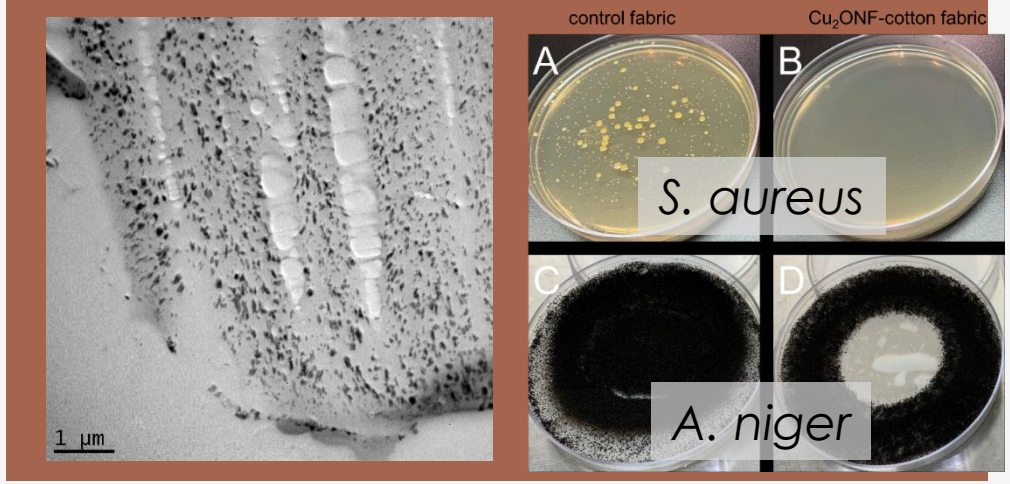
Process for broad-spectrum permanent antimicrobial cotton fibers

A synthetic procedure has been developed that imbues persistent antimicrobial activity against fungi in addition to Gram-positive and Gram-negative bacteria via copper oxide nanoparticles produced within cotton fibers. The manufacturing process can proceed at ambient temperatures without the use of chemical binding or reducing agents. The resulting nano-functionalized cotton fibers exhibit robust leach resistance during use and repeated laundering, and serve as a source for biocidal copper ions, regenerating the antimicrobial activity with each laundering.

Docket No: 13.21

Contact: Tanage.Boozer@ussda.gov



Benefits

- Powerful: kills >99.995% of fungi and Gram-positive & Gram-negative bacteria
- Durable: maintains antimicrobial functionality even after 50 laundering cycles
- Pure: comprised of only cotton and copper oxide nanoparticles; no chemical additives
- Adaptable: cotton fibers can be blended in the fabrication of all woven or nonwoven textile products

Applications

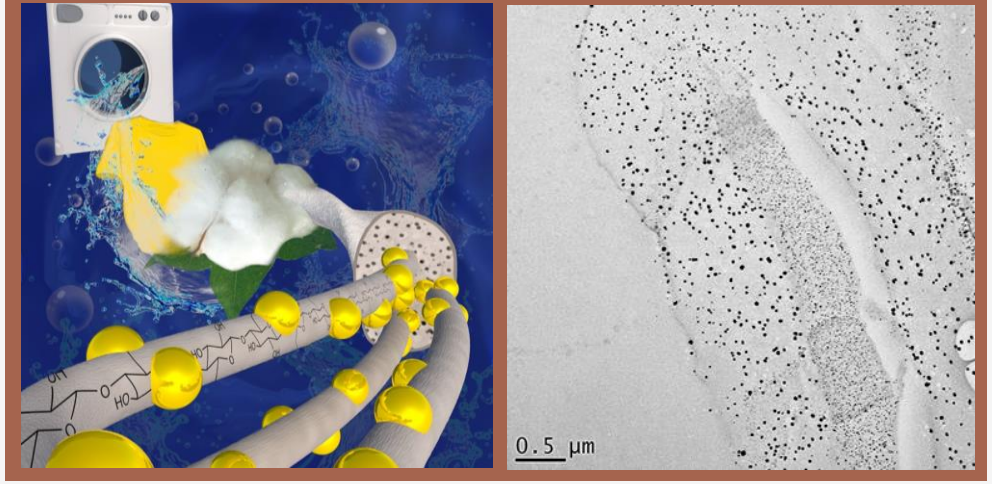
- Medical textiles (surgical masks and gowns, hospital curtains and bedding, etc.)
- Apparel (socks, underwear, athleticwear, military apparel, etc.)
- Home textiles (mattresses, blankets, etc.)
- Wound dressings and hygiene products
- Packaging for food and non-food items

Cotton Fibers Fighting Off Germs Wash After Wash

Novel, permanent antimicrobial cotton fibers are produced *via in situ* synthesis of silver nanoparticles inside the fiber. The silver nanoparticles encased within the fiber are leach-resistant against continuous launderings and serve as a reservoir for the release of biocidal silver ions, regenerating the antimicrobial surface wash after wash. This new nanotechnology tailored for cotton chemistry and structure is included in the invention.

Docket No: 18.19

Contact: [*Tanga.Boozer@usda.gov*](mailto:Tanga.Boozer@usda.gov)



Benefits

- Pure: consists of only cotton and silver nanoparticles; no chemical binders or coating matrices
- Powerful: kills 99.99% of both Gram-positive and Gram-negative bacteria
- Durable: retains the same antimicrobial function even after 50 laundering cycles
- Versatile: can be blended in the fabrication of all woven or nonwoven textile products

Applications

- Hospital textiles, socks, sportswear, military apparel, wound dressing, home textiles, hygiene products, and packaging

Bio-based Adhesives

Composite wood panels (e.g., plywood, particle board, flake board, and hard board)are indispensable for the construction industry. A substantial cost of these panels is the adhesive required to bind the wood pieces together. Much interest exists to create inexpensive bio-based adhesives to replace the expensive synthetic adhesives. Adhesives and methods of generate bio-based adhesives to fabricate panels are presented in this invention.

