaptable to any administration route: oral, parenteral, subcutaneous, intramuscular, endovenous or intradermic.

Development status

In vitro assays have been performed to test the antiproliferative effect over murine and human cell lines (B16-F0 melanoma, cervix carcinoma respectively).

Patent status

Priority date: 27/11/2012. Priority number: AR20120104445. Priority application country: Argentina.

Scientific leader

Ernesto G. Mata, PhD

Tyrosine Isomers as Therapeutic Agents for Primary Tumour and Metastasis Treatment

Technology description

The present technology describes the use of tyrosine isomers for the prevention and treatment of diseases associated to abnormal cell proliferation, such as tumours and tumour metastasis. These molecules were originally isolated from the serum of tumour bearing mice, in which they were associated with the phenomenon of concomitant resistance. This phenomenon consists of the resistance to the growth of secondary tumour implants and metastasis in tumour-bearing host. The incorporation of these amino acids to the protein synthesis inhibits the phosphorylation of key proteins involved in the activation of proliferative pathways.

Applications

• Prevention of the growth of both a primary tumour and metastasis (leukemia –including LB leukemia–, fibrosarcoma –including MC-C–, primary melanomas, carcinomas –including CEI and breast, testicular, ovarian, lung, colorectal, and bladder cancers).
• Decrease the likelihood of tumour relapse.

Keywords: Human health

Advantages

- Due to they are endogenous products they are not toxic and can be aligned with regulatory framework.
- Low dose rates are needed.
- Tyrosine isomers preparation methods are well-known, and both isomers are readily available from commercial suppliers.

Development status

In vitro and in vivo tests in murine models were performed. The assays were performed in LB tumour (primary and secondary), MC-C tumour, intraepidermal carcinoma, C7HI tumour. Besides human toxicity evaluations were carried out in ram red cells.

Patent status

Priority date: 11/11/2011, provisional patent application number: US61/558.833. PCT application date: 09/11/2012, PCT application number: PCT/IB2012/056312. Pending in: USA, Argentina.

Scientific leader

Raúl A. Ruggiero, PhD

Composite Resins for Direct Dental Restoration

Technology description

The present technology refers to five composite resins to be used in direct dental restoration, based on the use of five novel bis-glycidylmetacrylate monomers. These composite resins showed improved mechanical properties with respect to the actual composites resins.

Applications

Use in direct dental restoration.

Keywords: Human health

Advantages

The prepared composite resins showed improved mechanical properties with respect to the actual composites resins. These characteristics increase their resistance and durability.

Development status

Mechanical properties measurements in accordance with international guidelines (ISO-4049 y ANSI/ADA N.° 27).

Patent status

Priority date: 28/12/2012. Priority number: AR20120105084. Priority application country: Argentina.

Scientific leader

Norma D'Accorso, PhD

Antibacterial Peptides

Technology description

The present technology refers to the use of engineered synthetic peptides with reduced toxicity, to treat bacterial infections caused by clinically relevant and resistant Gram positive and Gram negative bacteria, including several strains of Staphylococcus and Pseudomonas. These peptides exert their activity by altering the permeability properties of the bacterial plasma membrane.

Applications

Synthetic peptides against bacterial infections.

Keywords: Infectology | Human health | Antibiotic | Bacterial resistance

Advantages

- Easily synthesized peptides with low toxicity.
- Alternative treatment against resistant bacteria.
- More effective antibacterial action than the already characterized standard control peptide.
- Application in topical form.

Development status

The peptides of the invention were compared in vitro with a known peptide (Omiganan) showing a higher bactericidal activity against eight bacteria strains of interest (Pseudomonas sp., Staphylococcus sp., Escherichia coli, Acinetobacter sp., Klebsiella sp. Enterococcus sp.). In vitro cytotoxicity assays have also showed promising results regarding its low toxicity.

Patent status

Priority date: 28/12/2012. Priority number: AR20120105083. Priority application country: Argentina.

Scientific leader

Paulo Maffia, PhD

Monoclonal Antibody for Angiogenesis Disorders*

Technology description

The current technology describes a novel monoclonal antibody (MAb) that selectively targets Galectin-1 (Gal-1). This MAb prevents or disrupts Gal 1– glycan interactions, attenuating aberrant angiogenesis and simultaneously potentiating antitumour immunity.

Applications

- Treatment for patients with different types of highly vascularized tumours.
- Diagnosis, prognosis, monitoring and predicting clinical outcome of patients with this specific tumour types.
- Potential usage for the treatment of post transplant lymphoproliferative disorders.

Keywords: Human Health | MAbs | Angiogenesis | Gal-1

Advantages

• Inhibition of pathologic angiogenesis in the tumour microenvironment while at the same time potentiates anti-tumour immunity in different tumour types.

Development status

In vitro and in vivo data available. Pre-clinical trials have been carried out with promising results.

Patent status

Priority date: 13/11/2009. Priority number: US20090283159P. Pending in: Europe, USA, and Canada. ***This Technology is in Co-titularity with Dana-Farber Cancer Institute. Patent Manager: Dana-Farber Cancer Institute. Contact: Dana-Farber Cancer Institute, 450 Brookline Avenue, Boston, MA 02215 | Phone: (866) 408-DFCI (3324)**

Scientific leader

Gabriel Rabinovich, PhD

Pharmaceutical Composition to Enhance Analgesia based on Omega 3 Fatty Acids

Technology description

This technology combines morphine and omega 3 fatty acids. This combination allows for a reduction in morphine concentration, thus decreasing or cancelling out its adverse effects. Likewise, this combined treatment allows for the continued use of morphine, as it reduces tolerance induction and enhances its analgesic effect.

Applications

Treatment for patients with moderate to severe pain, such as chronic pain related to cancer, post-surgical pain, chronic lumbago, osteoarthritis, neuropathic pain, etc.

Keywords: Human health | Cronic diseases | Biotechnology | Morphine

Advantages

• Omega 3 is a natural product and, therefore, its toxicity is low.
• Omega 3 enhances the analgesic effect of morphine and allows for a reduction in the concentration of the morphine being used, thus decreasing adverse effects, such as nausea, vomiting, constipation, drowsiness, cognitive deficit, etc.
• Combined chronic treatment of omega 3 and morphine reduces tolerance to morphine's analgesic effect.
• Combined chronic treatment of omega 3 and morphine reduces loss of body weight associated with chronic morphine treatment.

Development status

The effectiveness of a formulation consisting of omega 3 polyunsaturated fatty acids and morphine has been tested as an analgesic treatment in various animal models of pain.

Patent status

Priority date: 15/03/2012. Priority application number: AR2012P100854. Pending in: Argentina.

Scientific leader

Carlos Horacio Laino, PhD

Method to Obtain Vaccine for Melanoma Treatment*

Technology description

The current technology consists of a method for treating melanomas based on the administration of specific cell lines, in particular melanoma and dendritic cell lines, which act by inducing an anti-tumour immune response. The technology also refers to the procedures for generating and characterizing the cell lines. A combination of melanoma cell lines, previously irradiated, along with adjuvants and immunomodulators and/or autologous dendritic cells, is administered to patients with melanoma. Said composition promotes the synthesis of specific T lymphocytes, which fight the tumour and in more than 80% of the cases cure patients.

Applications

- Treatment of melanomas in humans at different stages of the disease.
- Use as an adjuvant after intensive treatments of cancer.

Keywords: Vaccines | Immunology

Advantages

• The combination of different cell lines provides the presentation of a great variety of antigens, thus generating an excellent anti-tumour immune response.
• Different cell lines mixture helps to stimulate maturity of autologous dendritic cells, fundamental for achieving an immune response.
• The anti-tumour immune response generated by the vaccine is systemic.
• The anti-tumour vaccine promotes the formation of tertiary lymphoid tissue. This new structure enhances interaction among the different types of cells involved in the immune response, thus increasing the kinetics of said response and generating a powerful anti-tumour protective effect.

