SANBio

SOUTHERN AFRICA NETWORK FOR BIOSCIENCES

BioFISA II Project Portfolio

July 2018

BioFISA II

BUSINESS MEETS BIOSCIENCES

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science & technology

Department:
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REPUBLIC OF SOUTH AFRICA

Ministry for Foreign Affairs of Finland

NEPAD
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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 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, approximately 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 partner, Botswana Innovation Hub has also committed R1 million to support innovations in health and nutrition. This portfolio presents the status of the investments made in thirteen 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 optimise 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).
- Field sampling and testing in both Botswana and Zimbabwe of approximately 1200 cattle.

Final field sampling and laboratory testing will be completed and analysed for compilation of a journal article.

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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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FLAGSHIP PROJECT

FORENSIC GENOTYPING KIT

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 has completed the:

- Testing of manufactured prototype by collaborating laboratories and prospective clients.
- Database development, population and website testing.

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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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FLAGSHIP PROJECT

TUBERCULOUS MENINGITIS DIAGNOSTIC TEST

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 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:

- Patient recruitment and sample bio-banking commenced across all 3 sites. The goal of 750 participants consented to the study has been achieved and surpassed. South Africa, Malawi and Zimbabwe have consented 250, 250 and 333 participants, respectively. Recruitment will continue until 31 August 2018 so as to enhance the power the accumulated data for IRISA-TB endorsement.
- A preliminary cut-off has been determined, showing superior performance when compared to competitor products. This will be validated during the next phase of the project.
- The customer segment has been engaged, the market has been defined and the cost of goods sold (COGS) determined.

In terms of sustainability, Antrum Biotech (Pty) Ltd has secured additional funding for IRISA-TB development, manufacturing and/or multisite clinical performance studies.

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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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FLAGSHIP PROJECT

INSECTS FOR FEED AND FOOD

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 develop fish and poultry feeds based on insect protein *(Tenebrio molitor)* and to build an industrial scale production to supply the mealworms. A fish feed will be developed, tested and commercialised by LUANAR and poultry feed by Department of Research and DRSS respectively. The commercial partner Scaled Impact will develop and drive the business strategy, evaluate other profitable applications of mealworm protein and successively build a large-scale insect production operation.

PROGRESS

To date, the team has completed the:

- Market and regulatory assessment for the mealworm production and use in Africa and Europe.
- Business strategy, setting direction to mealworm protein applications, market segments and economies of scale.
- Set-up of pilot mealworm production facility.
- Determination of the mealworm feed supply from industrial waste.
- Fish and poultry feeding trials successfully, validating mealworm protein as a good fishmeal substitute.

Multiple potential customer contacts have been established and clear indication of interest from many of them has been received.

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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 due to inadequate feeding as result of high protein cost. Outputs from this project are expected to positively impact the aquaculture and poultry industry at industrial and small-scale farming level. 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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SEED
PROJECT

PHARMACOGENETICS KIT FOR ARV TREATMENT OPTIMISATION

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 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.
- The team is currently running a clinical trial in Chitungwiza (5 Clinical Sites) and providing pharmacogenetics services at UCT & AiBST Harare to explain incidences of EFV related side effects in patients on ART.

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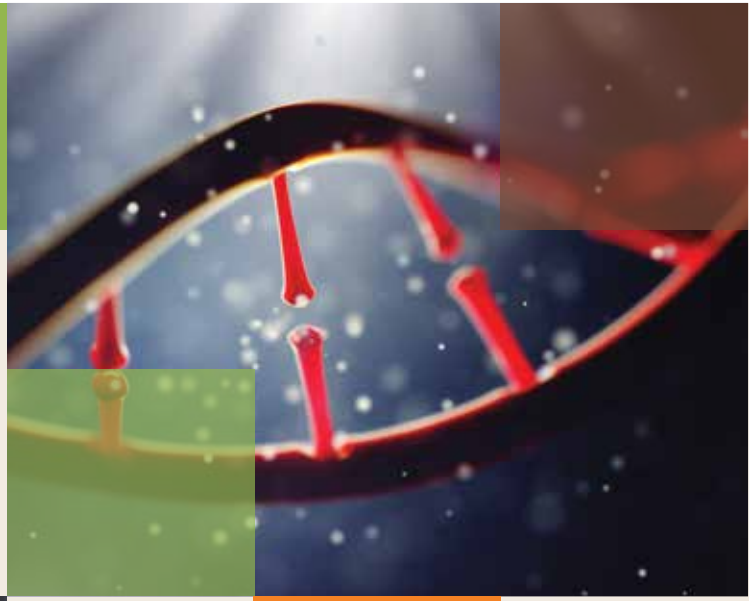
BioFISA II Funding Value

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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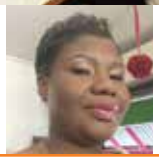

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SEED
PROJECT

FOOT-AND-MOUTH DISEASE DIAGNOSTIC KIT FOR SOUTHERN AFRICA

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 batch of kit prototypes is being manufactured. Testing of the prototype in Zambia is expected to begin in mid-2018.