Docket No: 81.20
Contact: Renee.Wagner@usda.gov

Benefits

- Provides low-cost bio-resins and adhesives for numerous applications
- Would result in eco-friendly composite wood panels for the building industry devoid of hazardous problems occurring when using synthetic resins

Applications

- Entirely organic and efficacious composite wood panels can be fabricated from relatively inexpensive agricultural by-products

Bio-based Resins/Adhesives for Wood Composites

There has been significant interest in using non-petroleum-based adhesives and resins to fabricate wood composites, particularly for interior uses. Unfortunately, currently available bio-based adhesives derived from soybean meals are more expensive than their petroleum counterparts. ARS has developed methodologies to employ inexpensive by-products from corn, ethanol processing and other feedstocks for production of a more cost-effective bio-based adhesive/resin for this purpose.

Docket No: 166.16

Contact: Renee.Wagner@usda.gov

Benefits

- Inexpensive to produce
- Excellent adhesive and mechanical properties

Applications

- Building, furniture and manufacturing industries

Protein-Cyanoacrylate Nanoparticles that Improve Wetting Properties of Materials

Nanoparticles formed of a protein-poly (alkyl-cyanoacrylate) or protein-poly (alkenyl-cyanoacrylate) copolymer used as a surface treatment to alter the wetting properties of a variety of different materials.

The nanoparticles are generated using a mild chemical reaction and proteins derived from agricultural sources. These new materials change the wetting properties of hydrophobic surfaces by adsorbing to the surface and rending them hydrophilic.

Docket No: 131.11 + 41.21

Contact: Renee.Wagner@usda.gov

Benefits

- When the nanoparticles are used as a coating material for transparent materials such as glass and transparent plastics, the surface wetting characteristics are modified without affecting the transparency
- When the aqueous suspension of the developed nanoparticle is sprayed on the surface of target material, the nanoparticle adsorbs in a matter of seconds

Applications

- As a surface treatment to alter wetting properties of a variety of materials such as glass panels and acrylic sheets
- Could be used for improving visibility of windshields, mirrors and goggles
- This surface-modifying property can also be used on stainless steel, porcelain and polymer films made of non-transparent plastics

Antibodies to Lethal Mushroom Toxins

Amatoxins are produced by some wild mushrooms, such as Death Cap mushrooms which could be mistakenly identified as one of the choice edible *Amanitas*. Amatoxin-producing *Amanita* are responsible for most of the serious mushroom poisonings.

Most current methods to detect amatoxins are time consuming and require expensive instrumentation. Novel monoclonal antibodies were developed against lethal amatoxins (amanitins). These antibodies can be used in a portable, easy-to-use, diagnostic test strip to quickly determine amatoxin poisoning in humans and dogs, as well as for presence of the toxin in a mushroom. Fast and sensitive detection of mushroom poisonings is critical for timely medical treatment.

Docket No: 21.19

Contact: David.Nicholson@usda.gov

Benefits

- Early diagnosis of amatoxin poisoning can help prevent deaths (in humans and dogs)
- Antibodies help produce highly-purified amanitin for cancer therapy and as a reference standard for research

Applications

- Rapid detection of deadly amatoxins from clinical samples (urine) and mushrooms
- Concentration and purification of amatoxins
- Potential therapeutic in the treatment of amatoxin poisonings
- A tool for easily, rapidly and safely determining amatoxin-containing mushroom species

Use of Modified Cyclodextrins to Promote Honey Bee Health

Modified cyclodextrins are functionally capable of conferring several protections to honey bees. This includes the ability to: sequester pesticides from bees, bolster immune responses against viruses, increase overwintering success, and lowering the level of *Nosema* parasites found in early spring bees. ARS developed a novel formulation compatible with common beekeeping practices that can efficiently deliver cyclodextrins directly to honey bees.

Docket No: 122.18

Contact: Jim.Poulos@usda.gov

Benefits

- Sequesters pesticides from bees
- Bolsters immune response against pathogens
- Significantly improves overwintering success, specifically in the presence of miticides
- Reduces levels of *Nosema* parasites within the gut of honey bees

Applications

- Simple and safe formulation that meets all FDA requirements, and uses are consistent with contemporary commercial, sideline, and backyard beekeeping practices. Additionally, provides benefits to bees from multiple issues associated with their pesticide detoxification and immunity.

An Economical X-ray Based Irradiator with High Dose Uniformity and Precision

A cabinet style irradiator employing standard commercially available x-ray components in a novel configuration that allows for precise dosimetry in real-time along with unprecedented uniformity of radiation dose among samples.