Development status

Phase I clinical studies.

Patent status

Priority date: 11/04/2007. Application number: AR2007P101520. Granted in: Argentina and Europe (Germany, Switzerland, United Kingdom, France, Denmark, Spain, and Netherlands). Pending in: USA, Canada, China, India, South Africa, India, Japan, New Zealand, South Korea and Russia. *Patent licensed in South America, Central America and Australia.

Scientific leader

José Mordoh, PhD

Chemical Compound from a Natural Product to Inhibit Human Complement by the Classical Pathway

Technology description

The current technology refers to compounds synthesized from the natural product filifolinol that inhibit the human complement. These compounds are based on complement inhibitor K76, a natural terpenoid that inhibits production of C5a. Filifolinol is a naturally occurring 3H-spiro [benzofuran-2,10-cyclohexane] which has recently been isolated in important quantities from Heliotropium filifolium (Miers) (Boraginaceae family).

Applications

• Treatment of diseases involving autologous activation of the complement system. These diseases may result in significant tissue damage with devastating effects, including xenograft rejection, necrosis of infarted heart tissue, brain damage and autoimmune tissular lesions. These unwanted, often life-threatening, effects can be ameliorated by complement inhibition.
• It may be applied on Alzheimer disease, cardiac disease, xenotransplant rejection, ischemia-reperfusion injury and asthma.

Keywords: Human health | Drug discovery | Complement inhibitors | Filifolinol

Advantages

• May be dispensed as component of an oral solid dosage form
• Easy to manufacture
• Absence of immunogenicity Presently, there is no specific complement inhibitor in the market with the characteristics of the compounds of the invention (low molecular weight suitable for oral dispensation).

Development status

In vitro activity data available.

Patent status

Priority date: 15/03/2012. Application number: AR2012P101054. Pending in: Argentina.

Scientific leader

Teodoro Kaufman, PhD

Nanomicellar Composition for Delivery of Hydrophobic Drugs

Technology description

The current technology refers to injectable aqueous sterile compositions formed by nanomicelles of glycosphingolipids and/or modified glycosphingolipids, which are non–covalently coated with albumin. Inventors of this technology have developed a novel formulation based on stable nanomicelles that allow charging high concentration of hydrophobic drugs, solving the problems of prior art.

Applications

• Delivery of active principles that present hydrophobic nature and possess a very low or limited water solubility

• This technology may be used for oncologic hydrophobic drugs such as Paclitaxel, Docetaxel and Doxorubicin; antifungal drugs such as Amphotericin B; hormonal treatments such as Progesterone; and anaesthetics such as Propofol. Also prostaglandins, Isosorbide dinitrate, testosterone, nitroglycerin, estradiol, vitamin E, cortisone, dexamethasone and its esters, and betamethasone valerate can be included by the technology.

Keywords: Nanotechnology | API | Human health | Glycosphingolipids

Advantages

- Stable formulation
- Nanomicelles can charge an effective amount of drug
- Appropriate size that prevents rapid elimination by kidney
- Delivery and controlled release of the active agent in the site of action
- Less unwanted side effects

Development status

In vitro data available. The technology is currently being tested in mice.

Patent status

Priority date: 17/03/2010. Priority number: AR2010P100854. Pending in: Argentina, China, USA, Europe, Brazil, Peru, Mexico, New Zealand and Australia.

Scientific leader

Dante Beltramo, PhD

Modified – Release Polymeric Microparticles

Technology description

The present technology describes a pharmaceutical composition comprising polymeric modified release chitosan microparticles for oral administration of antiparasitic substances, selected from the group of benzimidazoles, nitrofurans, and nitroimidazoles, where these microparticles have an average diameter roughly between 10 and 50 µm.

Applications

Controlled release of antiparasitic substances.

Keywords: Antiparasitic | Oral | Benzimidazole | Nitrofuran

Advantages

The present invention provides the advantages of modifying (immediate or controlled) release technology for the treatment of parasitic diseases. High stability in cellular culture media and, more significantly, in simulated intestinal fluids. The present invention may have a broad spectrum of activity against many internal parasites at low dosage levels, particularly for the treatment of Chagas' disease.

Development status

Early stage. Chitosan microparticles loaded wirh benznidazol were subjected to dissolution assays according to USP standards. In vitro data available.

Patent status

Priority date: 06/03/2009. Priority number: AR2009P101989. Pending in: Argentina and Brasil.

Scientific leader

Claudio Salomon, PhD

Novel Oral Vaccine against Intestinal Parasitic Protozoa

Technology description

The current technology consists of an oral vaccine against Giardiasis, the most common cause of parasitic waterborne diarrhoea worldwide. As many protozoan parasites, Giardia lamblia undergoes antigenic variation (the continuous switching in expression of surface antigens determinants), which allows the parasite to cause chronic and recurrent infections by evasion of the host's immune response. This vaccine is composed by the complete repertoire of variant-specific surface proteins (VSPs) of Giardia. These antigens are produced by the clone of the invention, which has been silenced for expression of the genes codifying for RdRP or Dicer and cannot carry out antigenic variation, expressing the complete set of VSP proteins in every parasitic cell. The innovation also includes a method for purifying the complete set of antigenic proteins from the microorganism by using a specific monoclonal antibody directed to the conserved five amino acid cytoplasmic tail present in all VSPs.

Applications

Oral vaccine against infections caused by parasites of Giardia family.

Keywords: Giardia | lamblia | Protozoo | VSP

Advantages

• It can be used prophylactically and therapeutically
• It induces long–term protection against infection by Giardia
• It is the first protein–based vaccine that can be orally administered and does not require cold chain for maintenance and transport, due to the particular characteristics of the antigens that composes it
• Potential application in humans and animals (domestic and farm animals)

Development status

Experimental animal vaccine proof of concept has been accomplished. Domestic animals (cats and dogs) pre-clinical phase has been performed.

Patent status

Priority date: 02/12/2008. Priority number: US20080119058P. Pending in: Europe, Australia, Brazil, Canada, Chile, Colombia, Costa Rica, Ecuador, India, Japan, Mexico, Peru, New Zealand., USA, China.

Scientific leader

Hugo Daniel Luján, PhD

Novel Platform for Oral Vaccine Production*

Technology description

The current technology involves the use of Giardia variant-specific surface proteins (VSPs) comprising at least two CXXC motifs (wherein C represents a cysteine residue and X any amino acid residue) in the formulation of oral or mucosal vaccines. The use of VSPs and/or portions of VSP with the CXXC motif can be used by the oral route as a carrier of heterologous antigens of interest. VSP polypeptides, which are resistant to degradation in the gastrointestinal tract and mediate the binding to epithelial cells of the gut, are able to shuttle a candidate antigen through the digestive tube to the intestine, where it may stay for a time enhancing the development of a strong local and systemic immune response. The VSP may also act as a mucosal adjuvant, because of its ability to induce immune response by its own. The antigen of interest can be either incorporated within or onto virus-like particles (VLPs) decorated with VSPs or polypeptide fragment for protection in the gastrointestinal track or bound in the way of fusion proteins, conjugates, or mixtures.

Applications

Vaccination against selected heterologous antigens, such as tumour, microbial antigens or any other antigens.

Keywords: Antibodies | Adjuvants | VSP | Giardia

Advantages

• Can be used to treat a wide range of diseases.
• Local and systemic immune responses.
• Room temperature storage and transportation.
• Oral delivery represents the ideal means of delivering prophylactic and therapeutic agents because of ease of administration, patient compliance and cost with respect to injectable ones.
• Applied without adjuvants.

Development status

Proof of concept has been accomplished. The product is ready for use in pre-clinical trials.

