KiwiNet

Kiwi Innovation Network

EMERGING OPPORTUNITIES

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Contents

ABOUT KIWINET

The Kiwi Innovation Network (KiwiNet) is a consortium of Universities, Crown Research Institutes and other publically funded research organisations who are dedicated to taking a collaborative approach to research commercialisation. Together these research organisations represent a total combined annual research expenditure of over $500 million and represent over 66% of the publically funded researchers in New Zealand.

KiwiNet's role is to empower people who are involved in research commercialisation by helping them to access the tools, connections, investment and support they need. By collaborating on projects, combining capability and sharing networks, we at KiwiNet believe that we can better leverage the limited resources available for commercialisation and help each another improve commercial outcomes for New Zealand.

KiwiNet is funded from the shareholder research organisations and the Ministry of Business, Innovation and Employment.

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ABOUT THIS DOCUMENT

This document provides an overview of some of the recent investments made by the KiwiNet Investment Committee (IC). The KiwiNet IC invests PreSeed Accelerator Funding (PSAF) provided by the Ministry of Business, Innovation and Employment (MBIE). This PSAF funding is targeted at developing research discoveries to the point where they are “investor ready”.

These projects are very early stage and may not yet be developed to the point where they can secure private investment. However, each project has had some targeted due diligence carried out as part of preparing a business plan for presentation to the KiwiNet IC.

The purpose of this document is help potential investors and business partners have more visibility of the opportunities that are emerging from research organisations. We encourage people who are interested in learning more about these projects to contact KiwiNet and we’ll introduce you to the relevant research organisation.

The project may not be ready for investment yet, but if you become involved early on, you may be able to help guide the project to become an attractive investment proposition in the future.

APICULTURE

HOTELS FOR CHELIFERS

Plant & Food RESEARCH
RANGAHAU AHUMĀRA KAI

Development of a novel beneficial method for biocontrol of varroa mite in commercial honey hives

THE PROBLEM

Varroa mite is considered to be the biggest threat to apiculture globally. Over the last 30 years it has spread rapidly and is now found in beekeeping countries across the globe, with the exception of Australia. It has a devastating effect on bee health and mortality and can lead to colony death. Varroa mite first entered New Zealand in April 2000 and has now spread to most parts of this country.

In 2012 the Ministry of Agriculture and Forestry (MAF) estimated varroa mite will cost the New Zealand economy between $400 and $900 million over 35 years.

Currently, for control of varroa almost all honeybee hives in New Zealand are treated with chemicals, termed acaricides. These treatments are expensive to apply and not always effective due to resistance development and potential toxicity to bees. There is a desire to have a non-chemical option that overcomes these issues and eliminates any risk of chemical residues in hive products.

THE SOLUTION

Chelifers provide an alternative method for Varroa control that has the potential to circumvent many of the current issues surrounding control. PFR have developed a novel way to culture chelifers and introduce them into bee hives for potential Varroa control. Called the “Chelifer Hotel System”, it enables the efficient transfer of chelifers from culture to commercial honey bee hives. This Chelifer system is expected to lower the current cost of varroa control, reducing honeybee mortality and reduce the reliance on acaricides. The system will fit easily with current beekeeping practices and may increase production and quality of honeybee products. The increased hive health will also result in improved pollination services for horticultural and agricultural industries.

There may be tangible benefits to the beekeeping industry from use of the Chelifer Hotel System, other than just Varroa mite control. The Chelifer system itself may increase brood production in honey bee hives, leading to improved honey production and pollination activity. These perceived benefits need to be quantified.

If successful, the project will lead to the first commercially available biocontrol solution for Varroa mite management in honeybee hives.

COMMERCIAL OBJECTIVE

Plant and Food are seeking external investment and commercial partners for this project. If you would like to know more about this opportunity, please contact KiwiNet and we will put you in touch with the relevant contact person.

AMARANTH PROTEIN

The Biopolymer Network have developed a process to produce an extract that is expected to deliver 3 beauty outcomes; skin whitening, hair strengthening, and skin cell protection.

THE PROBLEM

Currently the personal care market struggles to source Natural and Organic functional ingredients with the required efficacy that still meet the criteria for natural formulations. Natural and Organic are the fastest growing areas in the global personal care industry, with estimated market revenues in 2011 of over USD $8,400 million. While there is demand for natural products, there is reluctance to compromise on efficacy so additives with scientifically proven performance are sought after.

Skin whitening (also called "brightening") additives are keenly sought after, particularly in the growing Asian market and particularly in natural products where synthetic or chemically extracted additives are not an option.

Hair strengthening: hair is subject both to the elements – sun, rain etc. – and to the effects of an air conditioned or heated artificial interior climate. Tired, neglected hair becomes weak, fragile and brittle. As a result, consumers seek remedies that restore the overall condition and strength of their hair.

