

SANBio

SOUTHERN AFRICA NETWORK FOR BIOSCIENCES



BioFISA II Project Portfolio November 2017

BioFISA II

BUSINESS MEETS BIOSCIENCES



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science
& technology

Department:
Science and Technology
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MINISTRY FOR FOREIGN
AFFAIRS OF FINLAND



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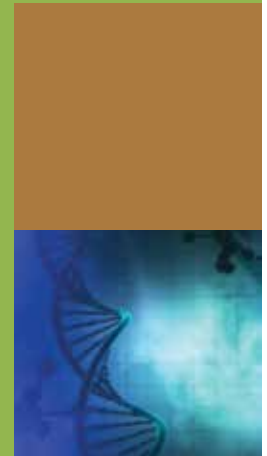
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The BioFISA II Programme – a Finnish Southern African Partnership Programme to strengthen the Southern Africa Network for Biosciences (SANBio) started in April 2015 and will be implemented until February 2019 with a total budget of approximately €6 630 000. Programme funds are aimed at investments in human capacity building, networking and the support of commercialisations of innovations in health and nutrition in 13 of the SADC Member States.

To date, R25 million (approximately €1.8 million) has been invested in innovations in health and nutrition covering in vitro diagnostics, forensics and super/healthy foods for both humans and animals.

Our partners, Zimbabwe Manpower Development Fund (ZIMDEF) and Botswana Innovation Hub (BIH) have also committed R2 million to support innovations in health and nutrition. This portfolio presents the status of the investments made in fifteen innovations by the Programme and its partners in the SADC region in the form of Seed and Flagship grants.



FLAGSHIP PROJECT

A SIMPLE AND RAPID FIELD TEST FOR BOVINE BRUCELLOSIS

SUMMARY

LifeAssay Diagnostics, a South Africa based diagnostics company has partnered with the University of Zimbabwe and the Botswana National Veterinary Laboratory to validate a rapid and simple field test for the serodiagnosis of bovine brucellosis. Preliminary assessments show that the test is reliable and better priced than any of the current methods used to detect bovine brucellosis and can be performed at the animal's side (point-of-care). As a lateral flow test, it is easy to use, does not need refrigeration or electricity, and provides the user with a result within 15 minutes.

PROGRESS

To date, the team implementing this project has completed the

- Research and Development to optimize the bovine brucellosis test.
- Production of 2000 sample prototypes for field validation.
- Training of the standard procedure for use of these tests in the predetermined locations (Botswana and Zimbabwe).

The team is now preparing for the field testing of the animals and subsequent serum/blood collection for follow-up laboratory testing and confirmation.



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BioFISA II Funding Value

R4 500 000

OUTCOME AND IMPACT

This is a novel and ground-breaking test as no point-of-care diagnostic kit for bovine brucellosis is currently available on the market. With this kit, it is expected that the diagnosis, reporting and management of bovine brucellosis shall be improved throughout Southern Africa to support better economic development particularly for the small scale and other bovine farmers affected by this zoonotic disease.



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SUMMARY

The University of the Western Cape in partnership with inqaba biotec™, the National University of Science and Technology in Zimbabwe and the Lesotho Mounted Police Service have joined forces to manufacture, validate and commercialise a novel forensic DNA kit targeting male DNA for improved discrimination in the genetic diversity between African males. inqaba biotec™ as the commercialising partner will manufacture and commercialise the kit prototype (designed by the University of the Western Cape) while the other partners will assist in its validation and the development of a reference database populated by individual profiles from anonymous donors to assess the validity of a match. A comprehensive database for African male genetic data is useful for genealogy, forensic and paternity cases.

PROGRESS

To date the team implementing this project have completed:

- The development and manufacturing of the prototype which is being tested by the collaborating laboratories.
- The development of the database and website which is being populated with relevant data.



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BioFISA II Funding Value

R2 480 000

OUTCOME AND IMPACT

The forensic genotyping kit is expected to assist in better examination of rape and sexual assault cases, including some cold cases, as well as studies of paternal genealogies, lineages and various opportunities for bioanthropological research. This kit has a shorter reaction time, making it much quicker in obtaining results and its improved discriminatory capacity will make it much easier to distinguish between African males from the family. Together with the database being developed, the kit is expected to contribute significantly to assisting the correctional services in the region, particularly in cases of rape and sexual assault.



