

## Results of competition: Nutrition for life - Collaborative R&D - Providing safe and healthy foods

Total available funding for this competition was £7m from the Technology Strategy Board, MRC, FSA, DEFRA, SE and BBSRC.

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>AB Agri Limited (lead)</b> Young's Seafood Limited	Application of near infrared reflectant analysis to provide rapid authentication of fish and seafood species and the rapid identification of substitute or undeclared ingredients.	£357,845	£116,000
<b>Project description (provided by applicants)</b>			
<p>This project will improve the identification of fish species at processor intake. The project will utilise innovative technology to provide a quick, cost effective and accurate identification method which is practical within a fish processor intake environment. This will enable the presence of adulterants, substitutes, or undeclared ingredients to be made quickly in processed frozen white fish and prawns. This will improve the competitiveness of the processor, reduce refrigerated storage and help address health and sustainability issues which can result from mislabelled fish entering the processing chain.</p>			

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<b>Bernard Matthews Limited (lead)</b> Cranswick plc B&V Water Treatment University of Birmingham Business Stream Limited	Nutrient recovery from meat processing effluents enabling water reuse	£751,368	£361,000
<b>Project description (provided by applicants)</b>			
<p>Food processors in water scarce regions are looking for ways to reuse water within their operations to overcome abstraction restrictions. This project will study the economically viable removal and recovery of nutrients (especially phosphorus) from meat processing effluents to enable water reuse. Phosphorus has historically been the only material in meat factory process effluents which is too expensive or impossible to remove to the required levels. The removal of phosphorus (and possibly other nutrients) from waste waters will allow the industrial project partners (meat processors) to reuse this water within their processes. Removal of nutrients from the meat processing waste waters will reduce the effluents' impact on the aquatic environment while also making available a renewable source of phosphorus. The production of this by-product will help make the recovery and reuse system economically viable.</p> <p>It is expected that the developed systems will be applicable in other sectors of the food industry worldwide with phosphorus-rich effluents.</p>			

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<b>Bernard Matthews Ltd (lead)</b> Cranberry Foods Ltd Cranswick Foods plc RAFT Solutions Ltd Optisense Ltd Food and Environment Research Agency	An integrated platform for rapid testing of pathogens in the meat/poultry supply chain	£779,809	£381,368
<b>Project description (provided by applicants)</b>			
This project will develop a system for rapid detection of hazardous bacteria in foodstuffs. The system is highly innovative, and will be easy to use by food handlers, and farm workers, without needing to send samples to third parties for analysis. This system will help to improve food safety and reduce infections in humans, which will increase consumer confidence in the UK food supply.			

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<b>Besmoke Limited (lead)</b> Sensient Flavors Limited The University of Reading	'SafeSmoke' - removal of carcinogens in smoke for use in food products	£623,352	£399,870
<b>Project description (provided by applicants)</b>			
<p>Besmoke Ltd, in conjunction with a leading flavour supplier and a UK University, has identified a novel method for extracting known carcinogens from the smoke that is used to preserve and flavour meat, fish and food ingredients. Epidemiological evidence has pinpointed certain Polycyclic Aromatic Hydrocarbons (PAHs), present in smoked food products, as being implicated in a variety of cancers in humans. Recent intense scrutiny by the EU has concluded that for most of the smoke flavourings on the market there are safety concerns for the proposed uses and use levels. This supports a need for new technologies to reduce or eliminate PAHs from smoked foodstuffs and smoke flavourings.</p> <p>Extracting just the PAH compounds; without affecting the other organic molecules that provide the flavour in smoked foods, requires a very high degree of specificity in the extraction process. Initial feasibility studies indicate that this can in fact be achieved. The objective of this project is to demonstrate the viability of a unique extraction technology that will reduce human exposure to PAHs whilst creating naturally smoked food products and flavourings.</p>			