Docket No. 38.20

Contact: David.Nicholson@usda.gov

Benefits

- Substitute for gamma irradiation using radioisotope-based sources and subsequent reduction in cost, regulations, and safety concerns for operators
- High dose precision and uniformity
- High reliability and proven ruggedness

Applications

- Insect sterilization for Sterile Insect Control technique
- Irradiation of small samples such as seeds, nuts, grain, sprouts or rice

X-ray Based Irradiation Units

This technology incorporates the use of x-ray tube-based irradiators as alternatives to gamma sources for laboratory scale irradiation. Irradiators are designed with sample placement in closest possible proximity to the source, allowing high dose rates for small samples. Designs using 1000-Watt x-ray tubes in single tube, double tube, and four tube configurations have been developed, as well as various cabinet construction techniques. Relatively high dose rates can be achieved for small samples, demonstrating feasibility for laboratory-based irradiators for research purposes. Dose rates of 9.76, 5.45, and 1.7 Gy/min/tube were measured at the center of a 12.7 cm container of instant rice at 100 keV, 70 keV, and 40 keV, respectively. For 2.54 cm diameter sample containers containing adult Navel Orangeworm, dose rates of 50–60 Gy/min were measured using a four-tube system.

Docket No: 156.09

Contact: David.Nicholson@usda.gov

Benefits

- X-ray results in consistent dose over time whereas Radioactive decay results in continuously reducing dose over time, eventually requiring replacement of the source
- X-rays do not produce nuclear waste like gamma rays
- X-ray source requires less shielding than gamma sources
- Gamma sources are “always on” while x-rays turn off
- X-ray is subject to less regulation than gamma sources

Applications

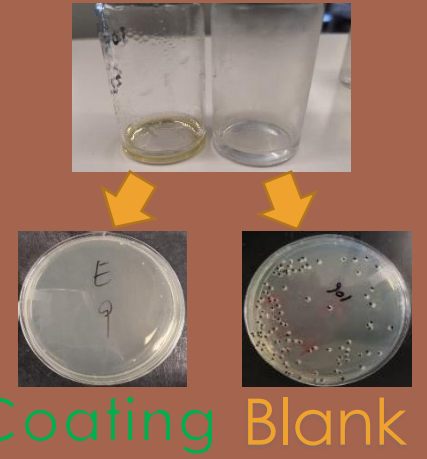
- Irradiation of seeds to prevent sprouting
- Treatment for insect control (Plant Health)
- Control of bacteria (Food Irradiation)
- Insect sterilization

Antimicrobial Curing Agents for Epoxies

A bio-based epoxy curing agents has been developed that gives the final cured epoxy polymer good antimicrobial activity against both Gram-positive and Gram-negative bacteria. The manufacturing process involves mixing this curing agent with commercial epoxy resins and hardening the mixture at certain temperatures. The resulting polymer coating doesn't contain any small molecular biocides embedded, but instead inhibits the bacteria by mere contact without releasing any reactive agents.

Docket No: 107.19

Contact: Jim.Poulos@usda.gov



Benefits

- Renewable
- Inhibit both Gram-negative and Gram-positive bacteria.
- Non-volatile and non-migratory
- Good water-resistance

Applications

- Antimicrobial coatings for public sanitations like public bathroom wall coating, flooring or toilet seat coatings
- Coatings for reception desks, countertop, dining tables or biological lab benches
- Medicine or food packaging materials
- Cosmetics additives to prevent microbial proliferation
- Polymeric disinfectants used for water treatment

Novel Capture Device for Selective Separation from Complex Mixtures

ARS developed a new class of particles for the selective separation of biological components. These new particles are suitable for affinity/immunological magnetic separation and provide many of the same benefits as the commercialized paramagnetic beads, except they were designed to query significantly larger volume samples in a cost-effective manner.

Docket No: 68.18

Contact: Jim.Poulos@usda.gov

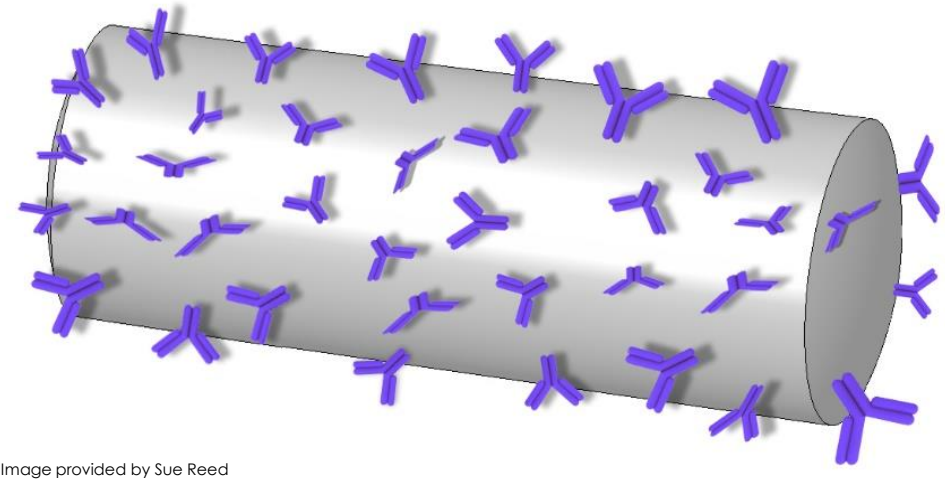


Image provided by Sue Reed

Benefits

- Expands the capabilities of immunomagnetic separation to large volume samples
- Platform-based technology used in conjunction with biorecognition elements for the selective capture of bacteria and other biomolecules
- Low-cost design allows for incorporation into disposable units amendable to automation for high throughput assays