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SUMMARY

The University of Cape Town Lung Institute in partnership with Antrum Biotech (Pty) Ltd, the Malawi College of Medicine and Biomedical Research and Training Institute (BRTI) are validating a new test to diagnose tuberculous meningitis. The test detects a biomarker (gamma interferon) in cerebrospinal fluid (CSF), where elevated levels suggest the TB disease. Through the support of the BioFISA II Programme, the project will generate clinical performance data at sites in Malawi, South Africa, and Zimbabwe, and facilitate the development of a dossier for pre-market regulatory approval from national bodies, endorsement from the World Health Organisation (WHO) and access to international donor markets.

PROGRESS

To date the team has obtained ethical approvals from all sites, and:

- Completed a comprehensive clinical protocol which has been shared with local hospitals and clinics for endorsement.
- In South Africa alone, over 100 participants have consented to participate in the study.
- Moreover, the diagnostic assay has been delivered and technicians and site leads have been technically trained.



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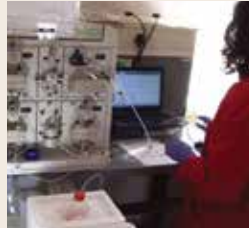
BioFISA II Funding Value

R4 082 833

OUTCOME AND IMPACT

The developed in vitro diagnostic device (IVD) proposes to replace less accurate products with a rapid more sensitive test to provide improved access to life saving treatment for TB meningitis.

The greatest need for the test is in populations with a high burden of tuberculosis and human immunodeficiency virus (HIV) (including children) in sub-Saharan Africa.



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SUMMARY

Lilongwe University of Agriculture and Natural Resources (LUANAR) has partnered with Scaled Impact in South Africa and the Department of Research and Specialist Services (DRSS) in Zimbabwe to formulate fish and poultry feeds and for the industrial scale production of the mealworm. A fish feed will be developed, tested and commercialised by LUANAR and its commercial partners while DRSS and Scaled Impact will concentrate on the formulation of the poultry feed and large scale production of the mealworm, respectively.

PROGRESS

To date, the team has completed:

- The market and regulatory assessment for the mealworm production.
- The initial set-up of the mealworm production facility including the determination of the mealworm feed supply from industrial waste.
- The initial trials for the fish and poultry feed.



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BioFISA II Funding Value

R4 500 000

OUTCOME AND IMPACT

The production of the fish and poultry feeds will enable better and more competitive poultry and fish from aquaculture production in the SADC region. Currently, Africa has significantly lower levels of fish production with the major hindrance attributed to the cost of fish feed. Outputs from this project are expected to positively impact the aquaculture production industry and trickle down to the lower income farmers.

Moreover the industrial mealworms production is expected to impact on the shortages of high quality protein for both animals and humans.



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SUMMARY

The African Institute of Biomedical Science and Technology (AiBST) in Zimbabwe in partnership with the University of Cape Town is developing and commercialising a pharmacogenetic diagnostic test and dosing algorithm for the safe use of the anti-retroviral drug, Efavirenz. The project will conduct a clinical validation study and a cost effectiveness/benefit analysis (CE/BA) to demonstrate the cost savings in the treatment of immunodeficiency virus infection and acquired immune deficiency syndrome (HIV/AIDS) patients with this genetic test and dosing algorithm. This demonstrates one of the mechanisms of using precision medicine in the public healthcare system.

PROGRESS

To date the project team has:

- Obtained the ethical and clinical study approvals in Zimbabwe where preparation for clinical trials are underway.
- Finalised the development of a prototype that has been validated across several platforms and has trademarked the GeneDose name for this and future products in the pipeline.



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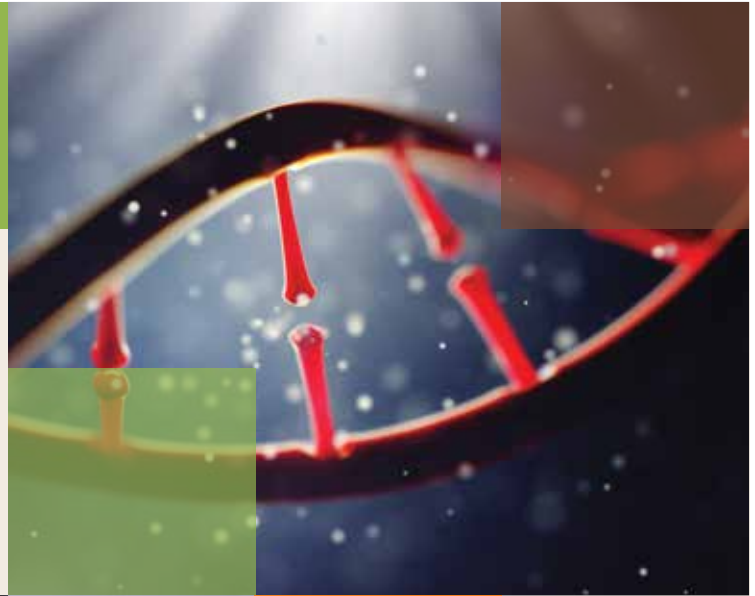
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BioFISA II Funding Value