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<b>Branscan Ltd (lead)</b> Arden Photonics Ltd Aston University Warburtons Ltd	Distributed UV and near infra-red and fluorescence sensing system for real time monitoring of food quality and contamination and process control	£618,704	£419,965
<b>Project description (provided by applicants)</b>			
<p>Measuring and managing quality in grain milling while processing has to date not been achieved due to the available technologies and their cost. This project seeks to develop near infra-red and UV fluorescence sensors that will be accurate and cost effective, which will enable in-process control of protein, moisture and contaminants such as mycotoxins and other key parameters to be measured in real time.</p> <p>The proposed project will utilise photonic technology to develop an innovative solution to replace conventional technologies. This approach also opens opportunities for integration into process control systems making the milling process more efficient, improving yields and more cost effective.</p> <p>Near Infra-Red (NIR) spectroscopy is the principle technology used to determine the physical properties and quality of foodstuffs such as flour, and can also be applied to industrial sectors handling powdered products, such as polymers. UV fluorescence spectroscopy is being used to detect the presence of potentially harmful mycotoxins.</p>			

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<b>Domino Printing Sciences (lead)</b> Keracol Limited	Formulation of inkjet inks for egg coding applications using dyes extracted from waste food products (EGGCODE)	£289,599	£159,784
<b>Project description (provided by applicants)</b>			
<p>The objectives of this work are to develop colorants extracted from natural resources to produce ink formulations that have good adhesion to the eggshell, with excellent water fastness, with no penetration of the colorant into the egg interior, coupled with good reliability in an inkjet printer. These will be formulated to promote rapid drying times to provide the high print definition required for barcoding, enabling an increase in the information placed on an egg.</p> <p>If successful, this project will enable novel food grade products, which contain dyes supplied from a UK source, to be manufactured within the UK and sold globally. These naturally-derived colorants will afford a reduced environmental and toxicological impact, compared to currently available products. The technology will ensure that durable codes exist on the eggshell, which will enhance security, safety, and traceability for this food product. These inks will offer the end user the opportunity of increased brand differentiation both between their product lines and with their competitors.</p>			

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<b>Dunbia (lead)</b> AgriFood and Bioresearch Institute	On line production of meat quality through use of NIR (Near InfaRed)	£589,756	£324,891
<b>Project description (provided by applicants)</b>			
<p>The challenge to the agri-food sector amidst a growing population is to not only meet demand but to meet consumer demands in relation to quality, public health requirements, sustainability, healthier and novel foods - this project aims to develop viable on-line technologies to quantify meat quality and ensure a more consistent product and as such improve product consistency by optimising pH and temperature declines in the transition from muscle to meat and improve product quality on a consistent basis.</p>			

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<b>Interasight Limited (lead)</b> University of Reading	Innovative scanning techniques for improved food safety	£345,866	£246,720
<b>Project description (provided by applicants)</b>			
<p>This project will develop an innovative method of scanning food at many points along a production line, to detect signs of food degradation and contamination. Through introducing advanced methods of producing, processing and interpreting food images, the maximum amount of information can be gathered, enabling better monitoring of food quality. Working with experts at the University of Reading, Interasight wishes to implement such advanced imaging techniques to produce a step change in the performance of its scanning product.</p> <p>The early stage feasibility work is being done with European Space Agency funding, and the introduction of space imaging techniques through an upcoming Technology Strategy Board Launchpad award. Funding through Nutrition for Life would take the product forward to a prototype stage that can be demonstrated to potential customers: food producers around the world right through the supply chain. Funding from the Technology Strategy Board would enable the project to go ahead more quickly and facilitate an early entry into the market for an innovative, more flexible and better performing food quality inspection system.</p>			

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<b>KWS UK LTD (lead)</b> M&S Rothamsted Research John Innes Centre	High fibre wheat for healthier white bread	£478,686	£174,836
<b>Project description (provided by applicants)</b>			
<p>The overall aim of this industry led project is to increase the intake of soluble dietary fibre by the general population, providing Nutrition for Life to consumers of white bread, many of which are children. Today, almost 55% of all bread consumed in the UK is white bread with low fibre content, and partly responsible for the low fibre intake by the majority of the population. KWS, the plant breeding company and leading partner in the project, will develop a new wheat variety suitable for UK growing conditions with increased soluble fibre content and good bread making quality. This work will be carried out in close contact with academic partners at Rothamsted Research and the John Innes Centre.</p> <p>M&amp;S will investigate the quality and nutritional value of bread made from high soluble fibre wheat, as well as exploit initial market opportunities, with the aim of launching a white bread with increased level of soluble fibre content. This project, involving a unique composition of plant breeders, retail industry, quality and genetic experts, has been made feasible with financial support from the Technology Strategy Board.</p>			

