

## Results of competition: Nutrition for life - providing safe and healthy foods - Feasibility studies

Total available funding for this competition was £1.6m from the Technology Strategy Board.

**Note: These proposals have succeeded in the assessment stage of this competition. All are subject to grant offer and conditions being met.**

Participant organisation names	Project title	Proposed project costs	Proposed project grant
<b>Advanced Microwave Technologies Ltd (lead)</b> Claymore Dairies Ltd	Assessment of the technical, practical and economic benefits of using Microwave Volumetric Heating (MVH) to process dairy products; can shelf-life be extended without compromising quality?	£99,909	£30,719
<b>Project description (provided by applicants)</b>			
<p>Microwave Volumetric Heating (MVH), is a unique and highly innovative technology developed by Advanced Microwave Technology (AMT) Ltd. Designed for the thermal processing of liquids and semi-solids, it is associated with a number of practical, technical and economic benefits and has been proven to pasteurise fruit beverages with minimal loss of nutrients and significant extensions to shelf-life.</p> <p>This project will focus on translating this knowledge to the more challenging products, processing scale and legislative landscape within which the UK dairy sector operates. The key objectives are: 1) To compare MVH treated products with conventional HTST pasteurised products in terms of shelf-life, nutritional content and organoleptic properties, 2) To optimise MVH processing for two dairy products, and 3) To assess the practical and economic issues involved with scaling up MVH processing. New knowledge relating to novel processing technology that has the potential to increase the biosecurity of dairy products whilst maximising the preservation of the nutritional content and quality, is of enormous value to the dairy industry.</p>			

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<b>Avanticell Science Limited (lead)</b> Cardiff University	A cell-based analysis platform to screen nutraceuticals and functional foods against osteoporosis	£99,889	£64,767
<b>Project description (provided by applicants)</b>			
<p>The project will build a new tool for the identification of food constituents which can be used to prevent or treat osteoporosis. The new tools will be in the form of a cell culture system which contains human bone cells. These cells will be cultured under laboratory conditions in which they display activities relevant to the development of osteoporosis. These activities will be measured when the bone cells are exposed to new food materials, so that the system identifies those food constituents which may bring health benefit if incorporated into the diet. An important feature of the new test system will be the ability to apply mechanical stress to the bone cells, just as happens constantly in the body.</p> <p>This innovation will encourage bone cells to behave in culture as they do when inside the bone, and in doing so, should allow food test results to accurately predict their health benefit. In doing so, this new laboratory tool will reduce the need for animal testing of new foodstuffs and make nutritional trials of functional foods more cost-effective through early selection of candidates likely to give health-benefit, while de-selecting those destined to fail before major expense is incurred.</p>			

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<b>Biocatalysts Limited (lead)</b> Cereform Ltd	Novel enzyme development to produce soya-free baked products without compromising their whiteness	£50,860	£36,595
<b>Project description (provided by applicants)</b>			
<p>The primary objective of this project is to develop speciality recombinant enzymes for use in the manufacture of baked goods. This feasibility project focuses on the development of recombinant enzymes, which are not currently available on the market.</p> <p>This study will involve the cloning and expression of genes from the enzyme of interest into multiple expression hosts to identify the most suitable expression system to develop a commercially valuable process. The enzyme will be tested in baking trials to evaluate its performance and suitability in the process.</p>			

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<b>Biocatalysts Limited (lead)</b> Prozomix Limited	Novel enzymes for production of salt-reduced food products	£90,060	£67,545
<b>Project description (provided by applicants)</b>			
<p>Biocatalysts Ltd will undertake a project to develop a novel enzyme for production of high value speciality yeast extracts. These speciality yeast extracts are valued for their natural taste intensification properties, ability to mask undesirable bitter notes, creation of umami flavours and their use in reduced-salt content food recipes.</p>			

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<b>Cellular Systems (Grantham) Limited (lead)</b> Nottingham Trent University	Egg shell waste - investigating the chemistry of the isolation processes of high value materials	£92,407	£66,805
<b>Project description (provided by applicants)</b>			
<p>Egg shell waste amounts to 15,000 tonnes per annum in the UK, and it is predominantly sent to land fill. This is both bad for the environment and also costs the egg processors hard-earned cash. This material, comprising a mineral calcium carbonate and a biological component, proteins and bioactive molecules, has a value. The mineral, at commodity prices, could be worth over £1m a year; the raw protein material over £40m. These will give the business early revenues, while we develop the processes to extract even higher value materials.</p> <p>This project will build on a previous Technology Strategy Board funded project and will characterise all the chemical components of the dual isolation process that we are developing. This will enable us to identify the best process from volume, ease and cost angles. The output will give us the foundation to move ahead on a programme of optimising the process prior to scale up in a pilot plant. Pressure from the supermarkets, imposing Corporate Social Governance policies on suppliers and the potential implementation of more stringent EU law on food waste disposal, make this a timely project for the egg processing industry.</p>			