R1 000 000

OUTCOME AND IMPACT

It is expected that by providing the right dosage for all patients currently on the Efavirenz drug (estimated at over 3.5 million patients in Zimbabwe and South Africa alone), their quality of life will be improved. Studies show that of the patients on Efavirenz in Zimbabwe and South Africa, over 700 000 require dose adjustment based on this genetic status and the Genedose Efavirenz kit developed will assist in ensuring that these patients are provided with the right dosages.



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SUMMARY

The Council for Scientific and Industrial Research (CSIR, South Africa) in partnership with the Central Veterinary Research Institute (CVRI) in Zambia and the Agricultural Research Institute of Mozambique (IIAM), are developing and conducting field trials of a new antibody-based diagnostic kit specific for the detection of African strains of Foot-and-mouth Disease (FMD). The kit enables viral identification several months past the initial two-week active outbreak period.

PROGRESS

To date the project team has successfully screened the currently circulating SAT (Southern African Territories) FMD strains using field samples collected in the SADC region. This analysis allowed the researchers to design up-to-date diagnostic components for prototype kit development. The various components of the prototype kit have been sourced and the first prototype is being manufactured.



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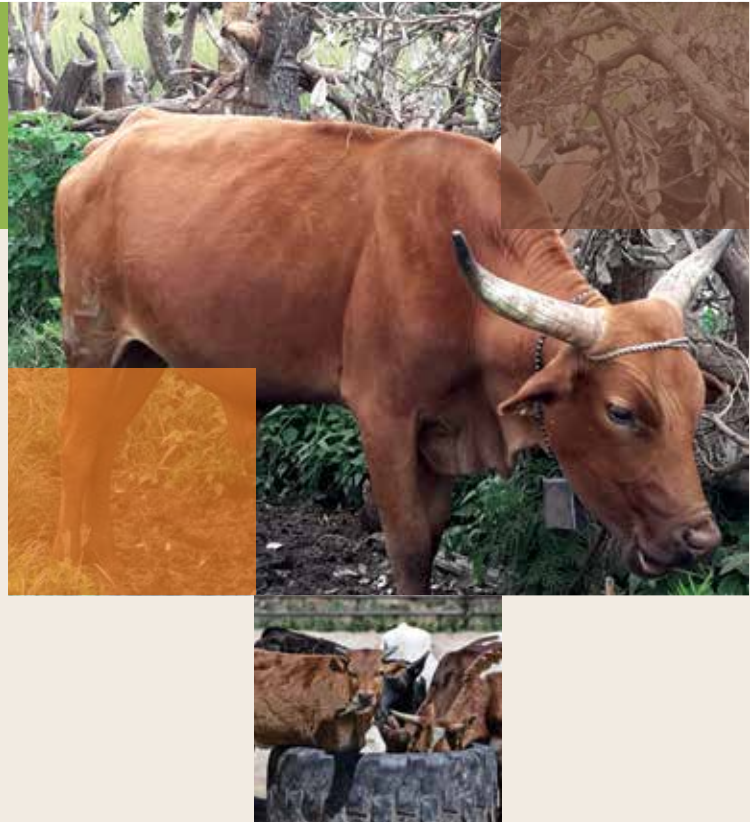
BioFISA II Funding Value

R1 000 000

OUTCOME AND IMPACT

The project forms part of a wider FMD management programme already initiated by the CSIR, which looks at the holistic management of infectious diseases such as FMD using various DNA- and protein-based detection technologies coupled with a centralised real-time data reporting IT platform.

The development of commercial Afro-centric detection kits for FMD is of critical significance. Such an Africa-specific FMD diagnostic will facilitate African countries' efforts to improve their management and control of FMD, thereby improving local trade and food security, and facilitating their entry into foreign markets.