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<b>Marlow Foods Limited (lead)</b> University of Nottingham New Food Innovation Limited JEM Innovation Limited A Poortman (London) Limited ACI Group t/a Naturis	Consumer insight driven development of ingredients and products to aid in the reduction of meat consumption	£476,648	£159,953
<b>Project description (provided by applicants)</b>			
<p>This project will look to understand the psychology of consumers with regard to meat and replacement of meat in meals. Based on the consumer insights ingredients and new meat alternative products and meat hybrid products will be developed that meet the needs of omnivores whilst not compromising on taste and mouth feel. Intervention studies will look at the effects of meat replacement notably cardiovascular, weight management benefit.</p> <p>As a result it is envisaged that new non-meat protein products and ingredients will be commercialised whilst development of a new hybrid meat non meat category established. New communication tools and channels will be developed to ensure the benefits of reduced meat consumption are effectively communicated to consumers and disseminated.</p>			

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<b>MARS Chocolate Limited (lead)</b> CPI Institute of Food Research University of Nottingham	CELLDEX - Development of a low calorie bulk sugar replacer	£1,259,014	£457,536
<b>Project description (provided by applicants)</b>			
<p>CELLDEX aims to deliver a pleasurable, great tasting chocolate confection with a reduced calorie and sucrose content that will appeal to consumers as an attractive alternative to standard chocolate confections. To achieve this, the project will develop a process to produce a new low calorie bulk sugar replacer from sustainable sources. The new ingredient must out-perform currently available alternatives in providing high quality chocolate confections without undesirable side effects at a reasonable price.</p> <p>The impact of the new ingredient on human physiology will be tested to determine its low calorie credentials and determine the threshold of tolerability. The new ingredient will eventually be available to the food industry and enable the formulation of a range of healthier reduced sugar foods. The availability of tasty but healthy snacks has a role to play in fighting the trend of increasing obesity and type 2 diabetes.</p>			

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<b>Olympus Automation Limited (lead)</b> University of Lincoln National Centre for Food Mfg Bakkavor Limited	Advanced Mixing and Cooking Technology (AMACT)	£978,236	£696,122
<b>Project description (provided by applicants)</b>			
<p>The innovative new “PDX” patented steam injection technology offers a major opportunity for revolutionary advances in food processing. It has already made an initial impact through salt and fat reduction and faster more efficient processing, but this has been achieved without full scientific understanding, largely by trial and error.</p> <p>Olympus Automation Ltd, together with its leading academic and industry partners, plan to realise the following objectives through this project:</p> <ul style="list-style-type: none"> <li>i) To gain a full scientific understanding of the operating envelope of the technology and to optimise its operation based on the ingredients or type of ingredients used to gain nutritional advantage, e.g. salt and fat reduction, and to minimise production time;</li> <li>ii) Research and develop methodology that identifies the parameters that drive key product characteristics and resultant nutritional impact;</li> <li>iii) Use knowledge gained to rank existing products in terms of potential nutritional benefits and monetary savings;</li> <li>iv) Use knowledge gained to model and develop a new generation of products and processes to unlock exciting new food opportunities not possible utilising current food process technologies</li> </ul>			

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<b>Phynova Group Limited (lead)</b> Neem Biotech Limited PhytoQuest Limited University of Southampton	Unique mulberry extract for blood sugar management	£591,067	£391,731
<b>Project description (provided by applicants)</b>			
<p>The project combines the expertise of 4 UK partners to characterise, formulate and develop a UK supply chain for IminoNorm™, a proprietary natural ingredient that, when incorporated into foods and beverages, can address diet-related health conditions such as diabetes and obesity. IminoNorm™ is derived from mulberry leaves which have a strong traditional history of use, particularly in South East Asia (SEA), for blood sugar management. The project will enable the partners to capture a greater share of the product's value chain, increase UK R&amp;D investment and open up global commercial markets.</p>			