Applications

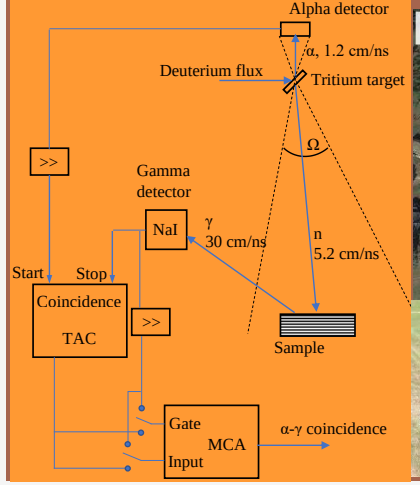
- This capture device was designed for targeted isolation from complex mixtures, having the same benefits as commercialized paramagnetic particles, except being more suited to large volume applications

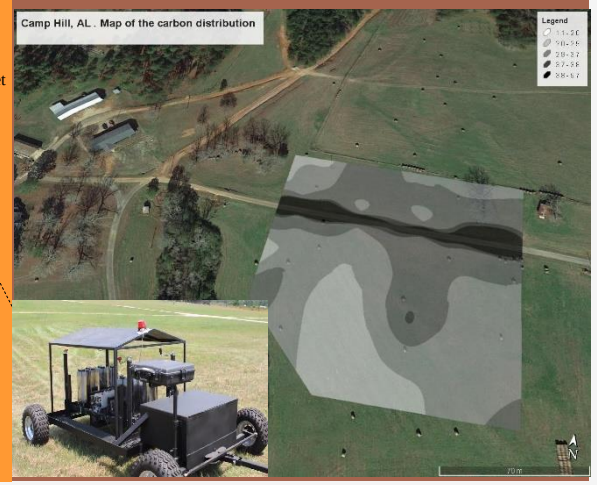
Non-Invasive System and Method to Measure Soil Elements and Locate Subsurface Objects

A neutron-gamma analysis system used as an alternative to traditional chemical analysis that measures soil elements such as soil carbon (C) by depth and can locate subsurface objects. This portable device makes non-invasive measurements using a neutron generator with an associate particle alpha detector known as Application of Associated Particle Imaging (API). The results of the invention can be combined with known mapping techniques to generate fast and accurate soil element maps such as C with depth increments.

Docket No: 61.18

Contact: Tanaga.Boozer@usda.gov





Benefits

- Soil Carbon averaged over whole field unit
- Saves labor and cost of soil samples and laboratory analysis of soil samples
- Soil C maps generated as soon as mapping is complete
- Buried objects can be detected and depth determined

Applications

- Soil C maps (and other nutrients) can be made following soil scanning with no soil disturbance
- Specific buried objects such as explosives or contaminates can be detected and depth determined

Methods for Recovery and Reuse of Filtration Media

This invention describes the process for recycling spent filtration media used to filter organic solids from fluids. While the invention specifically focusses on diatomaceous earth filtration media, the methods are applicable to other siliceous filtration media as well.

Docket No: 129.17

Contact: Jim.Poulos@usda.gov

Benefits

- Provides for reduced costs of filtration
- Provides for reuse of a finite resource… a 'greener' approach

Applications

- Diatomaceous earth is used as a filtering agent in many industries due to its unique properties including its large pore size to grain size ratio, and its ability to 'stick' to itself. However, its use is expensive relative to other filtration media.

Novel Polytriglycerides

Polyketone, polyamine and polyimine vegetable oil derivatives from renewable sources enable chelation or removal of heavy metal ions from aqueous solutions. The oil is heavier than water and can be regenerated and recycled after recovery of the heavy metal content.

(Life Sciences, Materials)

Docket Nos: 124.19 + 156.17 + 190.13

Contact: Renee.Wagner@usda.gov

Benefits

- High molecular mass compared to current neutralization agents
- Made from renewal resources in the form of vegetable oils

Applications

- Potentially used for neutralization, metalworking, metal ion absorption/extraction/sequestration
- Sequestration of toxic metal species from aqueous media and environmental purposes
- Biodegradable lubricating agents

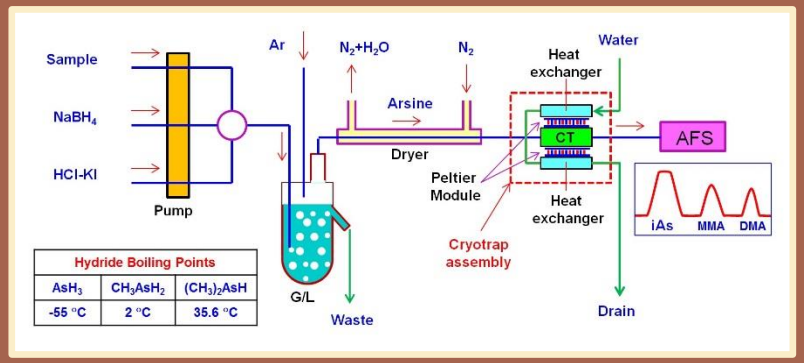
Cryogenic Trap

A thermoelectric cryogenic trap system and method used to separate and identify inorganic and organic arsenicals in a vapor stream.