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SUMMARY

The CSIR (South Africa) in partnership with Elvema Nutrition in South Africa is commercialising the nutri-drink and working on a second variation of the drink with the National Food Technology Research Centre in Botswana. The just-add-water or milk nutri-drink premix has been developed as a nutrient dense product from locally sourced indigenous ingredients. It is an instant powder prepared from legumes, as source of protein, leafy and other vegetables which are sources of pro-vitamin A, as well as sorghum which is a source of minerals.

PROGRESS

To date the project has completed the first pilot batch manufacturing of the Nutri-drink to establish a supply chain of the raw ingredients for market testing and techno-economic evaluation of the product.



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BioFISA II Funding Value

R1 000 000

OUTCOME AND IMPACT

This project aims to create a market for indigenous crops by creating demand through the production of the Nutri-drink. This will improve the socio-economic profile of the stakeholders along the value chain while at the same time reducing post-harvest losses of some of the locally farmed ingredients. Moreover, the drink addresses issues of under and over nutrition currently affecting a number of countries in the SADC region and globally by providing a well-balanced meal suitable for persons of all ages.



SUMMARY

The University of Pretoria, National University of Lesotho and the Botswana University of Agriculture and Natural resources have teamed up to develop Safe, Market ready, Acceptable African, Ready-to-eat/use, Trendy (SMA²RT) nutritious snacks from indigenous ingredients.

PROGRESS

To date:

- A micro bakery enterprise Healthily Baked Pty Ltd., owned by three graduates from the National University of Lesotho (NUL), has been established.
- Commercial partner, Denmar Estates (Pty) Ltd has launched Motoho in the retail market, a sorghum based drink co-developed with the University of Pretoria, and is well on its way to launch a second product as part of the project collaboration.
- Several agreements have been signed with partners that can support in the commercialisation of the products developed of with technical and entrepreneurship training to the entrepreneurs running the micro bakery enterprise.



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BioFISA II Funding Value

R1 000 000

OUTCOME AND IMPACT

Key outputs from this funding include the creation of enterprises that commercialise healthy nutritious snacks from indigenous ingredients, job creation and local content along the value chain. Other outputs include the commercialisation of an instant traditional cereal-melon composite popular in Botswana. Overall, the products will create a culture of consuming healthy foods and promote indigenous foods among the youth, tourists and other consumers at local and international levels.



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SUMMARY

In a collaboration between the Chinhoyi University of Technology in Zimbabwe, the Regional Agricultural and Environment Innovations Network-Africa (RAEIN-Africa) in South Africa and Capital Foods in Zimbabwe, an ash based mineral-vitamin block lick optimised by linear programming is being developed. This project aims to change the nutritional profile of local beef cattle owned by subsistence farmers by creating an affordable and convenient nutritional supplement that will improve their yield and provide better opportunities for higher returns per unit of beef cattle sold.

PROGRESS

To date the project has completed a prototype block and is patenting this technology.



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BioFISA II Funding Value

R1 000 000

OUTCOME AND IMPACT

The block lick product will help correct mineral and vitamin imbalances in grazing beef cattle, resulting in better economic returns benefiting especially small and medium-scale cattle farmers.



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Capital Foods in Zimbabwe

SUMMARY

The demand for livestock products in Africa has outpaced domestic production, rendering the continent heavily reliant on importation of basic livestock products. In Swaziland, for example, dairy products' consumption exceeds domestic production by ~50 million litres. Production is hampered by under-nutrition of dairy animals, and undernourished animals are immunocompromised and hence become susceptible to parasitic infection (e.g. *Haemonchus contortus*) during this period. Control of parasites through the use of veterinary drugs is expensive, out-of-reach for many smallholder farmers and ultimately unsustainable. The project team of experts from the University of Swaziland and Chinhoyi University of Technology aims to develop a nutritious pelleted goat feed with anti-parasitic properties derived from *Melia azedarach*.

PROGRESS

To date the project team has completed the development of prototype pellets which are being validated in a dairy goat feeding trial to assess improvements in milk yield among other factors.



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BioFISA II Funding Value

R1 000 000

OUTCOME AND IMPACT

The novel feed pellets will address the problem of poor nutrition for livestock in the SADC region, especially during the winter and/or dry season, as well as their infestation with parasites that further worsen their body condition and productivity. The pellets produced are expected to improve milk yield as well as the quality of the animals' health, particularly in dairy goats. Also, *Melia azedarach* is an invasive plant in many SADC countries; hence its use as an animal feed and medicine will help control its rapid proliferation in our natural ecosystems.



