

1 Title: Flavour Design

Acronym: FLVD

Submitted by:

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Theme: Food, agriculture and biotechnology

Focus Area: Fork to farm: Food, health and well being

Type of project: Thematic network on specific research questions

Summary: Idea proposed by Raija-Liisa Heiniö, VTT Finland The flavour of a product is a critical factor influencing food choice and repeated purchase decisions. Correlation between the healthiness of raw materials or products and the flavour may not always be obvious. The flavour can also be impaired during the processing or storage of the product. The flavour of a product results from a mixture of several chemical compounds. The composition of the product may influence the perceived flavour in 3 ways: 1) direct impact of certain volatile compounds in the headspace of food, 2) direct or indirect impact of small non-volatile chemical compounds and 3) impact of large non-volatile chemical compounds of the biopolymer matrix of food, i.e. proteins, carbohydrates, lipids in binding/ releasing flavour-active compounds The idea of the proposal is to combine sensory and consumer studies with chemistry and processing of products; to explain, how the flavour is formed, how we can actively modify the flavour through processing, and what are the consumer preferences/ restrictions to use for these products. The aim is to actively modify the perceived flavour of foods through (bio)processing in a controlled way, and to link sensory perception and food acceptance/preference o To understand correlations between the chemistry/ macromolecular characteristics of flavour and the sensory profile of foods, and to understand the role of food biopolymer matrix in sensory perception o Study on binding of flavour-active compounds/ flavour release o To develop tailored (bio-)processing techniques for targeted flavour boosting or elimination a - Boosting of desired flavours (disappeared/ decreased in processing) b - Removal of unwanted flavours, such as bitter or rancid taste o To better understand sensory perception and ultimately food acceptance/preference in new, improved or experimental ways.

Expertise offered: The trend worldwide in both developed and developing countries is for food companies to develop foods with functional benefits. Functional benefits include nutritional value, processibility, storage stability, safety and eating quality of foods. The Dept of Food Science (University of Pretoria) has a good track record of publications based on research aimed at improving functional benefits of many indigenous African food types (e.g. sorghum, cow peas, millet, dairy products). Research funded by the NRF on "The sensory perception of traditional foods" commenced in 2005 and is focused on the effects of the improved functionality on the sensory properties (including flavour) and consumer acceptance of the foods. Projects include e.g. 1) the bitterness and astringency perception of polyphenols in different varieties of sorghum, 2) the effect of sorghum variety and milling process on the sensory attributes of sorghum porridge and 3) the physico-chemical, descriptive sensory properties and consumer acceptance of dry beans.

Previous FP involvement: Yes

Details of Previous FP involvement: FP 6 MARAMA II, ENVIROPAK

Consortium status: Members of the European Sensory Network (ESN) www.esn-network.com .
A research brainstorm meeting is planned for 29 and 30 September 2006 to prepare for FP 7

Related projects: South African national R&D programmes

2 Title: Investigation of the stress response in commercially important seaweeds

Acronym: SeaWeedStress

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Theme: Food, agriculture and biotechnology

Focus Area: Sustainable production & management of biological resources

Type of project: R&D project (small scale)

Summary: The project will employ microarray technology and genomics to investigate the disease/stress response in commercially important seaweeds. The objective of the study will be to identify key molecular markers of the stress/disease response in seaweeds and to employ these to generate robust strains through the use of genetic transformation. It is envisaged that this study will generate an in-depth understanding of the stress/disease response in seaweed and will result in strains that can be commercially exploited in a sustainable manner.

Expertise offered: Application of molecular techniques to *G. gracilis* (difficult due to high agar content of cell wall); on-site microarray facility; bioinformatics; *G. gracilis* cDNA libraries; 'state of the art' research aquarium.

Previous FP involvement: No

Consortium status: None

Expertise sought: I am seeking partners involved in similar research on commercially important seaweeds in order to pool resources and speed up progress through joint research and networking.

Related projects: South African national R&D programmes

3 Title: Characterisation of the immune system of commercially important shellfish

Acronym: MOLHEALTH

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Theme: Food, agriculture and biotechnology

Focus Area: Sustainable production & management of biological resources

Type of project: R&D project (small scale)

Summary: There is very little known about the immune system of shellfish, especially with regard to the immune system genes and their regulation. Importantly, since the immune system is the primary disease detector and co-ordinates the response of the animal, any change in immunobiological functions will give an indication as to the 'health status' of that animal and its ability to deal with infections and stress. Indeed, it well known that there is a link between stress and the immune system of molluscs. Instead of measuring parameters such as phagocytosis to monitor animal health in aquaculture facilities, it would be better to make use of genetic markers to determine whether the animals are immunologically fit. In order to achieve this, it will be necessary to identify and characterise immune genes that are regulated in response to immune stimulation. The project will employ microarray technology and genomics to investigate the immune system of commercially important shellfish. The objective of the study will be to identify key molecular markers of the stress/disease response in these molluscs.

Expertise offered: On-site microarray facility; abalone genetics; bioinformatics; cDNA library of abalone immune genes; expertise in molecular technology; 'state of the art' research aquarium.

Previous FP involvement: No

Consortium status: None

Expertise sought: Partners are sought for joint research projects and networking in order to speed up progress.

Related projects: South African national R&D programmes

4 Title: Tuberculosis (Mycobacterium bovis) Vaccination in Buffalo

Acronym: BuTbVac

Submitted by:

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Theme: Food, agriculture and biotechnology

Focus Area: Sustainable production & management of biological resources

Type of project: R&D project, including technology demonstration (large scale)

Summary: The overall objective is to design the best possible vaccination strategy in buffalo that deals with sensitization of young animals with environmental mycobacteria. We will have to perform controlled vaccination/challenge experiments. The facilities needed exist in the KNP. The vaccine candidates that we are intended to test include the BCG vaccine as well as recombinant proteins (the most promising in mice being the chimeric protein ESAT6-CFP100) and DNA vaccination. The vaccination strategy for tuberculosis in humans that is advocated nowadays is a prime/boost one: priming with BCG and Boosting with recombinant proteins.