Patent status

Priority date: 29/03/2010. Application number: AR2011P101036. PCT: WO2011120994. Pending in: Argentina, Europe, USA, Japan, Canada, China, Brazil, Singapore, South Korea, Venezuela, Paraguay, Uruguay and Bolivia. *ThisTechnology is in Co-titularity with INSERM, CNRS, Córdoba Catholic University and UnivPyM Curie. Patent Manager: INSERM. Contact: 101, rue de Tolbiac - 75654 Paris Cedex 13, France.| Telephone: ++33 1 44 23 60 00

Scientific leader

Hugo Daniel Luján, PhD

Development of Attenuated Viral Strains

Technology description

The present technology consists of a novel methodology for producing attenuated viral strains, which implies contacting a sulphated polymer and a virus susceptible to the inhibition by that polymer. This amenable virus is characterized by the method of reducing viral plaques, and the strain resulting from the attenuated virus has stable phenotypic and genotypic characteristics, different from that of the wild type strain.

Applications

The present technology may be employed in the preparation of vaccines and pharmaceutical compositions against a wide spectrum of enveloped viruses. It may be also applied in vaccine production against some naked viruses such as the encephalomyocarditis virus, hepatitis A virus and papillomavirus (HPV) both DNA and RNA.

Keywords: Human health | Immunology | Sulphate | Heparine

Advantages

• Innovative process for producing the attenuated viral strains.
• This process prevents contamination with adventitious virus during the attenuation procedures.
• Mutant attenuated viruses selected by this methodology are abundant, easy to collect, stable, inexpensive, innocuous and can be chemically modified easily.
• The same procedure may be employed for different sulphated polymers, both natural or synthetic.
• The method does not requires sophisticated equipment or high-cost, time-consuming procedures.
• The attenuation is stable with minimum risk of reversion.

Development status

In vitro data available. The product is ready for use in pre-clinical trials.

Patent status

Priority date: 20/11/2007. Application number: AR2007P105144, "A PROCESS FOR PREPARING ATTENUATED VIRAL STRAINS." Pending in: Argentina, Europe, USA, India and Brazil.

Scientific leader

María Josefina Carlucci, PhD

Adjuvant Peptides to Increase the Effectiveness of Mucosal Vaccines

Technology description

This technology consists in a mucosal vaccine adjuvant, comprising small peptides by capable of joining GM1 ganglioside (mucosal cell surface receptor), that increases not only the immune response of mucous membranes mediated by IgA type antibodies but systemic mediated by IgG type antibodies as well. In vaccines formulation this peptide can be used in combination either with a viral or bacterial antigen. Likewise it is possible to make chimerical proteins fusing the mentioned peptide with either viral or bacterial antigen.

Applications

- To increase vaccine immune response administered through the mucous membrane.
- The generated vaccine can be used to create defences against both viral and bacterial pathogens. It can also be considered its use with other kind of antigens such as tumour antigens, protozoa or other organisms.
- The generated vaccine can be administered through the nose, mouth, rectum, vagina or dermis.
- The vehicles used in this vaccine composition can comprise saline solution, Phosphate Buffered Saline (PBS), oleous carrier, etc.

Keywords: Infectology | Adjuvant | Bacteriology | Virology

Advantages

- The mucosal vaccines are easy to produce and administer.
- The use of these small peptides as adjuvants allows their combination with large antigenic complex.
- This adjuvant peptide combination increases the immune response generated by mucosal vaccines.

Development status

The peptides capability to join the mucosal cell surface receptor (GM1) was tested as well as their effectiveness to trigger immune responses mediated by IgA and IgG types antibodies in lab mice. Toxicity tests must be carried out so as to ensure its use in human beings.

Patent status

Priority date: 26/10/2005. Priority number: AR2005P104481. Granted in Argentina.

Scientific leader

Alejandro Montaner, PhD

Disacharide with Increased Immunity Response to Treat Epithelial-origin Tumours

Technology description

The current technology describes a modified immunogen based on the Thomsen-Friedenreich Disaccharide (TFD). This disaccharide itself has never shown an immune response throughout tests, but due to Glycane engineering applied in this invention, the TFD immunogen characteristics have changed, increasing its anti-tumoural immunity, inhibiting the adhesion of tumour cells and their metastatic ability.

Applications

This technology has potential applications in the treatment of patients suffering tumours of epithelial origin, as the ones in breasts, intestine, prostate, lungs, etc.

Keywords: Small molecules | Immunology | Oncology | Immunogen

Advantages

The development of a more rigid Thomansen-Friedenreich disaccharide (TFD) generates increased immugenicity, producing adequate amount and quality anti-antigen T tumour associated immune response.

Development status

Early stage. In vitro data available.

Patent status

Priority date: 20/11/2007. Application number: AR063868. Pending in: USA, Europe. Granted in: Argentina.

Scientific leader

Fernando José Irazoqui, PhD

Diagnosis of Physiologic Status and Selection of the Best Spermatozoa

Technology description

The current technology refers to a device for diagnosis of physiologic status and/or selection of the best spermatozoa of a semen sample based on chemotaxis. The device includes two compartments separated by a space where an attractant gradient is formed and has been designed as a function of the physical-chemical features of the attractant, the hormone progesterone. The spermatozoa are placed on one compartment and the attractant on the other. Therefore, the content of the second compartment at the end of the process may be used to select and/or separate spermatozoa capable of fertilizing ovules and it may be employed in assisted fertilization techniques.

Applications

This method enables the diagnosis of the physiological state of a given sperm sample and allows separation and concentration of spermatozoa with the best physiological state to fertilize an ovule. Its use improves the results of assisted reproduction technology (ART). Furthermore, this methodology can be used in ART protocols applied to animal species of economic significance (e.g., bovines, horses, other domestic animals) as well as endangered species.

Keywords: Biotechnology | Assisted reproduction

Advantages

• Highly efficient method.
• Simple and inexpensive device.
• The only elements needed for operation are the present device, a regular light microscope and personnel with elementary knowledge of laboratory management.
• Allows both diagnosis and selection of the best spermatozoa in only one step.
• Fast: it takes less than an hour to obtain the results.

Development status

Positive results in studies performed in Argentina and Brazil. With this device, an enrichment of capable spermatozoa of up to 600% superior to the original semen sample can be obtained. That enrichment was verified by determining the ratio of spermatozoa performing the pharmacologically induced acrosome reaction, a procedure known as capacitation indicator.

Patent status

Priority date: 3/3/2009. Priority number: AR2009P100749. Pending in: Argentina, USA, Europe, Japan.

Scientific leader

Laura Cecilia Giojalas, PhD

AGRO-INDUSTRY

Genetic Construct for Development of Stress Tolerant Plants

Technology description

The current technology consists of a genetic construct bearing a sunflower DNA sequence able to confer multiple abiotic stress tolerance to transgenic plants. The construct was assayed in Arabidopsis plants which showed longer periods of survival to severe drought, high salinity treatments, submergence and water-logging than their controls transformed with an empty vector. Moreover, the transgenic plants showed a significant yield increase, around 250% over controls, when grown in well watered conditions. The constructs may be used to transform different species like soybean, maize, wheat, sorghum, rice and others.

Applications

Obtaining of transgenic maize, soybean, wheat, rice or sorghum, tolerant to drought, salinity, submergence, water-logging and increase yield in any condition.

Keywords: Biotechnology | GMO | Plant genetics

Advantages

• Most of the known technologies to obtain drought tolerant transgenic plants failed (according to the scientific literature) when the plants were grown in standard conditions in the field, since the severity of drought is difficult to predict. This technology ensures increased yield in any environmental condition.
• A combined beneficial effect in salted soils, water stressed regions and unpredictable abundant raining
• The construct bears a natural plant gene making easier to obtain the permits from regulatory organisms since the transgenic encoded protein is normally included in the human and animal diet
• One of the constructs bears a stress inducible promoter ensuring no expression over the basal when plants do not deal with stress

Development status

The development finished the proof of concept stage and is currently undergoing the second step consisting in the obtaining of transformed crops.