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NEW PROJECT

New collaborations
Started in October 2017

RESURRECTION BUSH TEA

SUMMARY

The project aims to commercialise Resurrection Bush Tea out of Zimbabwe. Resurrection bush is drunk in small volumes by herbal tea drinkers in Zimbabwe, and to a smaller extent in South Africa. However, at present the domestic volumes are lower than it is believed they could be, with a more premium product aimed at higher end and tourist markets. In addition the project believes it is possible to enter the international market with the required safety and toxicology data in place.

BACKGROUND

The project involves:

- Proving the safety and absence of toxic effects with acute and chronic use of Resurrection Bush Tea. This will be achieved by doing a comprehensive review of the existing toxicology data available and then followed by a *in silico*, *in vitro* or animal testing dependent on what is required according to international standards as applied in Zimbabwe and South Africa.
- Developing a prototype, production protocols and specifications for the product for user tests. This step involves optimising the final form of the tea product, the production and quality control protocols, developing the product specification and doing market research.
- Production upscaling. This step involves producing small quantities of loose leaf, boxed and individual sachet teas for further market testing, distribution and early sales.



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BioFISA II Funding Value

R1 000 000

OUTCOME AND IMPACT

This project will increase the volumes of Resurrection bush currently being harvested by rural collectors (mostly women in ecological zones 4 and 5 of Zimbabwe). This will increase the number of collectors that can be employed as well as increase annual income, without detracting from other sources of income.

It will establish Resurrection bush as a recognised product of Zimbabwe and increase local manufacturing as well as export potential to South Africa and abroad.

The project will also set a precedent in Zimbabwe for benefit sharing with traditional communities. This may help to develop future policy on indigenous resources and knowledge in Zimbabwe.



NEW PROJECT

New collaborations
Started in October 2017

BROILER CHICKEN FEED WITH MORINGA OLEIFERA

SUMMARY

The prices of broiler feed have been escalating, thereby reducing the viability of the poultry industry in the SADC region and the world over (Mungate 2013). Additionally high mortality rates of 5 -10%, morbidity, decreased preference for broiler meat due to higher fat content and lack of appealing colour have been reported. This project seeks to produce low cost Moleifera broiler feed that results in reduced mortality and morbidity rates, tasty meat of low fat content, longer shelf life and appealing golden brown colour. The project will improve chicken nutrition through the utilisation of Moleifera feed within the SADC region.

BACKGROUND

The project involves:

- Intellectual property protection, development of the business goal, packaging designs and prototype demonstrations during the inception phase.
- Pilot and commercial scale production of the feed.
- Establishing the feed distribution channels and distribution contracts signed with distribution agents.
- Commissioning a feed manufacturing Plant for commencement of feed production.
- Further product research and development done in South Africa. Certification of the product will be done by Standards Association of Zimbabwe.



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BioFISA II Funding Value

R1 000 000

OUTCOME AND IMPACT

The economic benefits of the project will be reduced costs to small scale farmers who are in poultry production; a farmer keeping 8000 birds/year i.e. 1000/six week cycle under conventional feeding requires 24 000 kg feed/year costing US\$14 640. When the same farmer use Moleifera feed for the same number of broilers with the same quantity of feed over one year, he/she will need US\$13 200, making a saving of US\$1 440/year.

The Social Benefits derived from using Moleifera feed include improved diets and employment generation. The feed derives some ingredients from the Moringa oleifera tree. Moringa trees also provide ecological benefits such as; wind breaks, improved water quality and air through carbon sequestration.



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NEW PROJECT

New collaborations
Started in October 2017

SYNMBA – A FUNCTIONAL SYNBIOTIC SORGHUM-BASED BEVERAGE

SUMMARY

Probiotics have been shown to ameliorate a range of gut-linked health challenges including diarrhoea and oral thrush. Probiotics are live microorganisms which when ingested in adequate amounts impart health benefits to the host. On the other hand, prebiotics are fructooligosaccharides which selectively stimulate probiotic growth in the gut.

Presently many would-be beneficiaries miss out on potential health benefits of probiotics as they are usually in up-market dairy-based beverages, or pharmaceutical dosage forms associated with clinical use only. The project will develop and market a sorghum-based instant beverage enriched with phytonutrients and synbiotics (Synmba).