Expertise offered: We are intended to put together a South African consortium, including all the partners of the tuberculosis study group. The tuberculosis study group includes scientists from the Kruger National Park, the Hluhluwe Imfolozi Park, the Onderstepoort Veterinary Institute, the faculties of zoology and veterinary science of the University of Pretoria, the Veterinary Services, the faculty of Health Science of the University of Stellenbosch and the Peace Park Foundation. This group has a long expertise in wildlife tuberculosis and members of the group have published on wildlife tuberculosis for the last decade. It is worth to mention that a paper on an experimental infection model in buffalo will be published by the end of this year.

Previous FP involvement: Yes

Details of Previous FP involvement: FP5 and FP6

Consortium status: Preliminary contacts: Dk (P. Andersen: SSI), UK (M. Voordermeier: VLA; J. Mc Neir, R. Suske: Agri-Food and Biosciences Institute, NI); Be (K. Walravens: VAR and K. Huygen: Pasteur Institute); NI (V. Ruttem, Utrecht University)

Expertise sought: Expertise: DK (Peter Andersen: Recombinant Antigens), UK (Martin Voordermeier: Immune responses and protection in the cattle model; Jim Mc Neir, Robin Suske: Immune responses and protection in the cattle model and molecular typing of M. bovis strains); Be (Karl Walravens: Immune responses and protection in the cattle model; Jim Mc Neir, Robin Suske: Immune responses against environmental mycobacteria in the cattle model and molecular typing of M. bovis strains and Kris Huygen: Tuberculosis DNA vaccination); NL (Victor Ruttem: Immunology / CD1 restriction)

Related projects: International bilateral cooperation South African national R&D programmes

5 Title: Risk Analysis Framework for GMOs

Acronym: RAnFram

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Theme: Food, agriculture and biotechnology

Focus Area: Fork to farm: Food, health and well being

Type of project: R&D project, including technology demonstration (large scale)

Summary: The introduction of GMOs brings significant new challenges in the analysis of risk and benefit. Risks to the environment, human health and food safety are routinely considered in any risk assessment. Socio-economic impact is less easy to predict and the tools for socio-economic assessment are less well developed. A risk analysis framework should also take into account the likely benefits. The project will develop a framework for decision making that takes into account both risks and benefits, bearing in mind that benefits may lie in a different domain from risks (eg nutritional benefits vs environmental risks). The framework should be appropriate for Developing Countries as well as the European situation.

Expertise offered: Theoretical and practical expertise in risk assessment of GMOs in the developing country situation.

Previous FP involvement: Yes

Details of previous FP involvement: Safe Foods

Consortium status: Not formed (potential to link with some members of Safe Foods consortium)

Expertise sought: Need leadership and expertise in scenario-based modelling and socio-economic evaluation

Related projects: FP6

6 Title: integrated approach to epidemiology of zoo noses to promote food security, food safety and animal welfare

Acronym: IAEZ

Submitted by:

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Theme: Food, agriculture and biotechnology

Focus Area: Sustainable production & management of biological resources

Type of project: Thematic network on specific research questions

Summary: Integrated systems approach to zoonotic diseases of livestock linked to methods of handling, transport and slaughter to optimise animal welfare together with food safety and security

Expertise offered: Experience in research in livestock welfare, participatory epidemiology and integrated livestock systems in tropical environments. Access to a wide range of comparative farming systems in South Africa - from extensive to highly intensive as well as a wide range of diseases and residues such as pesticides and toxins in food of animal origin

Previous FP involvement: No

Consortium status: Utrecht VPH, Royal Veterinary College, Perugia VPH, Upsala, Wageningen

Expertise sought: Veterinary Public Health, Integrated Systems analysis, Animal Welfare, Participatory Epidemiology, GIS

Related projects: International bilateral cooperation South African national R&D programmes

7 Title: The use of isolated lymphocytes for cytotoxic screening of agricultural commodities for mycotoxins and other toxic contaminants

Acronym: LYCS

Submitted by:

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Theme: Food, agriculture and biotechnology

Focus Area: Sustainable production & management of biological resources

Type of project: R&D project (small scale)

Summary: A fast screen for toxins in commodities is needed because of the diversity of these in the environment (e.g. mycotoxins, pesticides). Such a catch-all screen is provided by cytotoxicity testing using cell cultures but these require a specialised facility and growing times. An alternative is to isolated lymphocytes from the blood of humans (operatives or animals) and incubated them with extracts of commodities using a simple cell count or reduced dye (MTT) assay to determine toxicity. Current work on such a system has shown that it is feasible but much more work is need to investigate several aspects of this methodology: the effect of the more common mycotoxins and pesticides on these systems; the robustness, reproducibility and repeatability of the method - screening for false positives and negatives; the mechanisms of action on lymphocytes; lymphocyte isolation methods and criteria for subject selection (suitable animal donors); toxic fraction isolation and correlation of cytotoxicity result to analysis of real samples; synergy and antagonism-multi-mycotoxin containing extracts; optimisation of the system. The techniques required would be: sampling of blood an centrifuging out of various blood cell fraction; incubation in microtitre plate wells and scoring either by dye exclusion or MTT assay (use of plate reader); analysis of samples using hplc, gc/ms, immuno-assay methods; investigation of effects using immunocytochemical methods/electron microscopy and flow cytometry, comet assay and microarray. The ultimate objective would be to provide a method of multi-screening which would indicate suspect commodities for further analysis would be affordable; would be fairly rapid; and could be used by laboratories that did not have sophisticated cell culture facilities. The method would be reliable enough to pick out consignments of commodities that were of poor quality and dangerous for consumption for further testing. Thus it would be important that there were no false negatives.

Expertise offered: Expertise is available in lymphocyte isolation, cytotoxicity assay, comet assay, mycotoxin analysis) hplc, gc/ms, immunoassay) fungal isolation and identification, and flow cytometry.