(Environmental, Electronics & Hardware, Manufacturing)

Docket No: 118.15

Contact: Jim.Poulos@usda.gov



Benefits

- The cryogenic trap is cost effective, sensitive and selective
- No reagents or coolants (i.e. no liquid nitrogen) used. It is a physical approach

Applications

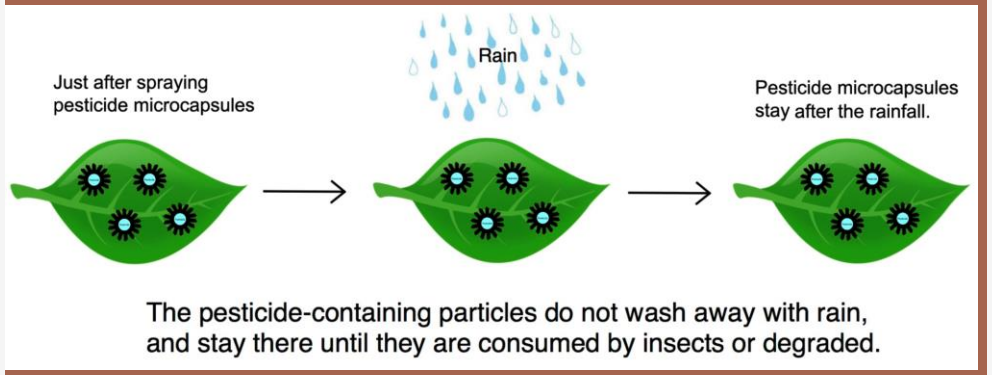
- Monitoring to protect consumers from dietary arsenic exposure
- To uphold regulations and protect consumers, methods capable of inorganic arsenic detection at ng g-1 level are needed. Because rice is such an important crop, it was selected as the model matrix in this work
- Monitoring of environmental pollution
- Pharmacokinetic, clinical and toxicology studies

Pesticides That Do Not Wash Away with Rain

Existing pesticides wash away with rain or morning dew after spraying. A novel procedure that can be used for the encapsulation of pesticides into microparticles was developed. These microcapsules adhere to the surface of plant leaves and are not washed away with rain. They stay on the leaves until they are consumed by insects or degraded. Therefore, multiple applications of pesticides are not necessary. Farmers thereby save application cost and labor, and environmental contamination is minimized. Compositions and methods of generating microcapsules are included in the invention.

Docket No: 140.17

Contact: Renee.Wagner@usda.gov



Benefits

- No need for multiple application of pesticides
- Lower application cost
- Saves time and labor
- Minimizes environmental contamination and lowers applicator exposure

Applications

- Replaces conventional formulations for pesticides
- Can be applied to any plants that are infected by pests
- Especially useful when multiple applications have to be avoided

Methods of Producing Calcined Coke from Bio-Oil and Calcined Coke Produced

A process for synthesizing biologically-derived coke from a byproduct of bio-oil distillation. The process entails fast pyrolysis, atmospheric distillation and vacuum distillation to remove liquid and volatile products.
(Energy, Manufacturing, Materials)

Docket Nos: 118.18 +126.14

Contact: Jim.Poulos@usda.gov

Benefits

- Biorenewable
- Sulfur is eliminated to trace levels below 500 ppm (vs. > 2 – 3%)
- Vanadium and nickel are absent completely in most cases (vs. > 300 ppm)
- Total ash/metal content is comparable and/or less than petroleum coke
- A desulfurization step is not needed

Applications

- The carbon rich product can be uses as a solid fuel (coal) substitute
- Can be calcined into coke suitable for use in aluminum smelting anodes, steel carburization and titanium dioxide production

Planar Transmission-Line Permittivity Sensor and Calibration Method for the Characterization of Liquids, Powders and Semisolid Materials

A planar transmission line sensor apparatus and calibration method for measuring the complex permittivity of liquids, powders, and semisolid materials over a wide band of radio and microwave-frequency. The sensor is also used for measuring the anisotropic dielectric properties of materials.

(Electronics & Hardware)

Docket No: 202.13

Contact: Tanaga.Boozer@usda.gov

Benefits

- Quantitative and sensitive test
- Results obtained in 3 - 6 hours instead of days or weeks
- Rapid, nondestructive, wideband permittivity measurements of materials, especially those without uniform edges and without the need to have the material perpendicular to the planar line by using a planar transmission-line sensor
- Simple calibration procedure
- Low cost planar transmission-line sensor apparatus

Applications

- Measuring attributes of products such as moisture content, fat content in agricultural products and food, lumber, chemical, pharmaceutical, concrete, and construction industries
- Poultry and meat processing plants

Methods for Killing Insects Using Methyl Benzoate

Natural compounds that provide alternatives to conventional synthetic pesticides to control the populations of brown marmorated stink bugs and other insect pests. The compounds could reduce threats to natural ecosystems and human health caused by application of conventional synthetic pesticides.

Docket No: 179.16

Contact: Jim.Poulos@usda.gov

Benefits

- Environmental-friendly green pesticide as an alternative to synthetic pesticides

Applications

- Botanical pesticide for controlling spotted wing drosophila, *Drosophila suzukii* and other pest species including brown marmorated stinkbug *Halyomorpha halys,* diamondback moth *Plutella xylostella*and tobacco hornworm *Manduca sext*

Fatty Ammonium Salt Starch Complexes for Numerous Products and Applications

Cost effective, bio-based complexes for numerous applications and products such as: antimicrobials, plant wounds, increased water resistance of paper, wood protectants, emulsifiers and providing other polymers with improved properties. This technology utilizes high amylose cornstarch and vegetable oil derivative(s) to produce the desired product, a complex. The raw materials are derived from plants produced throughout the mid-west. The process converts these compounds into Amylose Inclusion Complexes (AIC) using current industrial techniques.

Docket Nos: 100.17 + 96.15

Contact: Renee.Wagner@usda.gov

Benefits

- Environmentally friendly method using biodegradable renewably sourced materials
- Complexes are prepared from low cost corn/rice starch
- The raw materials for these complexes are commercially available in multi-ton quantities –many are TSCA registered, some are GRAS

Applications

- Numerous applications dependent on the vegetable oil derivative selected such as: antimicrobials, plant wounds, increased water resistance of paper, wood protectants, emulsifiers and providing other polymers with improved properties.

