



April 2016

Agricultural Research Partnerships (ARP) Network NOTES

Welcome to ARP Network Quarterly Notes! Our goal is to keep you informed about ARP Network and Agricultural Research Service current information. We hope that the notes build networking opportunities for businesses to connect with ARP Network Members.

Please help us spread the word by sharing ARP Network Notes statewide with your company contacts, colleagues, other organizations, etc. Thank you!

ARS

The Agricultural Research Service (ARS) is USDA's primary internal research agency. ARS conducts research to develop and transfer solutions to major agricultural problems that are both national and international in scope. ARS has nearly 2,000 scientists nationwide and a few in overseas locations. ARS scientists carry out 750 research projects on a variety of subjects. ARS has a Congressional mandate to disseminate the research findings of these projects to the American public and other interested parties. Learn more by visiting:

<http://www.ars.usda.gov>.

ARP Network

The ARP Network enlists the help of partners to spark economic development, entrepreneurship and community development. USDA ARS founded the ARP Network in an effort to expand the impact of ARS research and provide resources to help companies grow. By combining ARS research expertise with complementary capabilities and talents of partnering organizations, the ARP Network helps stimulate economic growth through technological advancements. The ARP Network matches business needs with ARS innovations and research capabilities and provides business assistant services to help companies and startups solve agricultural problems, develop products and create new jobs. Learn more by visiting:

<https://www.ars.usda.gov/business/Docs.htm?docid=24715>.

USDA-ARS just released a new version of its Agricultural Handbook 66 on "The Commercial Storage of Fruits, Vegetables, and Florist and Nursery Stocks."

This new version contains over 780 pages of guidelines and other important information for storing and handling horticultural commodities. It can be obtained on-line at:

<http://www.ars.usda.gov/is/np/CommercialStorage/CommercialStorageIntro.htm>.

Partnership Opportunity

Enhancing Utilization of Citrus Processing Coproducts

A continuous process using steam to enhance the release of pectic hydrocolloids and phenolic compounds from citrus or other biomass processing waste. This is an environmentally friendly method that does not use organic solvents for extraction. The resulting pectin hydrocolloids could potentially be used as thickening and gelling agents in food. Other potential applications include for the removal of harmful cations from industrial discharge waters, hydration control, micro encapsulation and as film cast material. ARS is seeking a partner with which to further develop this technology. Publication: Cameron, R. G., Chau, H. K. and Manthey, J. A. (2016), Continuous process for enhanced release and recovery of pectic hydrocolloids and phenolics from citrus biomass. J. Chem. Technol. Biotechnol. doi: 10.1002/jctb.4854. ARS docket no. 16.16. Please contact Joe Lipovsky: joe.lipovsky@ars.usda.gov or Tommy Valco: thomas.valco@ars.usda.gov

Partnership and/or Licensing Opportunity

Heavy Metal Remediation via Modified Bio-Oils

A process for the removal or extraction of metals, including heavy metals, precious metals and other metals, from a variety of solid, liquid or gas phase materials. Metal species are removed by contacting the material containing one or more metals with a chemically modified vegetable oil. After mixing the substrate with the modified bio-oil, the metal species are sequestered in the oil layer and the metal species may then be separated and recovered from the treated material. Potential commercial applications for this technology may include removal of toxic metals from drinking or fresh water systems, waste discharge streams from agricultural or commercial sites, or from industrial or mining sites and from flue gas discharge and may also have applications for recovery of precious metals. This process uses readily available materials and allows for remediation and/or recovery to be conducted in an environmentally friendly manner. This technology is available for licensing or for partnership opportunities to further develop the process for specific applications. ARS dockets 12.12 and 133.15 (U.S. Patent 9,126,909). Please contact Renee Wagner: renee.wagner@ars.usda.gov

Partnership Opportunity

Combinatorial Enzyme Technology

A "Combinatorial Enzyme Technology" for the conversion of agricultural waste fibers to designer oligosaccharides with commercially viable food and non-food applications. The emerging "green" industry, with its increasing demand for new products that are environmentally friendly, will be particularly benefited by this technology for developing bio-based replacements for products normally derived from petroleum or synthetic chemicals. The use of non-digestive oligosaccharides has gained acceptance rapidly as functional foods (nutraceuticals and prebiotics), with the global market reaching 90 billion dollars yearly. There is also huge potential for pharmaceutical, cosmetic, and other non-food applications that have not received as much attention for commercial exploration. Specialty oligosaccharides show particular promise because of their unique properties: i.e. gel forming, antimicrobial effect, cosmetic anti-skin ageing, drug carrier, anti-inflammatory, inhibition of free-radical damage, and inhibition of glycation. Oligosaccharides can undergo further enzymatic modifications to produce excellent surfactants, biodegradable plastics, films, coatings, capsules and tablets. Starting materials for these oligosaccharides include biomass feedstock and agricultural waste fibers. There appears to be particular opportunity in exploiting the waste material generated from food and industrial processing, such as citrus peel, apple pomace, almond husk, sugar-beet pulp, rice husk, wheat straw, corn stover, oleaginous seed residues, algal processing waste, and

many others. The Combinatorial Enzyme Technology is not limited by applications in the conversion of polysaccharides to novel oligosaccharides. This Technology should apply equally well to exploring new product functions in all types of biopolymers and heteropolymers. ARS is looking for a research partner to further develop and commercialize the technology. Please contact David Nicholson:

david.nicholson@ars.usda.gov

Partnership and/or Licensing Opportunity

Genetically Modified *Babesia* Parasites Expressing Protective Tick Antigens and Uses