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<b>Eat Balanced Limited (lead)</b> University of Glasgow Cash registers (Buccleuch) Ltd David Kilshaw Consultants Limited	Making healthy tasty - improving uptake of healthy lunches for school pupils	£91,000	£35,750
<b>Project description (provided by applicants)</b>			
<p>Eat Balanced, the creators of tasty, nutritionally balanced meals which are in the major UK supermarkets, are collaborating with leading academic, technology and food industry partners to develop a way to introduce tasty, healthy meals into the schools system.</p> <p>The innovative, fully nutritionally balanced lunch solutions will both be enjoyed by the kids, and appreciated by the parents, the schools and the local authorities.</p>			

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<b>Edinburgh Biosciences (lead)</b> Heriot-Watt University	Novel method for the detection of aflatoxins	£100,902	£55,768
<b>Project description (provided by applicants)</b>			
<p>Aflatoxins occur in a wide variety of foodstuffs in all parts of the world and are a major concern given their acute toxicological effects in humans. Edinburgh Biosciences Ltd and Heriot-Watt University have agreed on a collaboration to apply novel developments in spectroscopic design to investigate aflatoxins. Using the latest developments in Light Emitting Diode (LED) and interference filter technology, the partners seek to develop a low-cost, easy to use, portable spectrometer designed to test for aflatoxins in situ.</p> <p>The proposed instruments will provide the sensitivity required (ppb) to determine the presence of aflatoxins below the Maximum Residue Levels required by the EU which has the most stringent requirements of any regulatory body. The instrument is intended to screen for the presence of aflatoxins at all stages in the supply chain, from the farmer to the final producer.</p> <p>By the end of the project, EBS and HWU expect to have developed a prototype instrument, tested in field trials of a variety of different raw materials.</p>			

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<b>Eminate Limited (lead)</b> University of Nottingham	Healthy aging using thixate to deliver nutrients	£99,911	£54,459
<b>Project description (provided by applicants)</b>			
<p>This project aims to take a novel delivery system developed by Eminate and University of Nottingham and investigate the feasibility of delivering active ingredients over a sustained period of time. This novel delivery system is based on food ingredients and is expected to increase the bioavailability of micronutrients to the ageing population.</p> <p>This feasibility study will develop potential products and test their efficacy via a human feeding trial.</p>			

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<b>Eminate Limited (lead)</b> University of Nottingham	Pumpkin derived compounds to treat Type 2 diabetes	£99,920	£75,341
<b>Project description (provided by applicants)</b>			
This part-Technology-Strategy-Board-funded feasibility project is designed to assess the commercial potential for biologically active compounds derived from members of the Cucurbitae plant family to help naturally treat some of the most common symptoms of Type 2 diabetes.			

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<b>Eminate Limited (lead)</b> University of Nottingham	Functional food and feed ingredient from green plant tissue	£99,909	£54,478
<b>Project description (provided by applicants)</b>			
<p>This part-Technology-Strategy-Board-funded feasibility project is designed to assess the commercial potential for food and feed ingredients, extracted from green plant tissue, to support the global food sustainability agenda.</p>			

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<b>Genon Laboratories (lead)</b> University of Manchester	Food metagenomics for authenticity and safety	£122,240	£39,454
<b>Project description (provided by applicants)</b>			
<p>The recent horse meat scandal has encouraged food manufacturing and retail companies to look at production methods and sourcing of meat products. Critical in this process are techniques that can accurately and comprehensively analyse food products to determine the exact composition. PCR is an established technique used extensively to detect horse DNA contamination, but it has its limitations and cannot be used to quantitate accurate contaminating DNA levels in sample.</p> <p>Next Generation Sequencing is a powerful technique that determines the total DNA species content of a given sample. It does not require any prior knowledge of which contaminating species may be present, a requirement for standard PCR testing. Genon and the University of Manchester are collaborating on a project to validate Next Generation Sequencing for meat authenticity testing. If successful, the technique will be available to the food industry to validate their products in a more accurate manner.</p>			

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<b>Insignia Technologies Ltd (lead)</b> University of Lincoln	Development of a quality assurance CO <sub>2</sub> leak detector for modified atmosphere packaging	£126,833	£82,540
<b>Project description (provided by applicants)</b>			
<p>Modified atmosphere packaging (MAP) is widely used throughout the food packaging industry. It involves replacing air within the pack with a CO<sub>2</sub> rich/O<sub>2</sub> deficient gas mixture which keeps the food fresher for longer by inhibiting spoilage by microorganisms. However, if an accidental leak is present in the packaging, the preservation mechanism is disrupted and food spoils quicker. The presence of a leak is not always obvious nor its significance realised by consumers.</p> <p>This project will develop a simple colour-changing label which quickly provides information about the integrity of food packaging. Such inexpensive indicators will increase food safety, reduce waste and will vastly improve the quality assurance procedures currently used throughout the food packaging industry.</p>			