Patent status

Priority date: 02/02/2012. Priority number: US61/594,133. Pending in: USA and Argentina.PCT application number: PCT/US2013/024473. Available in Argentina for every use, and available outside Argentina except for the use in maize, wheat, Brassica oleaginous seeds, cotton, rice and sugar cane.

Scientific leader

Raquel Chan, PhD

Edible, Biodegradable, Biocompatible and Non–toxic Material

Technology description

The technology consist of an edible, biodegradable, biocompatible and non–toxic material that comprises a matrix composed by starch, glycerol and starch nano–crystals dispersed in the matrix. Specifically, the starch matrix is formed by tapioca starch, while the nano–crystals are corn starch nano–crystals. The material may be used in the form of foils, sheets, films, coatings, gels, etc, to isolate and/or to protect a product from the environment.

Applications

- Isolate and/or protect food (fresh food, cheese, confections, etc.), pharmaceutical products, cosmetics, and cleaning products
- Substitute the typical stretchable PVC films used to protect, among others, fruits or products found in trays of so–called 'fast food'
- Sheets of the invention may be used for manufacturing of bags, in particular envelope bags type

Keywords: Nanotechnology | Preservation | Starch | Cosmetics

Advantages

• Completely thermoplastic, renewable, and flexible, and can be easily conditioned to different processes of heat plasticization by employing equipment commonly used in the manufacturing of synthetic polymers
• Low cost of manufacturing
• More resistant to damage than conventional films
• Colourless, tasteless and odourless
• Apt to change its colour, smell or taste, using pigments, and has the property of transferring natural antimicrobials
• It preserves the organoleptic quality of food for a longer period
• Unique properties of water vapour permeation, mechanic resistance and transparency

Development status

All the proof of concept has been accomplished and the product is ready for scale-up.

Patent status

Priority date: 01/08/2010. Application number: AR2010P100044. Pending in: USA, Mexico; Brazil, Peru and Argentina.

Scientific leader

Silvia Nair Goyanes, PhD

Biofertilizer based on Nitrogen-Fixing Bacteria

Technology description

The current technology consists in a fertilizer based on a Pseudomonas fluorescens recombinant strain transformed by genetic engineering to include a gene associated with an increase in the ability to fix atmospheric nitrogen by plants growing in nitrogen-lacking soils. This fertilizer can increase up to 75 % crop productivity in soils with the mentioned features.

Applications

- The inoculant can be applied to either monocotyledonous or dicotyledonous plants, which covers almost every commercial crop.
- The inoculant can be applied either to nitrogen-lacking soils or to soils rich in nitrogen.

Keywords: GMO | Biotechnology | Bacteria strain

Advantages

• Replace the use of organic as well as inorganic fertilizers.
• The developed recombinant strain is able to fix nitrogen not only in leguminous plants, but also in non-leguminous plants, and provide the appropriate amount of nitrogen to a plant that is growing in a nitrogen-lacking soil.

Development status

The development was assayed on three plant species: Medicago sativa (dicotyledonous plant), Schedonorus arundinaceous (monocotyledonous plant) and Arabidopsis thaliana (dicotyledonous plant) in hydroponic nitrogen-poor systems. It was shown that the addition of a recombinant inoculant causes an increase of 200% in productivity when compared to the addition of a non-recombinant inoculant.

Patent status

Priority date: 24/11/2011. Application priority number: AR2011P104381. PCT date: 22/11/2012. Pending in: Argentina.

Scientific leader

Nicolás Daniel Ayub, PhD

Biocontrol of Post-Harvest Fruit

Technology description

The present technology consists in the use of epiphytic yeast strains from fruits as agents for biological control to prevent rot in post-harvest fruits during their conservation in cold storage. The use of these yeasts protects fruits mainly from infection by phytopathogenic moulds. Such yeasts are applied as part of a composition, which also includes different coadjuvants, and the resulting solution is sprayed on fruits.

Applications

Protection of post-harvest fruit, mainly pears and apples, against mould infections in refrigerated environments.

Keywords: Microbiology | Biofungicide | Pears

Advantages

• Substitution or minimisation of chemical fungicides, thus reducing chemical residue in the final product.
• First isolated yeasts that show activity at low temperatures and protect fruit in cold storage.
• The invention's antagonizing strains have more than one mechanism of fungal inhibition, namely the production of killer toxins, synthesis of antifungal enzymes (proteases, glucanases, and chitinases) and release of volatiles.
• Development of biofilms, colonising rapidly and protecting surface wounds in fruit from fungal attack.
• The yeasts are considered safe organisms and, in particular, the fact that they do not develop at 37°C rules out any likelihood of causing opportunistic infections in humans.

Development status

Datos experimentales disponibles. Actualmente se encuentran estudiando el sinergismo de las levaduras de la invención con aditivos químicos.

Patent status

Priority date: 28/03/2012. Priority application number: AR2012P101053. Pending in: Argentina.

Scientific leader

Marcela Sangorrín, PhD

Promotion of Honey Bee Pollination

Technology description

The present invention refers to a formulation that promotes pollination of sunflower crops (Helianthus annuus) or apple trees (Malus silvestris) to skew the preferences collection of honeybee (Apis mellifera). The formulation mimics the floral scent of sunflower or the apple tree flower to generate specific olfactory memory. It comprises the compounds sabinene, ?-pinene and limonene in case of sunflower, and citral, benzaldehyde and limonene in case of apple tree flower.

Applications

Crop polination.

Keywords: Crops | Sunflower | Apple tree

Advantages

- Increases bee pollination performance.
- Unique existing product based on recreating the floral scent of sunflower (or apple tree's flower).
- Possibility to be used in extensive crops because it is applied to bee hives and not splashed on the field.
- Specificity for only one kind of flower.

Development status

Proof of concept. Field testing.

Patent status

a) Priority date: 07/07/2011, application number: AR2011P102441. PCT application number: WO2013005200. b) Priority date: 07/07/2011, application number: AR2011P102442. PCT application number: WO2012IB53490.

Scientific leader

Walter Farina, PhD

Biopreservant for Food Products

Technology description

The patent describes a product made by a mix of bacteriocins obtained from Lactobacillus strains, organic acids (lactic and acetic) and nisin, and how it can be used as a biopreservative for processed meat products.

Applications

The biopreservative can be applied to processed meat products.

Keywords: Biotechnology | Aditive | Sausages | Listeria

Advantages

• The use of the product on Vienna sausage as unique preservative was effective to maintain safe the vacuum-packed product stored at 10° (temperature abuse) for 36 days.
• The addition of chemical preservatives to processed meat products can be avoided.
• The product pH, near to neutrality, did not influence the activity of the biopreservative (as it occurs when the bacteriocin nisin is used as unique biopreservative).
• The product was effective against both local and european pathogenic Listeria strains.

Development status

The biopreservative has been applied to avoid Listeria monocytogenes and Listeria innocua growth and propagation in Vienna sausages, but it could be applied to other kind of meat processed products and bacterial strains.

Patent status

Priority date: 9/11/2012. Application number: AR120104229. Priority application country: Argentina.

Scientific leader

Patricia Castellano, PhD

Automatic Phenotyping Platform

Technology description

The present technology refers to an automated platform for phenotyping plants. This invention allows for the simultaneous handling of multiple individuals and the automatic acquisition of information about the plants conditions (weight, position of the pot inside the chamber, amount of nutrient solution added, stereoscopic photograph of the plant, etc.) which is digitally incorporated to a computer software.

Applications

Use in greenhouses, plant breeding and genetically modified plants research.