Previous FP involvement: No

Consortium status: Looking for European partners

Expertise sought: Experts in cell culture, investigation of toxin mechanisms of action; analysts to develop the reliability of the method; advanced analytical methodologies, e.g., lc/ms, ms/ms; expertise in electron microscopy and cytochemical methods; toxicologists; food analysts

Related projects: None

8 Title: European Union and sub-Saharan Africa rural community agricultural programme

Acronym: EUSARCAP

Submitted by:

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Theme: Food, agriculture and biotechnology

Focus Area: Fork to farm: Food, health and well being

Type of project: R&D project (small scale)

Summary: The living standards of rural communities in semi-arid areas in the Mediterranean and, more specifically, sub-Saharan regions, depend on agricultural activities. Crop production is a major basis of these economies. Due to climate change it is expected that these regions will experience more adverse environmental conditions in the near future. In order to ensure a reasonable standard of living in these agriculture based economies, it is important that crops adapted to semi-arid conditions are established. In so doing more value will be added to the local diet, productivity of the local livestock will be increased and the local economy will be enhanced in terms of new domestic and possibly international markets.

Expertise offered: Plant Pathology (Prof WJ Swart) and Entomology (Prof SvdM Louw) expertise from the Centre for Plant Health Management at the University of the Free State, Bloemfontein, South Africa, will investigate healthy crop production strategies.

Previous FP involvement: No

Consortium status: Partners from Plant & Omgeving, Lelystad Station, Wageningen University, The Netherlands, who will act as project co-ordinators, already form part of consortium.

Expertise sought: Partners sought include agronomists and sociologists

Related projects: South African national R&D programmes

9 Title: Sustainable Abalone Production in South African coastal Environments

Acronym: SAPSAE

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Theme: Food, agriculture and biotechnology

Focus Area: Sustainable production & management of biological resources

Type of project: R&D project (small scale)

Summary: South Africa has become the largest Abalone producer outside Asia. However, the production relies on the use of natural Kelp and potential environmental and resource limitations hinder the continued development of the industry. This project aims at evaluating and identifying the sustainable ways of developing the industry and managing of the natural aquatic plants that are already depleted.

Expertise offered: The identification of a South African group to undertake the project is still underway and the potential European expertise includes the aquaculture institutes or oceanographic universities

Previous FP involvement: No

Consortium status: individual

Expertise sought: the expertise sought includes aquaculturists/biologists, economists, ecologists

Related projects: FP6

10 Title: Sustainable Transfer and Adoption of Biofuel Technologies

Acronym: STABT

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Theme: Food, agriculture and biotechnology

Focus Area: Sustainable production & management of biological resources

Type of project: R&D project, including technology demonstration (large scale)

Summary: Future projections and forecasts indicate the potential of the sub-Saharan African region to participate in the supply of biofuels. To this end, further studies have been undertaken to determine the feasibility of such renewable technologies, and it has subsequently been proposed to implement strategies in regional policies. However, a number of important issues have been raised to ensure the sustainability of biofuel technologies in the sub-Saharan region. For example: awareness and capacity building of all stakeholders in such technological systems, including, but not limited to, relevant government departments, farmers, persons involved in agro-forestry, funding and financial institutions, related industries, NGOs, academic and R&D institutions; a roadmap must be established, whereby detailed stable, long-term, holistic policies can be formulated for such technological systems; and in-depth analyses of the appropriateness of different technologies in a regional context, considering issues such as effective utilization of by-products and effluents, natural resource management in terms of biodiversity, ecology and pollution control, the management of supply and distribution chains, and effective production and applications of biofuels, to name but a few. These issues call for incorporating the concept of sustainable development into the technology management field of knowledge. The research will subsequently focus on the development of technology assessment methods, as they are applied in specific technology management practices that are important in the biofuels context, i.e. Technology Roadmapping and Technology Transfer, which integrate the intrinsic modelling that is researched in the emerging field of sustainability science. The final outcomes from the research will be the development and demonstration of effective management models, at sector and organisation levels. The research will address two distinctive challenges: the effective and sustainable transfer and adoption of biofuel-related technologies, and the interaction between multidisciplinary research teams that will be required to reach truly sustainable technology management practices.

Expertise offered: The team of researchers lead by the Council for Scientific and Industrial Research (CSIR) brings together a range of sub-Saharan expertise that is fundamental if sustainable biofuel technology adoption is to be achieved in the region: capacity development at first and second economy levels and in urban and rural areas; R&D engagement with the public and private sectors, and communities, at first and second economy levels and in urban and rural areas; ongoing R&D in technology and knowledge management, and sustainability science, i.e. the complexity of social-ecological interactions; technology assessment, modification and deployment in the African context; and understanding of the resource base of the region. To this end the CSIR has been actively undertaking research projects in Africa since 1993 and is currently working in about 23 African countries.

Previous FP involvement: No

Consortium status: Potential consortium members have been identified in Europe

Expertise sought: Biofuel technology developers and technology transfer researchers

Related projects: FP6 South African national R&D programmes

11 Title: Method development and validation for reference analyses of trace organic components in complex matrices

Acronym: Organic Trace

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Theme: Food, agriculture and biotechnology

Focus Area: Fork to farm: Food, health and well being

Type of project: R&D project (small scale)

Summary: Trace contaminants and trace nutritional components in foods and beverages have a major impact on human health and international trade. Residue monitoring programs require the support of a reference laboratory. The focus of the international metrology community in the organic and bio-analytical area is on health, food analyses and nutritional markers, clinical analyses and bio-metrology, and the dissemination of comparability and traceability in chemical measurements to working laboratories. The project can include setting up a capability to perform exact mass measurement of specific pesticide residues in complex food matrices. In addition, it could focus on establishing measurement equivalence of vitamin levels in infant formulations and adult food supplements and the refining of a capability to assist with the analysis of veterinary residues in foodstuffs. In summary, the project aims to develop methods for more accurate organic trace analysis.