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<b>InterPharm Investments Limited (lead)</b> PhytoQuest Limited	Sourcing and testing an immune system stimulant derived from an edible tropical fruit	£99,690	£74,768
<b>Project description (provided by applicants)</b>			
<p>InterPharm Investments Ltd is a 'search and development' company focussed on foods for special medical purposes. These are products for the dietary management of a medical condition. We have identified an edible fruit which contains a bioactive ingredient with distinctive beneficial activity on the human immune system, and we wish to investigate whether it is possible to develop a commercially viable supply of an extract from the fruit.</p> <p>The proposed project entails development of an extraction/enrichment method followed by a dose-ranging study in a suitable animal model, to provide guidance for a subsequent dose-ranging study in people. The project also includes research on the history and extent of consumption of the fruit in Europe, as such information is a necessary part of an application for regulatory approval. Finished products containing the bioactive would be sold globally through marketing partners.</p>			

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<b>MIATech Biosolutions Limited (lead)</b> Clarity Biosolutions Limited	Feasibility of an integrated ultrasonic enhanced extraction and magneto-immunoassay technique for rapid, in-situ measurement of antibiotic residues in animal tissue	£99,400	£49,551
<b>Project description (provided by applicants)</b>			
<p>This project will produce a new measurement system that will rapidly detect antibiotic residues in meat. The system will bring together ultrasonic and magnetic technologies in a unique way so that, if present, the amount of antibiotic residues in a small sample of meat can be measured. Small magnetic particles are used to break up the meat sample, helped by ultrasound, and any antibiotic in the sample will change the amount of magnetic material measured by the instrument.</p> <p>The system will be easy to use and will allow testing to be carried out at the point of sampling by semi-skilled personnel, leading to better surveillance, preventing antibiotics getting into the food chain and reducing the development of antibiotic-resistant bacteria.</p>			

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<b>Mu Innovations (lead)</b> Deltadot Limited IP Pragmatics Ltd	Lakto – the novel milk filter that ‘fills and eliminates’ lactose	£94,772	£71,079
<b>Project description (provided by applicants)</b>			
A project to create a new, easy and low-cost way to produce lactose-free milk at home, improving access to dairy milk and the nutritional content within for people who suffer from lactose intolerance, and reducing food wastage from spoilt milk in households that currently purchase several milk types due to dietary requirements.			

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<b>NCIMB Limited (lead)</b> Probiotics International Ltd (PIL)	Identification of novel probiotic microorganisms for improved gut function	£99,611	£57,208
<b>Project description (provided by applicants)</b>			
<p>Probiotics are live microorganisms which, when taken in adequate amounts, confer health benefits. Changing diets and lifestyles have seen an increase in diet-related health conditions which probiotics, acting as novel functional food ingredients, can help. There are many probiotic species but the majority of commercial products are restricted to the Lactobacillus and Bifidobacterium genera.</p> <p>This project will therefore examine the potential to increase the health benefits offered by microorganisms by exploring new genera for probiotic potential. The project brings together experience in previous research studies and in long-term protection and storage of microorganisms. The project will combine the strengths of two UK SMEs, a world-class culture collection centre, NCIMB Ltd, and a leading probiotic manufacturer, PIL, in their first collaborative R&amp;D project together to explore the potential of introducing novel food supplement and functional food products.</p>			

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<b>Nosh Detox Delivery Ltd (lead)</b> Deli 24 Ltd	Greater nutrition-based foods through innovative RAW technology	£92,685	£69,514
<b>Project description (provided by applicants)</b>			
<p>This project aims to develop healthy food and drink products using a novel combination of natural ingredients with shelf-life enhancing properties in conjunction with a low temperature (cold), high-pressure pasteurisation (HPP) process. The use of natural preserving ingredients will maintain the nutrient content and raw freshness of the food and drink products without the need for the addition of traditional, synthetically manufactured preservatives post processing. Using natural ingredients in combination with a cold HPP process will enable the preservation of nutrient content whilst maintaining fresh quality and tastes, avoiding the tainting effect caused by higher-temperature pasteurisation.</p> <p>This project aims to offer a new process to effectively enhance product shelf life, maintain natural nutrient content, raw produce freshness and pasteurise without causing tainting of taste and discoloration of products. Increased product shelf life will reduce waste and increase productivity and process efficiency using lower-energy inputs for pasteurisation. This novel process will generate healthier food and drink products in a broader food and drinks market as well as niche health and organic food markets.</p>			