Anti-Corrosion Coating Utilizing Bacterial Precipitated Exopolysaccharides

A method for inhibiting corrosion on corrosion-sensitive metal with a bacterial exopolysaccharide. Specifically, exopolysaccharides precipitated from NRRL bacterial strains coated on low carbon steel alloy provide anti-corrosion coating to corrosion sensitive metals. The corrosion rate for coated metal is less than 0.4 milli-inch per year.

(Manufacturing, Materials)

Docket No: 16.09

Contact: Renee.Wagner@usda.gov

Benefits

- Bacterial exopolysaccharides are bio-based, environmentally benign, and cost comparative to existing anti-corrosion measures
- Exopolysaccharides are produced using readily available commercial fermentation processes

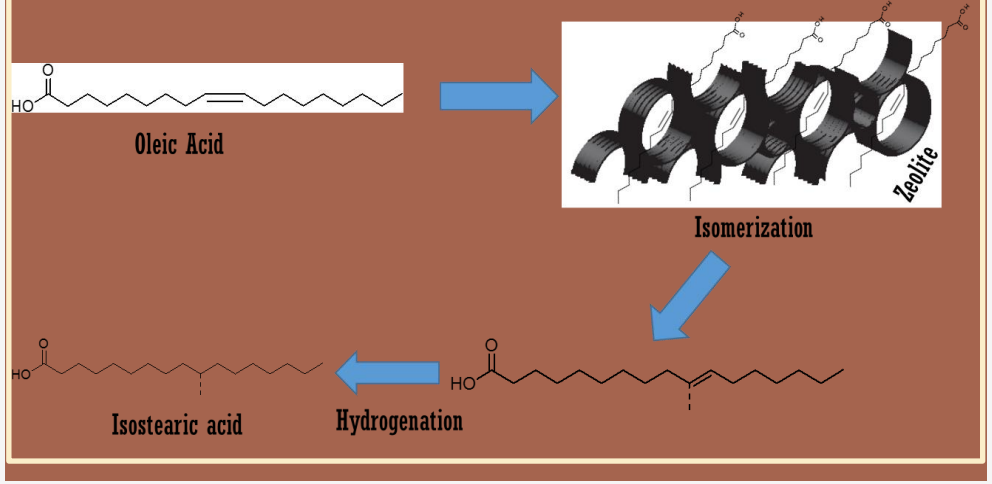
Applications

- Preventive measures that will reduce or eliminate corrosion of metals

Saturated Branched Chain Fatty Acid Production Method

Three novel catalytic methods of using ammonium cationic zeolites have been developed to produce saturated branched chain fatty acids (isostearic acid) from unsaturated linear chain fatty acid. The three selected zeolites (Ammonium Ferrierite, Ammonium ZSM-5 and Ammonium BETA) are found to produce three different compositions of isostearic acid products which will be different in physical properties and thus suitable for extended applications. High yield of product has been achieved in combination with specific co-catalysts and optimized reaction conditions even for large scale production.

Docket No: 48.16
Contact: Jim.Poulos@usda.gov



Benefits

- Property variation in products from different catalytic system is useful to expand the overall application of isostearic acid.
- Heat treatment for catalyst will make this technology cost effective and environmentally friendly
- Various zeolite-additives combinations suppress byproduct (dimer) formation effectively and thus produce high yield of isostearic acid

Applications

- Isostearic acid an important feedstock for the production of lubricant, cosmetics, emulsifiers, surfactants, biodiesel, hydraulic fluids and many more products

Process for Isomerization and Decarboxylation of Unsaturated Organic Compounds with a Metal Catalyst or Catalyst Precursor

Agriculturally-derived fatty acids are directly converted into olefins, or other useful hydrocarbons. The process involves the use of a metal catalyst or catalyst precursor that facilitates the isomerization and/or decarboxylation of unsaturated carboxylic acids derivatives into olefins.

(Life Sciences, Manufacturing)

Docket Nos: 26.18 + 10.12

Contact: Renee.Wagner@usda.gov

Benefits

- ~100% biobased content helps meet biobased formulation requirements
- Useful as a drop-in for replacement for commercial polymers without modification of existing process

Applications

- Biobased:
  - alkene for polymers such as linear low density
- Polyethylene:
  - polyolefin plasticizer
  - polyolefin lubricant

Use of Nitrogen-Containing Compounds as Plasticizers for Peptide-Based Biopolymers

A method of reducing the melting point of a peptide-based biopolymer, such as keratin or silk, using a nitrogen-containing compound as a plasticizer.