Expertise offered: Certification and distribution to forensic and pathology laboratories of solutions of drug reference materials. Equipment: LC-MS, GC-MS GC-TOF-MS Quantification by isotope dilution UV-Vis spectroscopy FTIR spectroscopy ICP-OES spectroscopy Melting point and water content determination

Previous FP involvement: No

Consortium status: Looking for EU Partners

Expertise sought: Organic analysis laboratories; Food industry

Related projects: South African national R&D programmes

12 Title: The role of mycotoxigenic fungi and mycotoxins in the health of humans and animals

Acronym: MYCOTOX

Submitted by:

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Theme: Food, agriculture and biotechnology

Focus Area: Fork to farm: Food, health and well being

Type of project: Networking between organisations in same area

Summary: The project aims to establish collaboration between world renowned institutions such as in Copenhagen (DFVF), Karlsruhe (BfEL) and Bari (CNR). This is to find and strengthen similar interested scientists in the field of mycotoxicology between Europe and South Africa. The Institute of Hygiene and Toxicology in Karlsruhe is specifically focusing on the gene expression of mycotoxin production and molecular method development for detecting mycotoxin producing fungi. This is a field that is becoming more important, especially to understand and ultimately prevent mycotoxin formation in food and feed commodities worldwide. The Institute of Sciences of Food Production (ISPA) at CNR in Bari, directed by Dr Angelo Visconti, is leading an FP6 project, MYCO-GLOBE, which specifically aims to establish a basis for mycotoxicologists worldwide to collaborate. The purpose of this project is to seek possible fields of collaboration and introduce the capabilities of CSIR in the field of mycotoxicology to these groups. Due to the involvement of these groups in mycotoxicology and in previous FP6 projects, they are aware of any developments in this field with regards to mycotoxicology and FP7. All groups have indicated their interest in collaborating with South Africa in this field and that FP7 could be an option. It is recognized that these groups are strategically important when it comes to mycotoxin research in Europe.

Expertise offered: The CSIR is in possession of a considerable amount of mycotoxigenic fungi that are known mycotoxin producers. The collection is representative of 30 years of mycotoxin research in South Africa. The expertise of CSIR around the study of these fungi, the development of new DNA-based techniques, and its experience in the food processing industry makes South Africa an ideal partner when it comes to study the fate of mycotoxigenic fungi and their mycotoxins in the human and animal food chains.

Previous FP involvement: Yes

Details of previous FP involvement: SAFEFOODS (FP6) - The involvement in this project include the comparison of GMO and non-GMO maize regarding the presence of mycotoxigenic fungi. BIOTRACER (FP6) - Rapid techniques are developed to identify mycotoxigenic fungi and their mycotoxins in during food processing to determine unintended contamination in criminal acts.

Consortium status: Dr Rolf Geisen from (BfEL) in Karlsruhe, Germany and Dr Angelo Visconti from (CNR) in Bari, Italy already indicated that they are interested to explore collaboration with CSIR in South Africa in the FP7 but also beyond this call.

Expertise sought: Currently, partners are sought specifically in the field of the development of new techniques to determine the presence of mycotoxigenic fungi and their mycotoxins. The consortium also need expertise in the identification of risk assessment and modelling of mycotoxins in food and feed commodities.

Related projects: FP6

13 Title: European conifer forests: integrated pest management, alien fungal invasion diagnostics and resistance genes (EUCONFOR)

Acronym: EUCONFOR

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Theme: Food, agriculture and biotechnology

Focus Area: Sustainable production & management of biological resources

Type of project: Implementation support to FP7s

Summary: Europe is the second biggest consumer for forest products and by 2010 will account for one third of world forest products consumption. Conifer softwoods account for 80% of the consumption, which is expected to expand in near future to reach a new record of 46.3 million m³, mostly for medium-density particleboard production used in furniture, shelving, and other laminated end-uses. Timber certification, in which wood products are certified that they are derived from sustainable managed forests remains a key issue and Europe's leading forestry countries are preparing various Sustainable Forestry, Sanitary Certification and Integrated Pest Management Programs. Thus, the insect pests and fungal diseases of high importance for European forestry are being discussed by EUCONFOR's preliminary participants in order to develop: 1. Pheromonal / kairomonal aggregation disruption field techniques to control bark beetle populations by non-host volatiles. 2. Molecular diagnostic tools for rapid detection of EPPO quarantine phytopathogenic fungi from seedlings, roundwood and/or soils. 3. Monitoring programs of EPPO quarantine fungi and their exotic insect vectors in tree mortality spots associated with bark beetle outbreaks and Europe's main harbours. 4. Cloning, by cDNA subtractive hybridisation, conifer defence-related genes against bark beetles and EPPO quarantine fungi. 5. Biocontrol agents or toxins for the control of EPPO quarantine fungi. 6. Developing IPM strategies against bark beetles using entomopathogenic fungi This starting point is a good opportunity to build a project with a broad scope, covering thus under the same umbrella different scientifically and economically important knowledge areas to European and South African Forestry. This collaborative effort will imply a scientific net with special emphasis in the opportunity to share top modern biotechnologies, the training of young European and South African researchers, and the reinforcing synergies with different countries research systems. The project structure is preliminary and other European groups are completely welcome to propose different tasks and/or research interactions between pre-established participants

Expertise offered: FABI-Forestry and Agricultural Biotechnology Institute was established by the Tree Protection Co-operative Programme (TPCP) which provides the forestry industry of South Africa with expertise in forest sanitary problems. The centre is localized in the University of Pretoria and has 15 academic staff and 100 M.Sc., Ph.D. students and post-doctoral fellows. However, high-level research is becoming increasingly complex, interdisciplinary and costly, requiring a constantly growing critical mass and international cooperation. This starting project is a good opportunity to boost South African collaboration with European leading and emerging scientific groups in Forest Pathology and Biotechnology. The broad structure endows it with substantial human resources and experience in interdisciplinary research lines. This will provide to both the European participating countries and South Africa with high-quality young researches trained in

modern biotechnologies and sanitary and economic improvement of the respective forestry industrial sectors.

Previous FP involvement: No

Consortium status: South African organization (FABI, University of Pretoria; Contact: Prof. Mike Wingfield, Dr. Xudong Zhou); Four organizations from Spain, Norway, Austria and UK have indicated that we will be joining the planned consortium.