Methods for stable transfection of *Babesia* parasites with any heterologous DNA and genetically altered *Babesia* expressing heterologous DNA. The technology could potentially be used to develop vaccines conferring immunity against parasitic arthropods. The method involves transfecting foreign DNA into *Babesia* resulting in genetically modified parasites that will be able to express foreign genes in animal hosts. Potential commercial applications include facilitating control of both ticks and tick-borne diseases in animals or expressing any desired antigen or other protein in animals that are infected with the genetically altered *Babesia*. The application could be a single dose of a bivalent vaccine. The method eliminates the need for recombinant protein production for vaccine. ARS docket nos. 35.16 and 116.05. Parent U.S. patent No. is 9,265,818. Please contact David Nicholson: david.nicholson@ars.usda.gov

Partnership and/or Licensing Opportunity

A New Whey Protein Formulation with Improved Solubility, Functionality and Thermal Stability

A molecular basis for designing an optimal whey protein formulation that not only possesses improved properties for processing whey proteins, but also includes an additional nutritional constituent. The invention also provides a new use for sugar beet pectin. ARS is looking for a research partner to help formulate product. ARS Docket 85.15. Please contact Jim Poulos: jim.poulos@ars.usda.gov

Partnership and/or Licensing Opportunity

Double Strand RNA-Mediated RNA Interference through Feeding Detrimental to Larval *Lymantria Dispar* (Gypsy Moth)

Genetic constructs have been developed for the expression of dsRNA corresponding to target genes in gypsy moth, *Lymantria dispar*. Also, methods have been developed for introducing dsRNA into target insects to induce RNA interference (RNAi). The technology could potentially be used as a molecular bio-pesticide to control gypsy moth. RNA interference through feeding may be beneficial over other techniques due to the ease of feeding large number of insects inexpensively and to preserve sustainable farming practices. This technology is available for licensing or for partnership opportunities to further develop the technology. ARS docket no. 3.15. Please contact Jim Poulos: jim.poulos@ars.usda.gov

Partnership and/or Licensing Opportunity

Variable Thermodynamic Raman Spectroscopy System and Method

A system and method for analyzing molecular structural changes of compounds as they begin to melt using Raman spectroscopy. A material is subjected to a variable thermodynamic protocol and analyzed using a differential scanning calorimeter. Potential commercial applications include enhancing the ability to identify substances through Raman spectroscopy for biomedical, biochemistry and material science disciplines and for non-destructive monitoring for manufacturing materials to ensure intended molecular

and structural integrity of material. ARS docket no. 86.14. Please contact Jim Poulos:
jim.poulos@ars.usda.gov

Partnership and/or Licensing Opportunity

Method for Killing Insects Using

A method for killing insects involving treating an object or area with an insect killing effective amount of a composition from fermented apple juice and optionally a carrier. Potential commercial applications may include use as a 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 sexta*. The method is an environmental-friendly green pesticide for use as an alternative to synthetic pesticides. ARS docket no. 53.15. Please contact Jim Poulos:
jim.poulos@ars.usda.gov

Available Technologies for Licensing

Each year, approximately 60 new patents are issued by the U.S. Patent Office for USDA inventions. The Office of Technology Transfer (OTT) transfers these inventions through licenses to the private sector for commercialization. Here is a link to *recently filed* U.S. patent applications that are available for licensing. This list is updated monthly so check back often! <http://www.ars.usda.gov/Business/Business.htm>

Recently Issued ARS Patents

View a list of 2015 issued U.S. patents: <http://www.ars.usda.gov/business/Docs.htm?docid=25285>

ARS Digital Online Research Magazine

AgResearch is a monthly publication highlighting short features on the scientific research discoveries occurring at all of ARS' research laboratories across the Nation and abroad. View *AgResearch* at <http://agresearchmag.ars.usda.gov>. One can subscribe to electronic delivery of the magazine on the website.



USDA Blog

Check out USDA Blog site for updates on Agricultural issues (<http://blogs.usda.gov>). One can sign up for email updates on the website by checking boxes of categories of interest including the blog, news categories and social media.

Welcome to VIVO

USDA VIVO provides a powerful Web search tool for connecting researchers, research projects and outcomes and others with relationships to the research. The idea is to link researchers with peers and

potential collaborators. VIVO makes it possible to quickly identify USDA scientific expertise. (<http://vivo.usda.gov>).

We are seeking contributions for future ARP Network Notes from members who wish to share information that would be of interest to the group. Suggestions include events, Ag challenges and community initiatives. For ideas of content for future notes, please contact Cathy Cohn at cathleen.cohn@ars.usda.gov.

Get more information: www.ars.usda.gov



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