Keywords: Genetically modified crops | GMO | OGM

Advantages

- Simplification in plant phenotyping.
- Advanced electronic technology is not required.
- Can be easily adapted to different types of plants and pots, and to a greater amount of them.
- Easily replaceable and repairable.
- Enables a simple way of statistically data processing.

Development status

Tests in Arabidopsis thaliana, where it was employed for helping to identify individuals with low sensitivity to soil water deficit.

Patent status

Priority date: 27/09/2010. Application number: AR2010P103498, PCT application number: WO2012042084. Pending in: Argentina, Uruguay and Paraguay.

Scientific leader

Luis Aguirrezábal, PhD

Fermented Product Based on Milk Whey Permeate*

Technology description

The product is based on the fermentation of milk whey permeate, a by-product obtained from the production of cheese as well as the purification of whey proteins. The fermentation of milk whey permeate allows for the obtaining of a product with a high dietary value for human nutrition, that can also be use for animal feed. The whey permeate, rich in lactose, is fermented with kefir grains, an agglomeration of lactic acid bacteria and yeast, or by concentrated cultures of such microorganisms obtained from the incubation of kefir grains in milk. The obtained product may be used either in a liquid or powder form, as well as lyophilized.

Applications

• Food product for human or animal consumption, with probiotic characteristics, as it contains both lactic acid bacteria as well as specific yeasts that provide health benefits. Organic and lactic acids are as well part of its composition.
• It may be marketed in liquid form, with the addition of juices or flavourings and sweeteners. In such conditions, it is preserved for 7 days under refrigeration.
• It may be marketed in solid form, whether lyophilized or in powder form, in which case it keeps for at least 5 months at room temperature.

Keywords: Probiotics | Kéfir

Advantages

• The same probiotic characteristics than traditional kefir, obtained from the fermentation of milk, broadly used in the diet of many Eastern European countries for thousands of years ago. Its similar composition in microorganisms implies similar features in its capacity to modulate intestinal function, the composition of its microflora, and immune response.
• Produced from industrial waste of little intrinsic value, which is hard to treat due to its high content of organic material, it may be transformed into a product of high added value as a result of its nutritional composition.

Development status

In Vitro tests and assays in lab mice have been made. Nowadays field studies in farm animals are being carried out.

Patent status

Priority date: 07/07/2009. Priority application number: AR2009P102570. Pending in: Argentina, Europe. *ThisTechnology is in Co-titularity with the National University of La Plata and the University of Coimbra. Patent Manager: University of Coimbra. Contact: Palácio dos Grilos, Rua da Ilha, 3000-214, Coimbra, Portugal.| Telephone: +351 239 859 900

Scientific leader

Analía Abraham, PhD

Nano-Insecticide for Pest Control

Technology description

The current invention describes a nano-insecticide for pest control. This environmental friendly insecticide consists on aluminium oxide and carbon particles obtained by chemical and hydrothermal processes and presents high toxicity to a broad range of insect species (e.g. ants- Formicidae Family) without affecting mammals' health.

Applications

Control of ants and other insects in ornamental, agricultural and forestry crops.

Keywords: Insecticide

Advantages

• Starts being active in 3 to 7 days after its application, but it may be applied only once because the effect does not decay over time.
• It may be applied directly to surfaces formulated as an aqueous suspension or in any other volatile solvent.
• Stable to extreme temperatures, water, light, oxygen and weak acids and bases
• It does not damage indoor surfaces or machinery
• Safe for the user
• Manufacturing process is particularly simple, fast, and requires low energy.

Development status

Extensive in vitro data is available and the product is ready for field studies.

Patent status

Priority date: 12/02/2011. Priority number: AR2011P104501. Pending in: Argentina.

Scientific leader

Teodoro Stadler, PhD

Method for Estrous Induction

Technology description

The technology refers to injectable microparticles made of biocompatible and bioassimilable materials with the capability to carry and release drugs in a controlled pattern, for a veterinary use. The current technology has shown outstanding results in the artificial induction and synchronization of estrous in farm animals when the microparticles were loaded with hormones. The technology is also suitable for the controlled release of antiparasites and antibiotics drugs.

Applications

- Estrous induction in farm animals.
- Controlled drug release in farm animals.

Keywords: Reproduction | Microparticle | Injectable | Hormone

Advantages

- Single subcutaneous injection to obtain defined and controlled delivery of several drugs
- Small and stable. Easy to store and transport
- No need for excessive hygiene and special facilities
- Possibility to customize dosage to each animal
- No toxic elements. In situ biodegradation

Development status

Extensive in vitro and animal data is available; the product is ready for scale-up.

Patent status

Priority date: 13/05/2011. Application number: AR2011P101665, PCT: WO2012156561. Pending in: Argentina, Uruguay, Paraguay and Bolivia. ***This Technology is in Co-titularity with UNL (Universidad Nacional del Litoral) and IPCVA (Instituto de Promoción de la Carne Vacuna Argentina)**

Scientific leader

Ignacio Rintoul, PhD

Method to Identify Sexually Premature Calves

Technology description

The present technology refers to a method for identifying those bovines that are expected to reach puberty at an early age by detecting the presence of single nucleotide polymorphisms (SNPs) in LHR y GNRHR genes. The detection of these particular SNPs is directly related to sperm concentration and motility at early stages of bovine puberty.

Applications

Cattle breeding industry.

Keywords: Calves | Biomarker | Genomics | Animal health

Advantages

- Allows breeders to decide in advanced the purpose of the reproductive animals.
- Reduce cost of cattle breeding given that a bull with sexual activity can be obtained at younger ages.
- Possibility to develop a line of genetic sexually premature bovines.

Development status

Extensive in vitro and animal data is available. The product is ready for field studies.

Patent status

Priority date: 13/05/2011. Priority number: AR2011P101664. Pending in: Argentina.

Scientific leader

Juan Pedro Lirón, PhD

INDUSTRY

Foams based on Epoxy Bioresins

Technology description

The present technology consists of a formulation in which the synthetic epoxy resin is replaced by an epoxidized vegetable oil (EVO), and that uses an environmentally safe and friendly foaming gas. The foams are obtained with at least 55% of the biogenic compound. Biogenic thermosetting epoxy foams can be used as core in sandwich structures constituted by external panel of composite material, to enhance mechanical resistance.

Applications

- Automotive industry (thermal and acoustic insulation).
- Marine industry (low density boards).
- Sport and leisure (surf boards, skates, etc.).

Keywords: Vegetable oils

Advantages

• The proposed formulations have a high content of epoxidized vegetable oils which are renewable, abundant and low cost feedstock.
• The use of such green components could alleviate the dependence with fossil resources.
• The blowing agent is also generally recognized as safe (GRAS) which ensures that it is environmentally safe and friendly.
• The formulation is also free of toxic monomers (i.e. styrene, isocynates).

Development status

Laboratory scale.

Patent status

Priority date: 28/12/2012. Priority number: AR20120105082. Priority application country: Argentina.

Scientific leader

Carlos Piacentini, PhD

Electroactive Material Capable of Binding Lectin Proteins

Technology description

This technology consists of an electrical conductor material for the generation of electrodes to manufacture enzymatic biosensors, and biosensors capable of responding selectively in the presence of glycans. The conductor material is a compound of polyallylamine, combined with a metal and a carbohydrate, where the former allows for conduction of an electrical current and the carbohydrate allows for noncovalent binding of lectin proteins by molecular recognition. The presence of these lectins allows for the recognition of molecular structures containing carbon hydrates and, thus, glycoenzymes with redox activity may be incorporated to generate enzymatic biosensors, or the lectin may be used directly for detecting glycans in the medium.