Expertise sought:

Related projects: None

14 Title: A Cattle Farm Management System for Emerging Farmers

Acronym: CFMS

Submitted by:

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Theme: Food, agriculture and biotechnology

Focus Area: Sustainable production & management of biological resources

Type of project: R&D project, including technology demonstration (large scale)

Summary: The Cattle Farm Management System (hereafter CFMS), is a sophisticated planning system for practical on-farm use, to assist cattle farmers with animal production, farm management and marketing to solve the following problems: · What is the right age to market animals · What is the best weight for marketing · When must animals be marketed and how many at a time · How and what must animals be fed for optimal growth and fattening in order to get maximum profit. Heart of the System The above questions, which every cattle farmer is aware of, will be answered by developing a computer system based on: · A data base with all farming factors of interest: rainfall, available grazing, feed to meat conversion, animal growth curves, feed and meat prices (forecast), and many more. · A mathematical model of beef cattle production which is used to calculate an optimal marketing strategy for maximum profit and a production strategy for sustainable farming (no overgrazing, no soil erosion). · Agricultural research: basic demonstrable CFMS, resulting from a pilot project, proving its feasibility. Face of the System: The CFMS has been designed for cattle farmers of different backgrounds, but especially focuses on those farmers who never had the opportunity of adequate education. Therefore the CFMS uses innovative computer game features to make it suitable and understandable for low-literate and even illiterate users: · On- screen information will be mostly graphical and symbolic, like a motor vehicle dashboard, and also animated: 'Marketing' is presented by a number of trucks, each one representing a number of cattle, who are visibly walking and loaded on the trucks. A rain meter icon will show rainfall, etcetera. · Verbal information will eventually be done by two-way audio I/O. The system talks to the farmer and the farmer talks back to the system. A speech system will be developed both in English and for each area in an African language, such as Tswana, Sepedi, Xhosa, Zulu Further information will follow

Expertise offered: The CFMS will be developed by a multi-disciplinary team of specialists from the fields of agriculture (research and practical), information technology (programming, data base, internet), mathematics (linear programming, risk and sensitivity analysis), education (perception techniques, language, training) and graphic arts (symbols, icons, graphics, display) Note: A Consortium partner with expertise in Linear Programming (=applied mathematics) still to be found. Question: Perhaps from a European University or Research Institute? Advise welcome.

Previous FP involvement: No

Consortium status: Consortium is currently being established

Expertise sought: Consortium partner sought with experience in applied mathematics (Linear Programming; mathematical modelling)

Related projects: None

15 Title: Management of microbial water quality at catchment level

Acronym: Catchmanage

Submitted by:

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Theme: Food, agriculture and biotechnology

Focus Area: Sustainable production & management of biological resources

Type of project: Thematic network on specific research questions

Summary: Investigation of approaches useful to manage the microbial water quality in catchments to reduce the risks to water users

Expertise offered: Molecular detection and typing techniques, Community analysis, bacterial ecology, water quality monitoring

Previous FP involvement: No

Consortium status: No members yet

Expertise sought:

Related projects: South African national R&D programmes

16 Title: microbial expression system for peptide display/bioremediation

Acronym: FEST

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Theme: Food, agriculture and biotechnology

Focus Area: Life sciences & biotechnology for sustainable non-food products & processes

Type of project: R&D project, including technology demonstration (large scale)

Summary: This technology relates to the development of an expression system for the surface display and production of peptides/proteins. This proprietary Gram-positive strain is able to over-produce and display chimeric gene products as heterologous peptide/protein fusions. This bacterium harbours the endogenous genetic background to over-produce the anchoring motif or carrier protein constitutively and continuously. In order to harness this ability as a surface display/expression system, a number of key genetic tools were developed such as gene targeted inactivation. In this genetic background peptides as well as proteins can be inserted as in-frame fusions and expressed on the cell surface of this strain. A lipase- chimeric fusion was shown to be expressed in the cell wall fraction (but not on the surface) and enzyme activity confirmed through whole cell bio-assays. This activity was confined mostly to the whole cell fractions with very little enzyme activity measured in the supernatant, a sought after characteristic in a microbial biotransformation system. Metal binding peptides have also been displayed on the cell surface and shown to be functional. The expression system is currently being further improved by target inactivation of key proteases. This research has been under-pinned by fermentation optimization studies and defined media formulations based on cell mass production are in place. There are a number of advantages of this system: o Gram-positive bacteria are robust and cell growth is not impaired by the production of chimeric gene fusions. o Chimeric production is continuous and constitutive and an inducible promoter system is not necessarily required for over-expression. o Small peptides are over-produced on the cell surface which facilitates peptide isolation. o Integration of the chimeric peptide fusions into the host chromosome thereby ensuring that no heterologous plasmid DNA or antibiotic markers are present in the production strain.

Expertise offered: This technology can be used to treat and remove pollution. It can also be used in a biotransformation whereby useful metabolites can be obtained from renewable resources

Previous FP involvement: No

Consortium status: none current

Expertise sought: expertise in environmental biotechnology and bioremediation. Also expertise in fermentative production of useful metabolites

Related projects: None

17 Title: Biotechnology of Prunus and Malus spp

Acronym: Prunus Malus

Submitted by:

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Theme: Food, agriculture and biotechnology

Focus Area: Fork to farm: Food, health and well being

Type of project: R&D project (small scale)

Summary: The major objective of the project is to improve the micropropagation technology for apple (Malus) and stone fruit (Prunus) rootstocks, especially for the Geneva apple rootstocks and peach rootstocks. The development of molecular breeding(GMO technology) will be investigated.

Expertise offered: Tissue culture Genetic engineering

Previous FP involvement: No

Consortium status: South Africa, Hungary, Italy

Expertise sought: Development of transformation and regeneration technology

Related projects: International bilateral cooperation South African national R&D programmes

18 Title: Blueberry production for the small scale farmer

Acronym: berry growing

Submitted by:

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Theme: Food, agriculture and biotechnology

Focus Area: Fork to farm: Food, health and well being

Type of project: R&D project, including technology demonstration (large scale)

Summary: The demand for plant material and technical transfer of blueberry crop production is increasing. A knowledge basis has been acquired for the cultivation of plants, and in pest management practices. The commercial farmers benefit from this technology. The objective of this proposal is to introduce and train the second economy farmer to benefit from this highly profitable crop. The research will be on production systems. This will be accomplished by erecting a training facility on an experimental farm in Stellenbosch South Africa.