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<p><b>Point-2-Point Genomics (lead)</b> University of Glasgow Complement Genomics Limited Dr Matt Pocock</p>	<p>SafeMeat.com</p>	<p>£127,305</p>	<p>£35,494</p>
<p><b>Project description (provided by applicants)</b></p>			
<p>With the recent horse meat scandal, consumers and retailers alike recognise that there is a pressing need to verify that the meat in food products matches what is claimed on the label. Point-2-Point has a genetic testing technology that has the potential to identify which meats are in food products - cheaply, quickly and accurately.</p> <p>This project will provide the evidence required to attract investment and commitment from stakeholders. This will enable the development of this Scottish invention into a testing regime that can be delivered to the factory floor and statutory testing labs, enabling routine and frequent testing. The system will safeguard that food is less likely to cause harm, through adulteration by other meats and their contaminants or other inappropriate components that might induce allergy. It will mean that less wildlife species will have shortened lives, ending up as jungle meat, in the developed world's frozen lasagnes. It will help ensure that there is no repeat of the kind of wide-spread meat substitution fraud that until recently was common. Introduction of these measures will inevitably cost money but this inexpensive system will aim to deliver assurance at minimal cost.</p>			

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<b>Rich Products Ltd (lead)</b> University of Birmingham	Pilot scale production of air filled emulsions	£92,669	£70,498
<b>Project description (provided by applicants)</b>			
<p>So far, reduction of fat in emulsions such as icings, spreads and sauces, while keeping a similar mouth-feel, has been difficult. Our approach enables use of the same ingredients as for manufacture of full-fat emulsions, but with lower fat content.</p> <p>This project is looking to reduce the amount of fat in a model emulsion by using power ultrasound technology to produce air-filled emulsions. Current laboratory scale production is successful and this project will look at the feasibility of scaling it up to pilot scale. This scaled-up process will serve as a technological platform to be applied to other emulsions uses (sauces, spreads or even cosmetics). The last step of the project is to use it on a food product. This technology could also be applied to new areas such as:</p> <ul style="list-style-type: none"> <li>- low-fat mayonnaise, and other sauces and dips, without the pasty mouth-feel</li> <li>- functional ingredients such as fish oils, which could also be included inside the air bubbles</li> <li>- flavour enhancement for lower salt content foods.</li> </ul>			

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<b>Safeguard Biosystems Holdings Ltd (lead)</b> Reading Scientific Services Ltd Arrayjet Limited	Antipasto	£114,567	£30,698
<b>Project description (provided by applicants)</b>			
The overall aim of the project is to create a rapid, cost effective, and easy-to-use commercial system to enable the highly accurate identification and quantification of adulteration or cross-contamination of meat, and meat-containing products, and subsequent analysis to detect fraud.			

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<b>Sheaf Innovations Ltd (lead)</b> Sheffield Hallam University Alcontrol Laboratories	Fast Automated Food Safety Screening - FAFOSS	£93,266	£75,200
<b>Project description (provided by applicants)</b>			
<p>Current methods for measuring contaminants in foodstuffs are often slow and costly. In this project, fast and robust parallel measurements of multiple food samples for important contaminants will be investigated. This will be achieved by using high throughput laboratory robots to carry out unattended sample preparation for high performance, thin layer chromatography.</p> <p>The proposed technique should also prove invaluable in emergency situations when large numbers of samples need to be screened to determine which samples are contaminated and which product batches should be withdrawn. In addition, new instrumentation for thin layer chromatography - mass spectrometry - will be investigated for the quantitative analysis of samples that were indicated as 'positive' in the initial screen. This will remove the need for additional sampling/sample processing and analysis that is currently required.</p>			

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<b>Silage Solutions Limited (lead)</b> Kelvin Cave Limited University of Bristol	Development of silage inoculants to improve mineral composition of animal products	£92,477	£43,040
<b>Project description (provided by applicants)</b>			
<p>Trace elements are essential for normal cellular function and some have been linked to reduced risk of cancer, cardiovascular disease, cognitive decline and thyroid disease. Trace element intake into human diets comes in two forms: inorganic and organic. The former is often taken as dietary supplements and is significantly less bioavailable than the latter. Therefore, an opportunity exists to enhance the levels of certain organic minerals in everyday foods (livestock products - dairy and meat) to increase bioavailability of these essential elements.</p> <p>The project will develop novel ensilage processes to incorporate minerals into organic compounds which, when fed to animals, will improve the organic mineral status of the animal and product (meat and milk). In addition, the improvement of the properties of the animal products would have the desired effect to increase shelf life and thus reduce waste.</p>			