Applications

- Development of enzymatic biosensors by noncovalent binding of redox glycoenzymes.
- Generations of biosensors consisting of microorganisms, given that specific microorganisms can be incorporated by lectin biorecognition of their surface glucans.
- Development of "electronic tongues" capable of detecting microorganisms at low concentration.
- Development of biosensors which, by incorporating neurons thanks to the recognition of their surface glucans, allow for making use of the high selectivity in the generation of electrical signals on the part of the neurons for the development of novel biosensors.

Keywords: Electrodes | Biosensors

Advantages

• The material by which the biosensor is coated can be easily manipulated and applied on the surfaces of different materials, such as gold, silicon, graphite, etc.
• Possibility to develop biosensors with different ranges of sensitivity.
• The catalytic efficiency of the redox glycoenzyme is not affected as well as its active site either sterically or chemically, since this is a non-denaturalizing and noncovalent method of incorporation and since it is based on specific molecular recognition of its glycans.

Development status

Proof of concept has been accomplished with the manufacture of electrodes incorporating the HRP enzyme, thus allowing for the determination of optimum manufacturing conditions. Other applications are under development.

Patent status

Priority date: 15/07/2012. Application number: AR2012P102997. Priority application country: Argentina. PCT application date: 15/08/2013, PCT application number: WO2013070596. Pending in: Argentina.

Scientific leader

Fernando Battaglini, PhD

Semi-Active Friction Tendons for Vibration Control of Structures

Technology description

The present device is an alternative semi-active vibration control system that consists of two variable-friction dampers linked to the structure through cables. Moreover, auxiliary soft springs in parallel with these dampers allow them to return to their previous positions, thus reducing the slackening of the cables. The use of cables makes the system suitable for deployable, flexible and lightweight structures.

Applications

Vibration control of slender and flexible structures such as: bridges, large space structures, satellites, tall buildings and mechanical structures.

Keywords: Metalworking | Building and infraestructure

Advantages

- Only one cable is needed for each damper.
- Avoids the slackening of the cables.
- Reduces the pre-tension required in the cables.
- Eliminates the problem of cable relaxation.
- Outperforms equivalent passive systems (even optimal).

Development status

Experimental tests in a working prototype and numerical parametric study.

Patent status

Priority date: 12/04/2013. Application number: AR2013P101196. Priority application country: Argentina.

Scientific leader

Daniel Ambrosini, PhD

Array of Pressure and Magnetic Field Sensors

Technology description

The technology consists of an array of sensors, which allows sensing mechanical/hydraulic pressure and magnetic field at the same time. The array is completely flexible, easy to fabricate, and can be produced to have differential response according to the direction of the externally applied stimuli. It represents a specific application of nanoscience into a concrete device, since it is constituted by aligned hybrid magneto-metallic nanoparticles.

Applications

• Measurement of hydrostatic pressures in salt solutions (eg. brine), lubricants, oils (industrial and food), petroleum solvents, etc.
• Measurement of magnetic fields generated by high currents needed for electrolysis, in metallurgical companies which obtain metals by electrolysis processes.
• Measurement of strength in difficult places: for example, within soil borings in geological exploration for heavy rock material.
• Measurement of heart rate (beats per minute), in real time, 24 hours a day using a non-invasive, fast and portable device (biometrics).

Keywords: Metallurgy

Advantages

• The device is completely flexible. It can be stressed, bent and manipulated without being damaged when it is located in inaccessible places.
• The flexibility allows, also, its incorporation in "flexible electronic devices", for example, electronic circuits on flexible plastic sheets, electronic skins or computing Zebra connectors.
• The range of pressures/magnetic fields that can be measured by the device can be adjusted during the manufacturing process.
• The device response is not influenced by temperature in the range 20°-200°.
• Both piezoresistive and magnetoresistive responses do not show memory effects.

Development status

A prototype is already developed and tested.

Patent status

Priority date: 19/10/2012. Priority number: AR20120103933. Priority application country: Argentina.

Scientific leader

Martín Negri, PhD

Enzyme Biocatalyst in Lysozyme Amyloidal Fibres Support

Technology description

A nanotechnological method is introduced to obtain lysozyme amyloidal fibres support, without neither biological nor enzyme activity, that can be used for the immobilization of lipase enzyme by means of a photochemical reaction. The biocatalyst thus obtained is highly stable as compared to free lipase enzyme. This support is based upon lysozyme polymerization in the presence of heparin to obtain amyloidal fibres resembling carbon nanotubes. It can be used for biocatalysts manufacturing by conjugation with various enzymes, such as lipases of importance in industrial processes.

Applications

• Biodiesel ecologically clean synthesis: starting fatty acid esters (biodiesel) usable as biofuel and glycerol by-product are obtained starting from vegetable oil.
• Aroma and flavour compounds used as additives in food, cosmetic and pharmaceutical industry are obtained.
• Fats and oils modification: lipids´ properties can be modified by lipases, obtaining in this way high added value fats from cheap lipids and with undesirable properties. These compounds are of interest both for food and pharmaceutical industry.
• Obtainment of pure enantiomers by means of racemic mixtures using lipase enzyme. The pharmaceutical industry aims at the resolution of racemic mixtures to obtain pure chiral drugs.

Keywords: Biocatalysis | Enzyme Immobilization | Biofuels | Lipase

Advantages

• Nanotubes (amyloidal fibre) of lysozyme present a large variety of functional groups that when reacting with other proteins allow the production of new functional materials.
• The lipase enzyme immobilization method by photosensitization is highly efficient, rapid and non-toxic.
• The biocatalyst comprised by a lipase in a lysozyme amyloidal fibre solid support is stable in broad ranges of pH and temperature, and allows the enzymatic reaction in organic solvents, unlike the lipase reaction when on soluble state.

Development status

The concept test has been carried out obtaining highly satisfactory results for different suggested applications. Is currently being developed to produce 10 litres of biofuel.

Patent status

Priority date: 02/07/2012. Application number: AR2012P102400. Priority application country: Argentina. PCT application number: PCT/IB2013/055405. Pending in: Argentina.

Scientific leader

Rosana Nieves Chehín, PhD

Enzymatic Analytical System for Flavonoid Quantification and Rutinoside Modification

Technology description

This technology introduces a system that allows measuring flavonoids and/or hydrolysing hesperidin flavonoid in food or other products. This innovation is based on the discovery of a fungal diglycosidase enzyme capable of generating rutinosides and hesperetin from hesperidin.

Applications

• Analytical Chemistry: Can be used for quantitative analysis of hesperidin by using a simple method on complex products.
• Food Industry: The invention can be applied to eliminate the "cloud" that is formed during the processing citric fruit juices: lemon, lime and orange, etc. Synthesis or hydrolysis of rutinosides, that have been identified as precursors of aroma compounds (increase bouquet of wines).
• Pharmaceutical Industry: Drug rutinosilation may extend and/or modify pharmacological activity, reduce adverse effects, increase bio-disponibility, water solubility, stability, etc.

Keywords: Biocatalyst | Enzymatic assay | Scents | Hesperidine

Advantages

• Introduces a more economic alternative for hesperidin quantification than high performance liquid chromatography (HPLC)
• The necessary equipment is simple and does not require highly trained operator, thus saving time and reducing investment and process costs.
• The method is rapid, easy to carry out and can be used in high-throughput tests.
• It uses green technology; can be carried out in water, at room temperature and neutral pH, not needing either high pressure or extreme physicochemical conditions, thus saving energy and preserving the environment.
• It does not generate toxic wastes and allows to obtain rutinose from citrus industry wastes.

Development status

The technology is ready to be implemented in citrus and/or pharmaceutical industries.

Patent status

Priority date: 01/04/2011. Priority number: AR2012P101056. Pending in: Argentina, EE.UU.

Scientific leader

Javier D. Breccia, PhD

Method to Build a Ionizing Radiation Dosimeter in a CMOS Process

Technology description

The present technology provides a method to fabricate an Ionizing Radiation Dosimeter using a standard CMOS process. The dosimeter developed has an inherent low cost, small size, low power, and allows real time and in vivo measurements of ionizing radiation doses with an accuracy of a few mSv with a very high dynamic range.