Expertise offered: Tissue culture of plants Propagation in a nursery

Previous FP involvement: No

Consortium status: new Cultivars, Mycorrhiza, Horticulture, Market

Expertise sought:

Related projects: None

19 Title: LPS induced early basal resistance in plants**Acronym:** LPS-EBR**Submitted by:**

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Postal Address: PO Box 524, Auckland Park 2006 South Africa

Theme: Food, agriculture and biotechnology**Focus Area:** Life sciences & biotechnology for sustainable non-food products & processes**Type of project:** R&D project (small scale)

Summary: Recognition of microbes in higher eukaryotes depends on an array of pattern recognition receptors (PRRs). These PRRs recognize characteristic molecular structures shared by large groups of microbes, the so-called pathogen-associated molecular patterns (PAMPs). PAMPs play a key role as activators of the innate immune response and as elicitors of defense responses in plants. Lipopolysaccharides (LPS) are PAMP molecules and elicitors / activators of plant defense. The biochemical responses involved in signal perception and signal transduction in response to LPS perception by plant cells were elucidated and described in previous research from our laboratory. It is proposed that the research activities be extended to identify the putative receptor for LPS. This receptor might be a membrane-localized receptor-like kinase. The approach to identify the receptor can be a genetic screen for mutants defective in LPS perception and / or a biochemical one where binding of labeled LPS is investigated in a ligand : receptor type of study.

Expertise offered: Molecular biology Biochemistry Proteomics**Previous FP involvement:** No**Consortium status:** No formal partner agreement**Expertise sought:****Related projects:** None

21 Title: Nitrile Biocatalysis

Acronym: NitBiocat

Submitted by:

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Theme: Food, agriculture and biotechnology

Focus Area: Life sciences & biotechnology for sustainable non-food products & processes

Type of project: R&D project (small scale)

Summary: This project is aimed at the development and application of nitrile converting biocatalysts for commercial bioprocesses. The goal will be to develop broadly applicable, low waste processes for the (enantio) selective synthesis of amide and carboxylic acid-containing fine chemicals from structurally related nitriles. The project will cover the complete development path from biocatalyst selection, via protein improvement and biocatalyst stabilisation. We aim to improve enzymes from selected strains by characterisation of the enzymes. The corresponding genes will be selected for improved catalytic function and stability by means of directed evolution, gene shuffling. This will be enabled by high throughput screening. Over-expressed enzymes will be used for a detailed kinetic analysis in order to understand the reaction mechanisms. Advanced enzyme immobilisation techniques will improve desired enzyme properties, in particular, enzyme stability. From the data, biocatalytic reactors will be developed. Nitrile and derived compounds have wide application in the pharmaceutical and chemical industries. The selection basis for our nitrile biocatalysts is their capacity to transform alpha and beta hydroxyl and amine substituted compounds. These classes of compounds are synthetic intermediates that may be used in the synthesis of protease inhibitors that may be used to combat HIV. The proposed research will involve molecular biology in order to clone nitrile hydrolysing enzymes from our current library in order to over-produce them. We will also require metagenomics to increase our biocatalyst tool-kit library without the requirement of microbial isolation and subsequent gene-specific cloning (nitrogen based enrichment culturing on nitrile substrates makes screening facile). Lastly we wish to perform directed evolution (particularly gene shuffling) on a set of clones that we possess in order to provide a capacity to produce "designer" biocatalysts for specific substrates on demand.

Expertise offered: Experience in biocatalysis up to pilot scale. High throughput screening equipment Nitrile biocatalysts - culture collection Assay methods Protein chemistry and purification, molecular biology, microbiology.

Previous FP involvement: No

Consortium status: Active

Expertise sought: Should have expertise in nitrile biocatalysis, structural biology, bioprocess design.

Related projects: COST

22 Title: Dynamics of heavy metals in soil

Acronym: Hheavy Metals

Submitted by:

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Postal Address: Dept Plant Production and Soil Science, University of Pretoria, Pretoria, 0002

Theme: Food, agriculture and biotechnology

Focus Area: Sustainable production & management of biological resources

Type of project: R&D project, including technology demonstration (large scale)

Summary: Large amounts of slag are produced in the steel industry that is presently classified as hazardous waste. In some places slag are used as liming material. The question is what will happen with the heavy metals that it may contain and will it enter the food chain. The present study aims to study the dynamics of these heavy metals in soil. When soil is used to discard waste material that contains heavy the pH may have a major influence on its mobility. It is also known that when heavy metals are supplied to soil either as slag or sewage sludge it will transform chemically. The important question is how does different heavy metals transform in soil and what is the desorbtion rate of these heavy metals and will it be available to plants. Not only is the detrimental effect investigated but also the beneficial effect of slag such as the presence of silica and phosphorus and their beneficial effect on plant growth.

Expertise offered: We have a well equipped lab and experience to study the changes of the heavy metals in soil such as extraction procedures and plant availability.

Previous FP involvement: No

Consortium status: None

Expertise sought: Experts in the chemistry of heavy metals in soil

Related projects: None

23 Title: Automated sustainable parasite control through retrospective Targeted Selective Treatment modelling for specific decision support

Acronym: Farmer-SELFHELP

Submitted by:

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Theme: Food, agriculture and biotechnology

Focus Area: Sustainable production & management of biological resources

Type of project: R&D project, including technology demonstration (large scale)

Summary: The complexity of methods of sustainable integrated parasite management (sIPM) such as Targeted Selective Treatment (TST) which show promise for countering rampant drug resistance, compounded by the global decline in numbers of parasitologists and extension personnel with the necessary field experience required for effective technology transfer to farmers, makes it well-nigh impossible to get optimum application of sIPM, to the full potential of existing knowledge. In order to address this issue, a "blueprint" has been produced for very specific automated decision support for farmers, without the need for laboratory sample analysis at every occasion when decisions are required. Factors which need to be addressed in modelling are, amongst others, climate, dominant parasite species, drugs to use/not to use at Time T (e.g. to consider existing resistance in the parasite populations), class of animal (as regards differential susceptibility to parasites), pasture type and minimalising labour inputs. The blueprint needs to be modelled and developed for functioning at ground level, as far as possible for both internal and external parasites. To be included in the project, is to facilitate field application of the software, including application by the resource-poor farmer (who is to be reached electronically via existing extension personnel and production advisors).