In 2011, almost 64% of new hair care products released in China touted a 'natural' claim, while in the global market, products with the same claim accounted for 50% of launch activity. Companies targeted will be those that are looking to capitalise on the growing demand for natural personal care products and are prepared to pay a premium for extracts that meet the stringent demands of this market.

THE SOLUTION

Amaranth PF1 is a powdered extract from Amaranth grain that delivers 3 beauty outcomes: skin whitening, hair strengthening, and skin cell protection. BPN have developed a process to produce an extract that meets the criteria for natural personal care products. Their natural extraction process avoids harsh chemicals or solvents and so enables our extract's use in the lucrative, global, natural personal-care market. This addresses growing global concern about the inclusion of chemicals in products applied to the skin.

The efficacy of the extract has been scientifically proven, unlike much of our competition, through in vitro and ex vivo studies by AgResearch for BPN. This enables it to be targeted at the USD 10 billion skin whitening market in Asia-Pacific.

COMMERCIAL OBJECTIVE

If you would like to know more about this opportunity, please contact KiwiNet and we will put you in touch with the relevant contact person.

AGRICULTURE

JOHNE'S ORAL CATTLE VACCINE

OTAGO INNOVATION
A UNIVERSITY OF OTAGO COMPANY

Otago Innovation aims to produce the first oral cattle vaccine for Johne's disease.

THE PROBLEM

Johne's disease is a chronic wasting disease caused by a bacterium Mycobacterium avium subspecies paraTB (MAP). MAP can affect sheep, goats, deer and cattle. The disease can result in long-term reduction in productivity and eventually death. The main ways to control Johne's disease in US dairy and beef cattle are to monitor and remove suspected infected animals, and to rear calves in isolation. Some farmers also vaccinate.

The only cattle vaccine for Johne's currently on the market does not enjoy a good reputation for efficacy, can interfere with subsequent Tb testing, and can leave an unsightly injection lesion. An effective vaccine for Johne's disease would be valuable to animal remedy companies. The market size in the US is 3 million doses or NZ$24m per annum.

There are 9 million dairy cattle in the US. Despite a relatively high herd prevalence of Johne's disease [68% is the most often quoted figure] and an estimated annual cost of Johne's of $US200-250 million, there are only about 50,000 doses [i.e. 0.5% of the adult dairy cow population] of injectable Johne's vaccine @ $NZ8.00 per dose sold per annum in that market. There are 29.3 million beef cows in the US, though with a lower herd prevalence of Johne's disease than the dairy industry [8% is the most often quoted figure].

THE SOLUTION

There is no oral vaccine for Johne's disease on the market for any species. Otago Innovation propose to develop the first, for use in cattle. They expect to elicit a stronger immune response and anticipate that their vaccine will overcome two other problems associated with existing vaccines; lesions at the injection site and a tendency to elicit a subsequent positive Johne's test result.

COMMERCIAL OBJECTIVE

Otago Innovation are looking to license the technology to an animal health company.

Please contact KiwiNet and we will put you in contact with this organisation for more information on this opportunity.

VITICULTURE

MICRO-OXYGENATION OF WINE

Plant & Food RESEARCH
RANGAHAU AHUMĀRA KAI

Plant and Food Research have developed a simple and cost effective tool to help winemakers make great wine through micro-oxygenation.

THE PROBLEM

Winemakers face a problem: the taste, colour and texture of young wines are sub-optimal. In order to mature their wines more effectively, modern winemakers who have the capital investment are introducing precise amounts of oxygen to their wine during the maturation process. The oxygen then develops the tannins that are present in the wine, resulting in a more palatable drop. This is the process of micro-oxygenation.

Each of the existing micro-oxygenation methods available to winemakers have significant drawbacks such as cost, complexity, and in some cases, speed to market. The potential market for a simple, cost-effective micro-oxygenation system is substantial.

THE SOLUTION

The micro-oxygenation system being developed by Plant & Food Research is a simple and cost effective tool to help winemakers make great wines through micro-oxygenation. The micro-oxygenation system will take advantage of the novel features of a patented valve to provide winemakers with a cheap and simple mechanism for introducing oxygen to their wine at mg/hr rates suitable for micro-oxygenating wines.

Heavy red wines have traditionally been produced in oak barrels which naturally allow small amounts of oxygen to be absorbed into the wine as it matures. This process is known to stabilise the colour and improve the wine's taste and texture. Wine barrels are becoming increasingly expensive and there is pressure on winemakers to get wines to market quicker.

By contrast, the micro-oxygenation system uses the valve to regulate the amount of oxygen being introduced to the wine. This allows for a product that is cost effective and easy to use - putting the process of micro-oxygenation within reach of winemakers who would otherwise be unable to afford it.