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<b>Sainsbury's Supermarkets Limited (lead)</b> FERA Limited Perkin Elmer Limited Roche Diagnostics Limited Greencore Group (UK) Centre Muller-Wiseman Dairies Anglo Beef Processors UK Vitacress Limited The Seafood Company	Non-targeted genetic and chemical profiling to identify adulterants and contaminants in food	£758,163	£291,380
<b>Project description (provided by applicants)</b>			
<p>This project will develop non-targeted (broad spectrum) screening methods to identify food safety contaminants and Economically Motivated Adulteration (EMA) using advanced chemical profiling and next generation sequencing. The innovative aspect is the use of cutting-edge technology platforms in the identification of unknown fraud and safety threats and emerging risks without prior-hypotheses. This will facilitate a key objective of ensuring the safety of UK consumers and protecting retailers and manufacturers from EMA, thereby building resilience into the UK Food Sector by reducing the risk and damaging impact of undetected and widespread fraudulent activities in global supply chains. The resulting outputs could revolutionise analytical testing throughout the food chain by reducing the need for costly targeted tests whilst generating greater insight into product safety and authenticity with associated economic and social benefits.</p>			

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<b>The Co-operative Group, (lead)</b> Food Foreniscs Ltd	Authentic Validation	£1,123,294	£563,016
<b>Project description (provided by applicants)</b>			
<p>Techniques for determining and verifying country of origin are limited by authentic databases against which to validate and the availability of cross verification techniques. This project will provide tools for determining country of origin of a range of proteins and produce using cross validated analytical testing methods such as stable isotope ration analysis, trace elements, DNA and pesticide residues.</p> <p>The ultimate objective is to be able to verify the origin of foods, deter fraudsters and protect and add value to consumers, retailers, brand holders such as Fairtrade and ultimately UK agriculture as well as developing UK analytical services to provide industry leading technology.</p>			

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<b>Unilever Central Resources Limited (lead)</b> Cranfield Engineering Innovations Limited Siemens Plc University of Manchester	A novel integrated process monitoring approach to enhance food safety through on-line analysis of allergens	£694,812	£309,904
<b>Project description (provided by applicants)</b>			
<p>This project aims to develop an on-line allergen sensor to enable detection of allergen materials in processing equipment where the elimination of allergen contamination from one production run to another is paramount. The allergen measurement will be complemented by additional processing information as part of an integrated process monitoring package to enable greater speed and accuracy of allergen determination and enhanced food safety.</p> <p>Through pilot plant evaluation the project will look to prove the technology in both dry and wet processing equipment where allergens are processed. Key objectives are to develop technology that allows a move away from precautionary labelling, enabling improvements in manufacturing efficiency through tailored cleaning programmes and the development of a technology approach that is capable of reducing the number of product recalls within the FMCG industry. There are no known examples of in-line allergen sensing technologies. If successful this project will bring about a paradigm shift in the way that food processes are operated with greatly improved levels of quality assurance and food safety.</p>			

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<b>Warburtons Ltd (lead)</b> DSM Food Specialties UK Ltd University of Aberdeen	Bakery products for non-coeliac gluten sensitive consumers	£852,587	£454,087
<b>Project description (provided by applicants)</b>			
<p>The aim of the study is to produce a much more palatable alternative to gluten-free (GF) bread for gluten sensitive people. Gluten sensitivity is distinct from coeliac disease and is estimated to affect a sizeable proportion of the overall population (6-10%), and does represent a significant market opportunity both at home and overseas. Because certain wheat proteins are more important in creating the texture of bread, while others are believed to be linked to gluten sensitivity, it is speculated that wheat bread can be made to be suitable for gluten sensitives by the removal of certain proteins from wheat using novel approaches.</p> <p>Bread made from wheat is expected to be more comparable to standard bread and to be preferable to GF bread. This work will be developed through a joint programme involving Warburtons and DSM, using approaches based on advanced enzyme technology, ingredient formulation and bakery processing in order to achieve the selective removal of wheat protein types. The Rowett Institute is a further member of the consortium and will seek to work with gluten sensitive volunteers to establish whether treatments are beneficial and desirable to them.</p>			