Expertise offered: Helminth epidemiology, anthelmintic resistance and sustainable worm control, with the focus on Targeted Selective Treatment using systems such as FAMACHA and Body Condition Scoring, together with expert experience in small ruminant disease conditions.

Previous FP involvement: Yes

Details of previous FP involvement: PARASOL Sustainable Parasite Solutions (FP6)

Consortium status: No partners as yet for FP7 call

Expertise sought: Partners who specialise in resistance of helminth and/or tick drug resistance, particularly modelling aspects for specific decision support to lead the farmer with specific parasite control decisions at Time T, on Farm X. Experience in satellite telemetry will be of particular value.

Related projects: FP6

24 Title: Breeding environmentally friendly black wattle

Acronym: ECOWATTLE

Submitted by:

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Theme: Food, agriculture and biotechnology

Focus Area: Life sciences & biotechnology for sustainable non-food products & processes

Type of project: R&D project, including technology demonstration (large scale)

Summary: The South African forestry industry is rapidly changing. Increased production costs and the steady decline of forestry landholdings are two of the most important factors affecting its sustainability. Therefore, production needs to be maximised to meet industry demands. *Acacia mearnsii*, otherwise known as black wattle, it is currently one of the leading commercially grown forestry species, grown for its tannins, adhesives and high quality pulp for the pulp and paper industry. Black wattle is known for its prolific seed production and its potential spreading outside plantations is still viewed as a threat by various environmental and conservational groups. This invasive nature of this species has promoted research into the alleviation of this problem through the curbing of seed production. Production of autotetraployploids through chromosome doubling and subsequent hybridisation with diploid varieties will result in sterile autotriploid varieties because of their irregular meioses and unbalanced gametes. Recently, tannin derived adhesives for the fabrication of derived timber products has been developed. When compared to chemical adhesives, these natural adhesives are nontoxic, fast processing and have the possibility to use wood by-products (e.g. bark) for the production of adhesives. Black wattle is known for high quality tannins and with the development of the environmentally friendly adhesive technology brings black wattle into the forefront of the adhesives and plastics industry. This potential for new black wattle market products, together with the production of environmentally friendly varieties opens up new opportunities for growth in the black wattle industry. For example, many rural community settlements are in low production (marginal) areas; thus the recognition of the economic potential of community forestry that exploits environmentally sound wattle plantations will encourage the establishment of small businesses that are crucial to rural economies in meeting local social and household demands. The aim of this project is to produce environmentally friendly wattle varieties through polyploidisation for commercial forestry and to investigate its introduction into community forestry.

Expertise offered: We are a team of 18 people, 11 of which are scientists/researchers. There are 4 PhD's, and the rest are either MSc or currently doing their MSc. Our skills are mainly in classical tree breeding, quantitative genetics, cytogenetics, biotechnology and reproductive biology. Please see our Web page for details. http://www.csir.co.za/tree_improvement/

Previous FP involvement: No

Consortium status: Different operational units of CSIR, Institute for Commercial Forestry Research, NCT forestry co-operative Ltd. Hope to link with developers of environmentally friendly adhesives at Université Nancy I, in France.

Expertise sought: Chemists, Adhesives specialists, tree breeders and geneticists.

Related projects: FP6 South African national R&D programmes

25 Title: Veterinary Science: Anatomy and Physiology

Acronym: Emuprod

Submitted by:

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Theme: Food, agriculture and biotechnology

Focus Area: Life sciences & biotechnology for sustainable non-food products & processes

Type of project: R&D project (small scale)

Summary: Working with Emu producers association of SA to grow the new industry into the full potential that it has.

Expertise offered: Emu nutrition, breeding, incubation of eggs

Previous FP involvement: No

Consortium status: Working on problems of hatchability

Expertise sought:

Related projects: None

26 Title: The potential of market incentives to conserve and manage natural and agricultural ecosystems in a developing country context

Acronym: MICE

Submitted by:

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Theme: Food, agriculture and biotechnology

Focus Area: Sustainable production & management of biological resources

Type of project: R&D project (small scale)

Summary: Ecosystem services (ES) are the end products of nature that yield human well-being (e.g., C sequestration, potential primary production, biodiversity, fresh water, etc.). Since human well-being is dependant on natural ecosystems, the study and measurement of ecosystems and ES provision is essential. This is particularly important because ES are "positive externalities", which means society derives benefits from them without appropriately compensating providers. The consequences of this are that ecosystems are often under conserved or inadequately managed, and services are under-supplied. These problems are prevalent in developing countries such as South Africa where inappropriate or underdeveloped institutions (property rights, finances, and communication), practices and knowledge create incentives for stakeholders to exploit the environment. In addition, the growing demand for ES to reach economic-growth targets and to alleviate poverty (high priorities of the SA government) is putting further pressures on natural and agricultural systems. Government intervention is often required in such cases in order to provide a socially optimal level of ecosystem conservation. The SA Government, however, does not have the necessary information to set priorities and to make intra- and inter-temporal trade offs in resource allocation, use and conservation. It is therefore proposed that the following challenges be addressed through multi- and inter-disciplinary research: 1) evaluate, in a developing-country context, payments for ecosystem services, regulatory and co-operative mechanisms available that might facilitate ES procurement; and 2) determine the optimal combination of mechanisms to inform public policy and decision-making. It must be emphasised that market-oriented policies in particular will be investigated because they create incentives for stakeholders to conserve ecosystems and provide ES at minimum cost, which, it is hypothesised, is likely to be the most sustainable approach. Finally, in order to address these aims, the research will also need to estimate and value the relationships between ecosystem integrity, ES provision and the benefits derived by humans from these services.

Expertise offered: The CSIR has extensive and well-developed expertise in ecology, biodiversity, social science and ecological economics research and policy advice. The researchers that will contribute to such a R&D project include: Dr Russell Wise (Ecological Economics), Dr Belinda Reyers (Zoology), Dr David leMaitre (Botany - Ecology) and Dr Patrick O'Farrell (Botany - Ecology). All of these researchers are currently involved in a project titled "The flow of benefits to people provided by ecosystems at multiple scales: a spatial and economic assessment". These researchers also have experience at coordinating and working within large consortiums to ensure cost-effective and timely project delivery. More generally, the CSIR has a long tradition of practicing inter- and multi-disciplinary research involving the natural, social and engineering sciences, which is essential

for the study proposed here. The organisation also has well-developed contacts within Government, other research organisation and the private sector, and its state-of-the-art facilities and technology allow it to do innovative research.