Applications

- Radiation therapy treatments in oncology.
- Medical imaging.
- Radioprotection of workers.
- Inclusion of radiation detectors in consumer electronics.
- Space applications.

Keywords: Radioprotection | Dosimeter | Radiation Therapy | Consumer Electronics

Advantages

- Low cost since it is fabricated in an unmodified CMOS process.
- Real time and in vivo measurements, with a small size and low power consumption.

Development status

Dosimeters were fabricated in two different CMOS processes, tested under different radiation fields and showing an optimal performance.

Patent status

Priority date: 24/01/2013. Priority number: AR2013P100221. Pending in: Argentina.

Scientific leader

Adrián Faigón, PhD

ENERGY

Biofuel Production using Alcohol in Supercritical Conditions

Technology description

The present technology introduces a continuous process for producing biodiesel using alcohol in supercritical condition. This process is carried out from chemical treatment of fats and oils that are normally wasted from industries like tanneries, abattoirs, slaughterhouses and manufacturers of fried foods, without the need for any special pre-treatment. It allows the production of a biofuel for diesel engines free of impurities such as methanol, water, glycerol and glycerides, to develop a fuel in accordance to strict quality norms. This is achieved by a transesterification reaction under high temperature and pressure, and consecutive final refining stage with adsorbent solids operated cyclically.

Applications

Biofuel production industry.

Keywords: Agroindustry | Use of wastes | Chemical processes | Catalysts

Advantages

• Less energy expenses during the production as compared to other existing methodologies.
• Its use allows the elimination of biodiesel impurities, such as: glycerol, glycerides, water and methanol.
• The use of this methodology allows to process fat raw materials of different qualities thus reducing production cost.
• The introduced methodology requires less separation steps and biodiesel purification, reducing the production cost.
• Its production does not generate either liquid effluents or by-products difficult to eliminate.
• It presents a produced biodiesel/fat matter better performance.
• The use of biodiesel as fuel reduces polluted gases release, usually produced by oil fuels
• This methodology uses fats and oils which at present are removed without any treatment in landfills causing ground water contamination in addition to the production of unpleasant odours.

Development status

The low scale production has been successful. A prototype has been designed and manufactured at pilot scale in order to obtaining process data that may allow the design of facilities at an industrial scale.

Patent status

Priority date: 28/06/2012. Application number: AR2012P102318. Priority application country: Argentina. Pending in: Argentina.

Scientific leader

Juan Carlos Yori, PhD

Production of Aircraft Biofuel

Technology description

This technology consists of the formulation and method for obtaining biofuel for aircraft turbines, Antarctic gas oil and gas oil for low temperatures from turbofuel synthesized by transesterification of castor oil and methanol in a sodium hydroxide medium. The turbofuel (crude diesel oil) obtained from castor oil dilutes with turbofuel JP A1, a mixture of C1 to C3 light alcohol with water is added, and finally after a process of separation the final product is achieved, a biofuel apt for aircraft turbines.

Applications

Fuel production for aeronautical purposes.

Keywords: Motors | Biofuels | Castor oil

Advantages

• High performance for obtaining FAME ("Fatty Acids Methyl Esters") from castor oil.
• More simple, with reduced time of reaction and low energy consumption, since it takes place at room temperature when compared with the previous state of the technique.
• With a simple treatment it is achieved a diesel oil from castor oil which is apt to partially substitute the Jet A 1 and the Antarctic Gas Oil.
• Easy and low cost mean to obtain a new aircraft turbine fuel.

Development status

The proof of concept has been accomplished.

Patent status

Priority date: 18/04/2012. Application number: AR2012P101329. Priority application country: Argentina. PCT application date: 17/04/2013, PCT application number: PCT/IB2013/053056.

Scientific leader

Jorge Daniel Pérez, PhD

SOCIAL DEVELOPMENT

Shut-off System for Gas Appliances

Technology description

The current technology consists of a gas supply shut-off system for appliances running on natural gas as well as bottled gas, in the presence of carbon monoxide (CO) at concentrations that are toxic to humans (more than 50 ppm). This system is applicable to gas-fired combustion equipment, such as heaters, ovens, kitchen stoves, boilers, coffee machines, and any other equipment running on natural or bottled gas and also using a thermocouple and a valve with magnetic actuator. This technology enables the electrical circuit to shut off the tension signal feeding the magnetic valve whenever a certain level of CO is reached in the proximity of the equipment (a level established by safety standards for human beings), thus interrupting the passage of gas supply and, as a result, combustion.

Applications

The device of the invention may be attached to gas appliances (heaters, ovens, kitchen stoves, boilers, etc.) to increase safety in this type of equipment, thus preventing accidents that in many cases may cause fatalities.

Keywords: Prevention | Gas | Fire | Gas-Fired Equipment

Advantages

• It shuts off gas line supply by acting on the thermocouple system (installed in the equipment)
• It can be easily attach to systems currently operating
• It has no CO inductors
• The electronic system that keeps check on the formation of CO gas is located near the site where combustion takes place in order to verify tightness in the burn-in chamber
• It acts on the thermocouple that is currently included in appliances running on natural or bottled gas
• There is direct gauging of CO formation. There is no indirect reading of 'oxygen deficit' (as in present-day analyser pilots)
• It is complementary to the analyser pilots currently manufactured in the market
• It has an easily replaceable, low cost sensor.

Development status

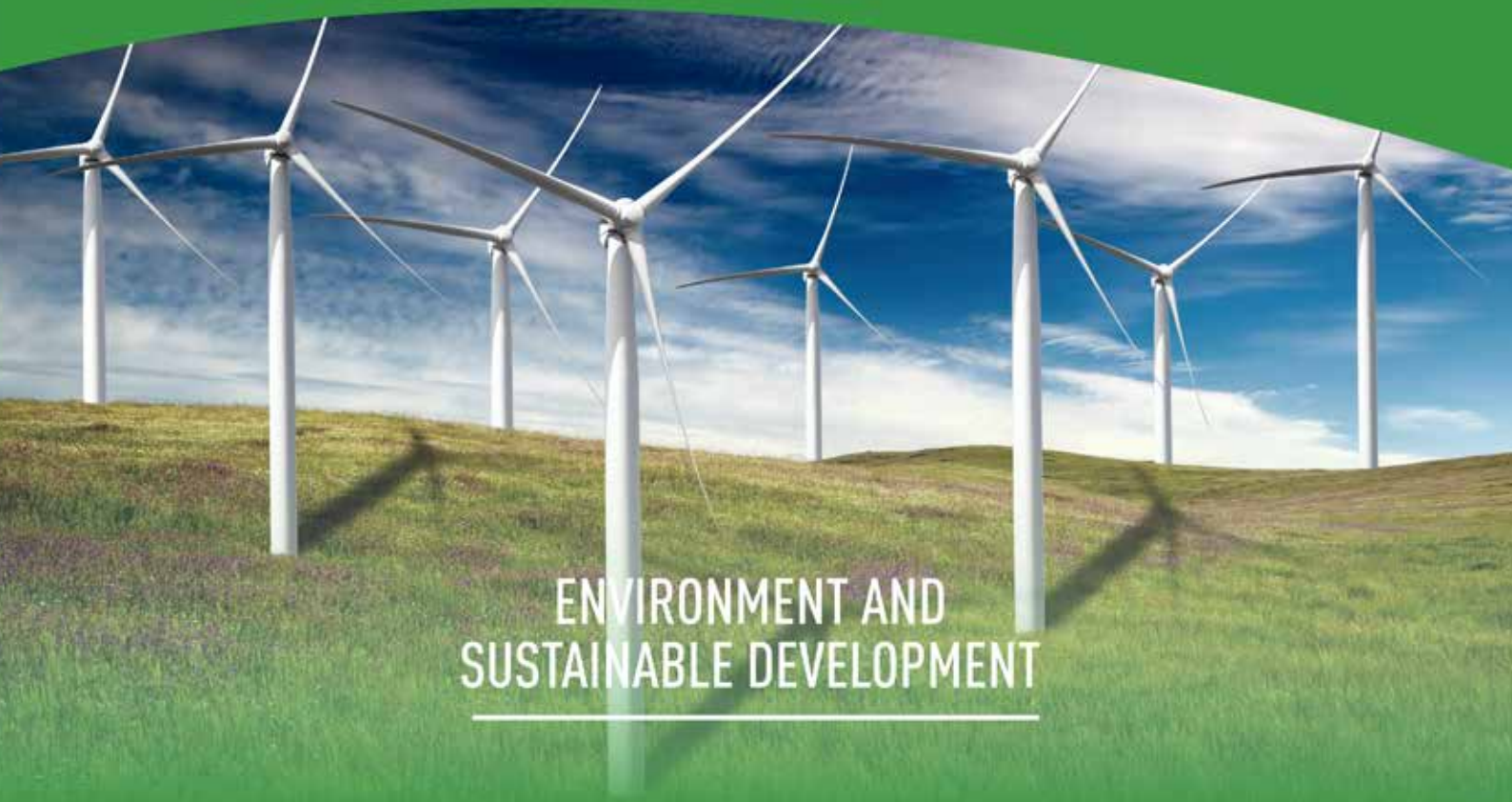
Proof of concept has been accomplished. The laboratory-scale prototype is ready.