(Life Sciences, Materials)

Docket Nos: 120.17 + 104.14

Contact: Jim.Poulos@usda.gov

Benefits

- The peptide-based processed biopolymers are malleable, digestible and biodegradable
- Using nitrogen-containing compounds as plasticizers lack the problems of using urea or petroleum-based plasticizers

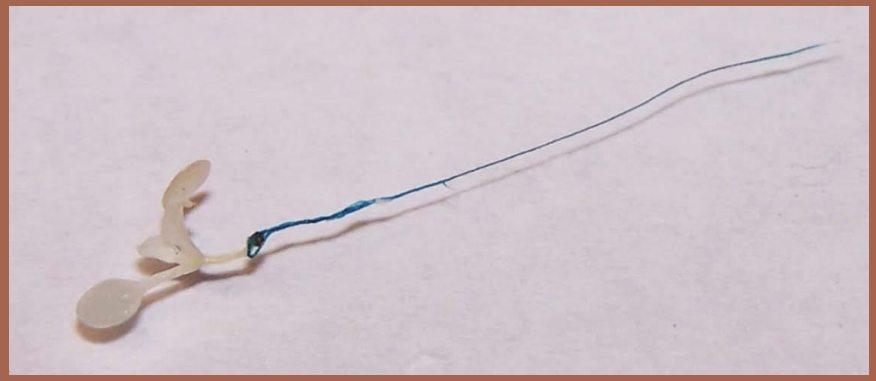
Applications

- Produce animal feed to increase the adsorption of amino acids (for mammals, fish, birds, amphibians and reptiles)
- Biobased fertilizer
- Biobased substitutes for petroleum-based plastics

Tissue Specific Regulatory Elements Derived from Citrus

Expression vectors and expression cassettes containing a tissue specific 5' transcription regulatory element, optionally linked to a translation regulatory element, optionally linked to an intron transcription regulatory element, operably linked to a heterologous polynucleotide encoding a protein or RNA of interest are described. The regulatory elements control expression in root cells, phloem cells, or fruit/abscission zone cells. (Life Sciences)

Docket No. 135.14
Contact: David.Nicholson@usda.gov



Arabidopsis thaliana with root-specific GUS expression

Benefits

- Localized expression of genes of interest
- The regulatory elements are derived from citrus and have been tested in different genetically altered plant species

Applications

- Expression vectors and expression cassettes containing regulatory sequences can be used for tissue specific expression of a gene of interest

Adhesive Compositions and Methods of Adhering Articles Together

There is ongoing interest in using agro-based materials (like proteins) in wood adhesives. The issues are cost, adhesive strength, and water resistance. New adhesive compositions involving cottonseed protein are shown here to be attractive adhesive ingredients. These include the use of specific modifiers that enhance cottonseed protein performance and several biopolymers (ex: soy protein or polysaccharides) that can decrease the cost of use. With these compositions, the performance/cost ratio for cottonseed protein-based adhesives can be enhanced. These can be used as eco-friendly and cost-effective products for wood adhesives.

(Manufacturing, Materials)

Docket No: 115.16

Contact: Tanaga.Boozer@usda.gov

Benefits

- Use of agro-based materials will minimize toxicity and environmental impact
- Cottonseed protein with modifier provides effective adhesive strength and water resistance
- Blends with cheap biopolymers can decrease cost
- Potential new products for wood adhesives

Applications

- Adhesive compositions can be used as cost-effective, eco-friendly, and sustainable ingredients in wood adhesives

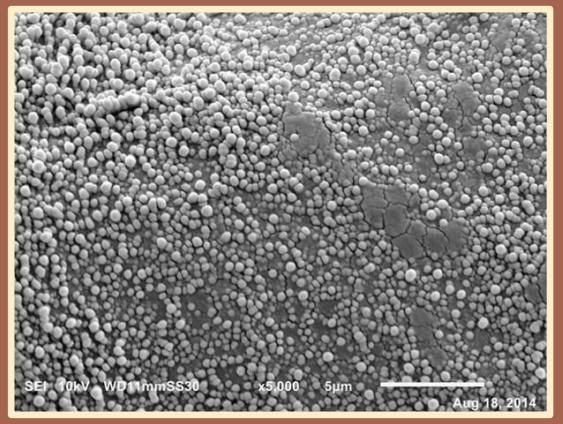
Nanoparticles and Films Composed of Water-Insoluble

Nanoparticles and the process of producing them through the use of homogenization of water-insoluble compounds. The invention also includes films composed of the nanoparticles.

(Materials)

Docket No: 118.14

Contact: Renee.Wagner@usda.gov



Benefits

- The nanoparticles are easy to produce and environmentally friendly

Applications

- The nanoparticles could be used to entrap and release varying molecules, particularly those with hydrophilic character
- Potentially used to form films, coatings, and fibers that when combined with different polymers, makes other materials
- Potentially used to deliver medicine, in the automotive industry, for cosmetics and many other industries

Variable Thermodynamic Raman Spectroscopy System and Method

A system and method for evaluating materials at multiple temperatures using Raman spectroscopy. A material is subjected to a variable thermodynamic protocol and analyzed using a differential scanning calorimeter.

(Electronics & Hardware, Life Sciences)

Docket No: 86.14

Contact: Jim.Poulos@usda.gov

Benefits

- Quantitative and sensitive test
- Results obtained in 3 - 6 hours instead of days or weeks
- Reliably measures and analyzes molecular level changes of compounds as they begin to melt
- Provides molecular structural information regarding a target substance

Applications

- To enhance the ability to identify substances through Raman spectroscopy
- Biomedical, biochemistry, material science and more
- Non-destructive monitoring for manufacturing materials to ensure intended molecular and structural integrity of material

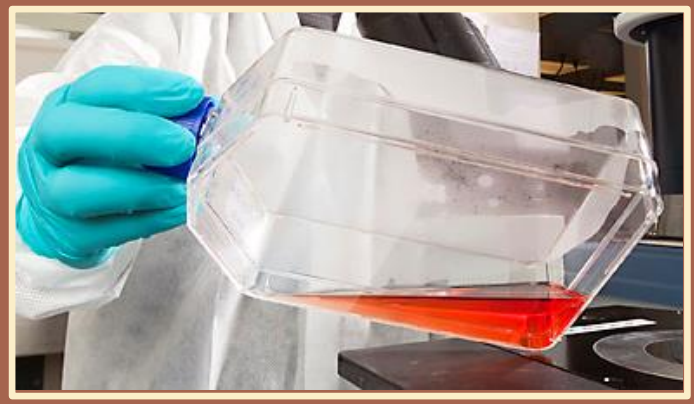
Bioassay for Cell Conditioned Media

A novel hybridoma cell line (RMH359) and its use as a cellular bioassay to determine the bioactivity of cell conditioned media (CCM) as a supplement used to support cell survival and promote growth in culture. This bioassay provides a measure of CCM bioactivity in support of hybridoma cells used in the generation and production of monoclonal antibodies.