COMMERCIAL OBJECTIVE

Plant and Food Research aims to develop a prototype micro oxygenation system and trial with wine-makers. Please contact KiwiNet and we will put you in contact with this organisation for more information on this opportunity.

BIOCONTROL FOR VEGETABLES

Lincoln University
Te Whare Wānaka o Aoraki
CHRISTCHURCH·NEW ZEALAND

Lincoln University intends to develop a commercially viable live spore product to protect high value vegetables against soil-borne pathogens.

THE PROBLEM

New Zealand produces around 60% of the world's carrot seed, all of which is exported. The export value of carrot seed was $27M in 2013. This production and export is increasingly coming under threat from two fungal pathogens, Alternaria radicina (which is seed-and soil-borne) and Fusariam solani (which is soil-borne). These two pathogens are reducing carrot seed crop yields by an estimated 5-20% p.a. It is becoming increasingly difficult to find disease-free sites suitable for seed production due to their prevalence and longevity in Mid-Canterbury soils. The problem is further exacerbated because A. radicina, in its seed-borne phase, reduces seed germination, making it difficult to meet contract seed quality standards, currently causing ~10% of seed lots to be rejected. These issues are decreasing New Zealand's ability to meet an increasing international demand for our high quality seed. Unless a solution to the problems caused by A. radicina and F. solani is found quickly, New Zealand carrot seed growers will not only be unable to take the opportunity provided by the increasing international demand, but will also struggle to maintain existing export volumes. Soil-borne Fusarium species including F. solani also cause significant seed yield reductions in radish and vegetable brassicas and yield losses in commercial crops of tomato, pepper and curcubits in both glasshouse and field production systems. There are currently no effective control methods for the soil-borne phase of these two pathogens.

THE SOLUTION

Our technology will provide an effective method of protection against soil-borne pathogens. Not only will this improve crop yield and quality but will also allow growers to expand into soils currently out of circulation due to infection. This control will be cost effective and save exporters millions in wasted fungicide application.

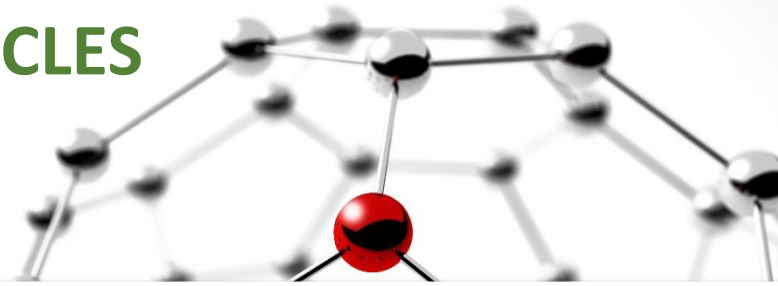
Our novel Trichoderma strains have proven to be effective in pot trials, protecting carrot seedlings against both Alternaria radicina (seed-and soil-borne) and Fusariam solani (soil-borne). Once formulated into a soil prill and seed coating we believe our technology can effectively protect carrot seed crops and commercial vegetable crops where these pathogens are of concern. The aim of our product will be to reduce and maintain pathogen levels in soils to below those necessary for a disease outbreak.

COMMERCIAL OBJECTIVE

Lincoln aims to validate this product and secure commercial use in both the carrot seed and fresh vegetable industries in conjunction with commercial partners. Please contact KiwiNet and we will put you in contact with this organisation for more information on this opportunity.

BOTIQ NANOPARTICLES

viclink



Viclink produces novel magnetic, catalytic and optical particle products that can be tailored to meet customers' needs using cost-effective processes

THE PROBLEM

Next generation diagnosis and treatment of cancers and degenerative diseases requires novel medical devices and approaches. In many cases, the newly developing technologies require an accessory or complimentary technology (such as a tracer or contrast agent) on which the function of the device significantly relies, in order to produce an image or signal for the purposes of diagnosis. The tracer material used in these technologies often derives from colloidal magnetic nanoparticles, of which there is a significant lack of supply at a clinical level.

This poses a three-fold barrier to market implementation and success for device manufacturers: 1) lack of supply of clinically approved materials 2) need for registered tracer materials that show the best competitive performance, when coupled with the device, and 3) security of supply and the ability to address future adoption or supply problems within the realms of the developers expertise.

THE SOLUTION

The magnetic nanoparticles produced by Boutiq sciences limited have the potential to solve this problem, through their superior performance in sensitivity and detection capability (relative to any other magnetic particle product that may be suitable for clinical application).