Patent status

Priority date: 21/05/2012. Application number: AR2012P101794. Priority application country: Argentina.

Scientific leader

Miguel Adolfo Ponce, PhD



ENVIRONMENT AND SUSTAINABLE DEVELOPMENT

Equipment for Standardized Measurement of Plants Flammability

Technology description

This technology describes a novel equipment capable of measuring the flammability of whole plants, or parts thereof, in a short time and inexpensively. The device and the proposed protocol provide the first standardized method for quantitative studies of flammability applied to a large number of species from different ecosystems.

Applications

The invention can be applied to various fields of research such as functional ecology, evolutionary ecology and vegetation-atmosphere modeling.

Keywords: Forestry engineering | Fires

Advantages

• It can be taken to the place where the study is carried out, reducing the time between sampling and the experiment, preserving the integrity of the material under study. Also, it only requires a small gas cylinder as energy source to work, thus favoring its autonomy.
• Enables to collect highly standardized information from a wide variety of species from different ecosystems.
• It allows to treat whole samples up to 70 cm long, providing data closer to reality as compared to studying the parts separately
• Simple and inexpensive design.
• The device can be adapted to different conditions. Given its simple structure, it can be designed according to the experiment.

Development status

The device is fully designed and ready to be implemented in research laboratories.

Patent status

Priority date: 21/05/2012. Application priority number: AR2012P101794. Pending in: Argentina.

Scientific leader

Gustavo Bertone

Biosensor Capable of Detecting Simultaneously Various Toxic Metals

Technology description

This technology consists of a biological sensor which is capable of detecting both monovalent metallic cations (Cu^{+}, Ag^{+} and Au^{+}) and divalent metallic cations (Hg^{2+}, Pb^{2+}, Cd^{2+} Co^{2+} and Zn^{2+}). More particularly, the current development refers to a modified polypeptide sensor combined with a genetically modified bacteria strain that relates an analyte detection with an easily measurable signal (as might be the expression of a reporter gene). Even though the technology has been developed in Salmonella and E. coli strains, it could also be carried out in other bacteria strains, and eukaryotic organisms, as well as been combined with different measuring devices.

Applications

- Liquid effluents of contaminating industries, for instance mining and petrochemical industries
- Water treatment facilities
- Environmental impact studies

Keywords: Ecosystemas monitoring

Advantages

• The use of bacteria-based biosensors for the detection of toxic elements represents a versatile and economic alternative to the use of analytical methods.
• Unlike the existing biosensors for measuring toxic metals which only detect one metal element or a group of metals physico-chemically related, the current biosensor is capable of detecting a wide variety of metals simultaneously.
• Reduces the time needed to detect toxicity in water and industrial effuents by allowing the detection of more than one cation at the same time.

Development status

The biosensor has already been developed and tested in Salmonella and E. Coli bacteria strains.

Patent status

Priority date: 11/03/2013. Priority number: AR2013P100783. Priority application country: Argentina.

Scientific leader

Susana K. Checa, PhD

Manganese Oxide-based Catalysts for Gaseous Flow Purifying

Technology description

This technology involves the development of a catalyst based on manganese oxide which allows the purification of gaseous streams containing environmentally undesirable volatile organic compounds (VOCs). This catalyst is based on the reaction between a soluble Mn2 + salt and a soluble alkali metal permanganate salt, which generates a solid precipitate that is then calcined, resulting in a catalysis based on manganese oxides with cryptomelane and Mn2O3 - MnO2 type mix structure. It can be developed as a solid mass, or supported on porous or monolithic alumina structures. The catalyst oxidizes volatile organic compounds at temperatures above 100 ° C, turning them into CO2 and H2O.

Applications

Purify gaseous flow through the removal of volatile organic compounds (VOCs) such as ethanol, acetic acid and ethyl acetate.

Keywords: Gaseous Emissions Control | Depuration | Catalysts | VOC

Advantages

• The technique used for the development of the catalyst of the present invention does not require pH adjustment, or the technique of reflux, the formation stage of the solids is carried out at temperatures close to the ambient ones and at stoichiometric conditions, in order to simplify and reduce the cost of the required steps.
• The presence of a cryptomelane phase type in the present technology provides an excellent catalytic capacity, since criptomelanos present $Mn4^{+}$ vacancies associated with the formation of OH and $Mn3^{+}$.
• These compounds have shown high stability, allowing its use for a long time without reducing the catalytic capacity.

Development status

The proof of concept has been completed and is ready for scaling.

Patent status

Priority application date: 18/08/2012. Application priority number: AR2012P102998. Pending in: Argentina.

Scientific leader

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Microbial Biosensor for Biological Oxygen Demand (BOD)

Technology description

The present technology consists of a device that allows measuring BOD in water accurately, in a short time and without the need of diluting the sample. The instrument includes an immobilized microorganism matrix which produces CO_2 from dissolved organic matter. This matrix is fixed to a gas permeable membrane that is attached to an electrolytic cell. Further an H^+ electrode is in contact with the electrolytic cell. The CO_2 is measured by potential difference due to the carbonic acid concentration present in the cell; next CO_2 is electronically correlated with O_2 consumption and printed as BOD in the device's display. It is intended to be used for industrial effluents monitoring, environmental impact studies, liquid effluent treatment facilities and water treatment plants.

Applications

- Any industry whose effluents contain organic matter.
- Water treatment plants.
- Environmental protection agencies.
- Environmental management companies.

Keywords: -

Advantages

• Reduces the time and the complexity of the test.
• The constitution of the device is simple and does not involve the use of dangerous nor toxic substances.
• Minimizes or eradicates the main sources of miscalculation that may affect BOD measuring such as non–biological oxygen consumption, low oxygen solubility in water, consumption of the oxygen electrode, among others.
• Low measurement error in acid effluents and optimal performance in slightly acid or neutral samples.
• Can be used in both continuous as in batch systems.
• High correlation with the conventional method, and compatibility of its standard reagents.

Development status

All the proof of concept has been accomplished and the prototype is almost ready for field studies. .

Patent status

Priority date: 02/05/2011. Priority number: AR2011P101506. Pending in: Argentina.

Scientific leader

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