(Life Sciences, Manufacturing)

Docket No: 98.11

Contact: David.Nicholson@usda.gov



Benefits

- Validates the bioactivity of MCM to be used in hybridoma cell culture
- Determines optimal concentration of MCM for addition to hybridoma growth media
- Normalizes batch production of MCM

Applications

- A bioassay that can be used to validate bioactivity and standardize production of CCM such as macrophage conditioned medium (MCM). The RMH359 cell line represents a novel cellular bioassay as its survival is completely dependent on the addition of MCM

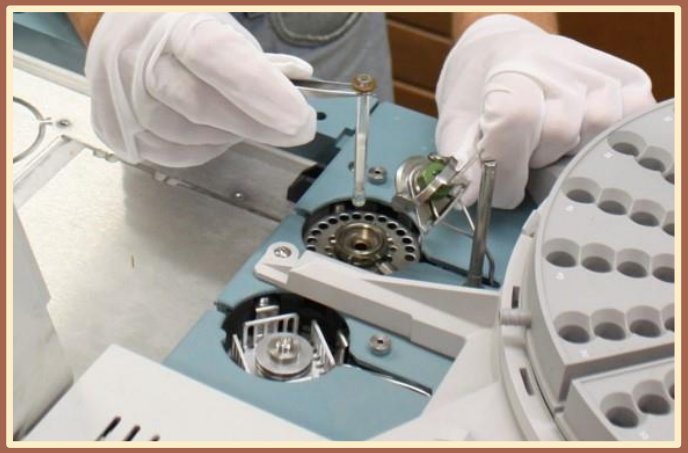
Technique for Thermal Desorption Analyses of Thermo Labile Volatile Compounds

An apparatus and method for the analysis of volatile organic compounds released by, for example, plants or insects. The apparatus is designed for adaption to existing GC/MS systems and utilizes a splitless injector as the desorption oven with a liquid CO2 cooled low thermal mass cryo trap.

(Electronics & Hardware, Environmental, Life Sciences)

Docket No: 23.14

Contact: Tanaga.Boozer@usda.gov



Benefits

- A solvent free injection technique that utilizes a desorption oven and a cold trap where effluents are collected until flash heated onto a GC column
- Eliminates the need to dedicate a GC/MS system for thermal desorption by being designed as an integral part of a standard split/splitless GC injector which is used as the desorption oven but still can be used as a normal injector without any additional changes
- Eliminates the need for flash heating of volatile compounds
- The cold trap eliminates losses due to aerosol formation

Applications

- Natural product chemistry and chemical ecology laboratories

Berry Catcher System

A berry catcher that has an elastic catcher sheet sandwiched between upper and lower hollow rims. A protector sheet is stretched across the lower rim. The system is structured so that as a harvester moves across a field, falling berries are caught by the catcher sheet as the protector sheet simultaneously protects the underside of the catcher sheet.

(Electronics & Hardware)

Docket No: 50.15

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Benefits

- System is designed to reduce berry bruising in machine-harvested fruit
- The system could be incorporated into existing commercial over-the-row harvesters and platform-based harvest-aid systems

Applications

- Machine-harvesting berries such as blueberries, raspberries and blackberries destined for fresh-market packaging

Preparation and Uses of Locked-Ring Sugar C-Glycoside Derivatives

A process for producing derivatives of C-glycosides called “locked-ring sugars” wherein the ring of the sugar molecule remains intact without the need for any protecting groups. The C-glycosides can be conjugated to biotin via a hydrazine or ozime based linker. The “locked-ring sugar” biotin hydrazones bind to streptavidin.

Docket Nos: 188.09

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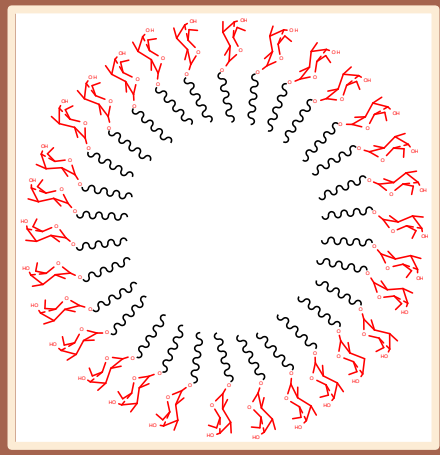

Benefits

- The “locked-ring: sugar derivatives including biotin hydrazones retain the antigenic properties of their parent sugars
- The process is simple to preform using water as the reaction solvent, at mild temperatures, with readily available starting materials and is nearly quantitative.

Applications

- ELISA assay kit market
- Capture and purification of antibodies that can recognize cell-surface carbohydrate motifs
- Lectin recognition based products
- Other techniques based on biotin-streptavidin binding