BACKGROUND

The project involves:

- Formulation and testing of a phytonutrient-enriched sorghum-based synbiotic beverage.
- Piloting and scaling up manufacturing of the beverage.
- Conducting stability testing and quality control of final product for market launch.
- Launching and marketing the product.



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BioFISA II Funding Value

R1 000 000

OUTCOME AND IMPACT

The Synmba drink will improve health, reduce illness among the targeted consumers, create jobs, expand the biotechnology-skills base, incentivise small and medium sorghum farmers and eventually improve food security. A number of diseases and/or medical complications including diarrhoea, constipation, intestinal infections, hypercholesterolaemia, bacterial vaginitis and oral and vaginal candidiasis may be alleviated by ingestion of synbiotic beverages, such as the Synmba drink, taken in adequate amounts on a regular basis.



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NEW PROJECT

New collaborations
Started in October 2017

MARULA KERNELS EXTRACTION FOR NATURAL SEED OIL

SUMMARY

Marula trees are in high concentrations in several areas of Botswana, one of which is the Tswapong tribal area. With the advent of the natural products revolution, the benefits of exotic seed oils to human skin, hair and nails are becoming common knowledge. The tree and all parts of it have been studied for decades. The chemical composition of marula oil lends itself well to the treatment of stretch marks, scars, blemishes, uneven skin tone. Its high antioxidative stability makes it perfectly suited for the prevention of the ageing of the skin.

Marula processing has however been inefficient due the lack of suitable technology to extract marula kernels to replace the traditional means of hand-and-stone. Blue Pride has been able to formulate a very simple but efficient strategy for becoming a dominant producer of marula oil in Botswana and has developed marula decorticating machinery with an engineering firm in South Africa to optimise the process.

BACKGROUND

The project involves:

- Introduction of mechanisation to the marula kernel extraction process and oil extraction to multiply current marula oil output and thereby deepen the social and economic impact that commercialisation of marula oil production has on rural communities in Botswana.



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BIH Funding Value

R797 984

OUTCOME AND IMPACT

The technology will enable the company to reach new production levels at a fraction of the current cost (both time and money). With the use of its new and affordable technology Blue Pride will quickly service a great number of rural communities from which it will buy marula stones. This means that the company and Botswana may soon become the major exporters of this product within SADC member states.

By sourcing wild marula from the communities and placing part of the processes in rural villages, Blue Pride could generate employment for women, giving a sustainable source of income to the most economically vulnerable members of the rural societies.



NEW PROJECT

New collaborations
Started in October 2017

HERBALOMIC QUALITY CONTROL METHOD AND FINGERPRINT DATABASE

SUMMARY

The herbal market is rapidly growing, with an estimated annual sales figure of \$115 billion by 2020. It is estimated by WHO that 80% of the African population have used herbal medicines. 25% of medicines in the developed world are known to be adulterated; a substantial proportion of those are herbal based products. This poses a risk to the end user (pesticide contamination, counterfeit product, product variation leading to under and overdosing). National regulators do not have a quality control test that is routine, easy to use, affordable, and has a wider applicability and ability to decipher numerous potential problems associated with herbal products. The product developed consists of a method and a database of fingerprint of constituents of herbal products. The same method can be used for different herbal products from different geographical origins and grown in different seasons. It is able to discern the variations brought about by these conditions. The database can be used to compare a standard herbal profile to one claiming to be similar within a certain acceptable degree.

BACKGROUND

The project involves:

- Validating a quality control method and fingerprint database through:
 - Identification of herbal products to be included in the optimisation phase.
 - Optimisation of the extraction method; algorithm and coding of database.
- Developing and implement a business model for the commercialisation of the solution that ensures product-customer fit, scalability, sustainability and profitability.



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ZIMDEF Funding Value

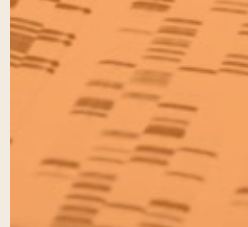
R1 000 000

OUTCOME AND IMPACT

The availability of such a test will ensure regulators can ensure safe, quality and effective products enter the markets.

With the technology, manufacturers will be able to avoid variation of the products they produce and optimise their production processes, while growers of herbs can maintain consistent agricultural practices and, mostly importantly, consumers are assured of the quality of products they buy in the market.

The presence of such a test will meet an unmet need for different players in the herbal industry all aimed at guaranteeing a consistent product. The product and service provide a seal of approval that will add value to the herbal product.



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