Previous FP involvement: No

Consortium status: In discussions with the SA Department of Environment and Tourism (DEAT), the SA Dept' of Science and Technology (DST), and the UN Food and Agricultural Organisation (FAO). Other organisations to involve include: DIVERSITAS and IFPRI

Expertise sought: R&D expertise in 'payments for ecosystem services' (particularly in ecology and economics) to determine and value the relationships between ecosystem integrity, ES provision and the benefits derived from these services in order to help advise on policy.

Related projects: None

27 Title: Modelling nutrient and water balances of cropping systems

Acronym: NutWatBal

Submitted by:

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Theme: Food, agriculture and biotechnology

Focus Area: Sustainable production & management of biological resources

Type of project: R&D project (small scale)

Summary: Nutrient (N & P) and salt and water balances of cropping systems are being measured and modelled to assist with the sustainable, environmentally responsible management of sewage sludge and poor quality waters used for irrigation. Vegetation is also used to minimize the environmental impact of waste dumps by manipulating the soil water balance. Newly patented wetting front detectors are being used to better manage irrigation water and to collect "solute signatures" for better salt and nutrient management. Apart from the field scale (1 Dimensional) work, we are also attempting to model the impact of agriculture on non point source nutrient pollution. The irrigation water and nutrient management of pastures, vegetables and fruit tree crops are also studied.

Expertise offered: The water research group in the Dept of Plant Production and Soil Science is made up of myself - John Annandale, with about twenty odd years of experience in the field of irrigation and water balance modelling, Martin Steyn, a potato agronomist with similar experience in water relations and modelling, and several PhD students. We also work closely with other colleagues in the Dept. depending on the project e.g. pasture scientists and horticulturalists. We also have very close collaboration with the CSIR in Pietermaritzburg where Colin Everson heads a group of hydrologists with experience in micro meteorological measurement of evapotranspiration, and the use of sap flow technology for tree water use. We also work closely with Richard Stirzaker and Keith Bristow from CSIRO in Australia. Richard is the inventor of the wetting front detector and is spearheading the solute signatures work. Keith assists with the NPS pollution project and mine water and salt balance work.

Previous FP involvement: No

Consortium status: Currently working with Water Research Commission, East Rand Water Care Works, CSIR, CSIRO, Mining Industry

Expertise sought: Expertise in domestic sewage sludge management and nutrient modelling is sought. Also expertise in pasture, vegetable and tree crop water and nutrient management and modelling.

Related projects: None

28 Title: Improved, novel breeding technologies for forestry

Acronym: Future Forests

Submitted by:

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Theme: Food, agriculture and biotechnology

Focus Area: Sustainable production & management of biological resources

Type of project: R&D project, including technology demonstration (large scale)

Summary: Forest trees are relatively slow growing compared to other agricultural crops. The development of novel breeding technologies stands to make a substantial impact on this resource for the future. The CSIR Tree Improvement team wishes to use modern advances in technologies to overcome the particular breeding challenges which long generation forest trees present. Areas currently under investigation by the group, include overcoming instability of BLUP predictions in forest genetics predictive models; technologies to improve the efficiency of selection of hybrids for forestry; inducing infertility as a mechanism to reduce invasiveness; biotechnology interfacing with classical selection techniques; genetic algorithms applied in the process of selection as an aid to improve predictions of genetic worth; overcoming infertility issues in the production of hybrids; modelling climatic change and the impact on genetic forest resources; and vegetative reproduction for the rapid deployment of improved material. The aim of this project is the address various breeding challenges experienced with the breeding of superior genotypes for the forestry industry.

Expertise offered: We are a team of 18 people, 11 of which are scientists/researchers. There are 4 PhD's, and the rest are either MSc or currently doing their MSc. Our skills are mainly in classical tree breeding, quantitative genetics, cytogenetics, biotechnology and reproductive biology. Please see our Web page for details. http://www.csir.co.za/tree_improvement/

Previous FP involvement: No

Consortium status: None at this stage.

Expertise sought: Tree Breeding, reproductive biology and population genetics

Related projects: South African national R&D programmes

29 Title: Economics of quality and labelling in the South African food industry

Acronym: EQLSA

Submitted by:

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Theme: Food, agriculture and biotechnology

Focus Area: Fork to farm: Food, health and well being

Type of project: R&D project (small scale)

Summary: As South African consumer income increases preferences for quality, safe, nutritious and ethically produced food are rapidly increasing. At the same time producers are moving away from commodities and trying to supply quality and uniquely differentiated products. All of this requires a better understanding of the management and labelling aspects of quality differentiated food products

Expertise offered: Consumer economics; sensory testing and current work on Geographical indications in South Africa and Namibia

Previous FP involvement: Yes

Details of Previous FP involvement: FP 4 - Univ of Sussex, Prof M. Lipton; FP6 - Q Pork chain - Wageningen

Consortium status: none

Expertise sought: Signalling; economics of quality

Related projects: FP6

30 Title: The protective effect of ferulic acid on UV-induced stress in human skin

Acronym: FA

Submitted by:

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Theme: Food, agriculture and biotechnology

Focus Area: Fork to farm: Food, health and well being

Type of project: Thematic network on specific research questions

Summary: Ferulic acid (FA) is a hydroxycinnamic acid which acts as an antioxidant. It is present in all plants and is found in high levels in olives and maize. Maize is a staple food for South Africa and Africa and since we have shown that FA can be organically extracted from maize waste, it represents a potent source of antioxidant. We are testing it in combination with vitamins E and C on skin cells for its potential as a UV protector.

Expertise offered: This project involves the use of chemical engineering and tissue culture techniques which will be provided by the South Africans. In addition it will involve gene array technology as well as proteomics which will be provided through the expertise of our Dutch collaborators.

Previous FP involvement: No

Consortium status: Collaboration is currently underway

Expertise sought:

Related projects: None