Boutiq make tailored nanoparticles for research purposes. They focus on particles with unique optical, magnetic and catalytic properties, produced with bench-top solution-phase methods that are relatively rapid, low cost and allow for tailoring of particle properties and surface chemistry as required by the customer. Particles produced include Iron/Iron-Oxide Core/Shell particles (magnetic properties), Platinum, Paladium, Nickel, Gold and Silver particles (catalytic properties) and Silicon Quantum Dots (optical properties). Boutiq's core technology and end product will be a magnetic tracer/contrast agent for use in humans and by clinicians/surgeons. Boutiq provides not only nanoparticles with novel properties that extend the existing capability of what is on the market, but also the ability to tune and develop these properties to align specifically with the development requirements of an end user in a cost effective and controllable manner.

- Expertise and know-how in production of novel nanoparticles
- Quality research-grade particle production
- IP in production methods and particle products
- Tailored/targeted products

COMMERCIAL OBJECTIVE

Please contact KiwiNet and we will put you in contact with this organisation for more information on this opportunity.

CEMARS Energy

GREENTECH

Landcare Research
Manaaki Whenua

Landcare Research have developed an integrated carbon and energy management system in response to UK regulation

THE PROBLEM

On the 31st December 2014 a new energy management regulation (applying to all companies with 250 or more staff or turnover exceeding €50M turnover) called the Energy Efficiency Opportunity Scheme (ESOS) was enforced in the UK. ESOS is a compliance requirement and each company will require additional tools to demonstrate compliance. 50% of the ESOS work stream relates to measuring energy use which is a significant task for most companies.

Companies must be assessed by a registered lead assessor. There is an onerous process involved in becoming a registered lead assessor and early adopters able to undertake this assessment will have an advantage in establishing market share.

THE SOLUTION

According to the regulator (Environment Agency), this ESOS impact approximately 7,500 UK organisations and presents a significant opportunity for professional service firms to support companies impacted by the regulation.

Enviro-Mark Solutions currently has a client-base of approximately 130 clients in the UK through our existing CEMARS (Certified Emissions Measurement And Reduction Scheme) programme. Many of these have been in the CEMARS programme for more than 5 years. The CEMARS program is being further developed by Landcare Research to support those organisations with carbon and energy obligations resulting from these changes in legislation.

The CEMARS programme is specifically referred to as a route to compliance within the ESOS statutory guidance published by the UK Department of Energy and Climate Change. The tools provided to CEMARS participants currently capture energy use data and, with further development, these tools can provide a one-stop shop for companies to comply with ESOS and maintain their carbon certification.

COMMERCIAL OBJECTIVE

Landcare Research aim to expand the revenue of Enviro-Mark Solutions and increase the capability of the service offerings by developing a programme to support organisations impacted by the newly introduced ESOS regulation.

Please contact KiwiNet and we will put you in contact with this organisation for more information on this opportunity.

SOFTWARE

GEOTHERMAL FORCASTER

GNS Science aim to automate geothermal development forecasting using modelling tools, driving economic models for several decades into the future.

THE PROBLEM

At the moment it is extremely difficult to obtain robust predictions of field performance over the economic lifespan of a geothermal development. This difficulty is mostly due to the complexity of developing the forecast scenario. Consequently a lot of forecasting that has been done it is either very simplified or has been a laborious and time-consuming process that is prone to error.

Estimates of the sustainable capacity and corresponding development requirements (such as new wells) for a geothermal field are important inputs for economic modelling done by developers of geothermal fields. New geothermal wells can cost more than $10M and power stations more than $200M, so estimates of capacity and make-up well requirements have large associated dollar values. Current approaches to estimating these values are ad-hoc and require significant manual input.

THE SOLUTION

This technology will allow end user to obtain predictions of the requirements for future field generation so that economic decisions on field development (eg: size of turbine) can be made faster and with more confidence. Such a capability will be of considerable value to end users as they are able to make more informed and robust decisions.

This project will further develop algorithms and a software interface to automate and optimise the modelling workflow that estimates the capacity and development requirements. These algorithms will improve efficiency and reliability. The interface will provide a consistent approach to preparing the forecasting which will reduce operator errors. The software will also seek to reduce computational issues that often arise with the current simulation software TOUGH2. TOUGH2 is a widely used geothermal simulation programme developed for the DOE in the United States.

In addition to automating the current workflow, the project will extend the algorithms to add rule-based systems that can incorporate economic factors. For example, this can estimate the optimal time to add a new well to the field – this may be after the capacity has started to decline depending on the economics of the geothermal development.

COMMERCIAL OBJECTIVE

GNS are aiming to develop this technology and sell this as a software product to geothermal developers and consultants, or to offer this as consultancy service by New Zealand companies. Please contact KiwiNet and we will put you in contact with this organisation for more information on this opportunity.