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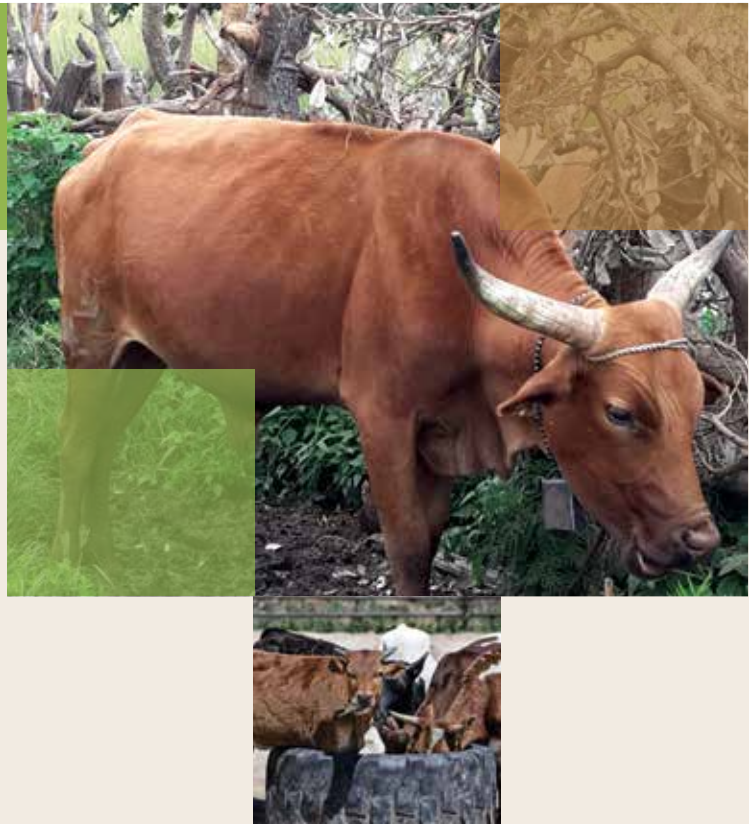
BioFISA II Funding Value

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.



SEED
PROJECT

HEALTHY SMA²RT SNACKS FROM CLIMATE-SMART CROPS

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 (UP), and is well on its way to launch a second product as part of the project collaboration.
- SR Snacks Pty Ltd was established to commercialise a range of tasty and nutritious sorghum snacks under the SO-yhum brand.
- An exciting new sorghum-based product developed at Botswana University of Natural and Agricultural Resources (BUAN) is set to hit the market soon.
- Students at UP, NUL and BUAN are doing research and have received training and skills development opportunities as part of the project.

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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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SEED
PROJECT

MINERAL AND VITAMIN BLOCK LICK

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 team has:

- Produced a vitamin-mineral block lick prototype.
- Done validation animal response trials across Zimbabwe.

The feedback from the farmers has been very positive. Farmers including smallholder cattle owners have testified that their animals have improved in body condition when exposed to the block lick and are prepared to buy it, making commercialisation of the project's product possible in the near future. The project has successfully registered the summer and winter vitamin-mineral block licks with the Ministry of Agriculture, Mechanization and Irrigation Development in Zimbabwe according to the requirements of the Fertilizers, Farm Feeds and Remedies Act. The product is being patented.

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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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SEED
PROJECT

DAIRY GOAT FEED WITH MELIA AZEDARACH

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 have been validated in a dairy goat feeding trial to assess improvements in milk yield among other factors. Investigation on the most optimum level of inclusion of *Melia azedarach* leaves that will ensure improved milk yield and health status of the goats is on-going.

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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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SEED
PROJECT

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.

PROGRESS

To date:

- The toxicology testing and a comprehensive report which have been completed show that Resurrection bush herbal tea is safe for consumption by humans.
- The team is working with the Zimbabwean Ministry of the Environment and other stakeholders to establish Bioprospecting regulations in Zimbabwe. The partners in Zimbabwe have signed a Memorandum of Understanding with the Chivi Rural District Council, which allows the project to apply for a harvesting permit and engage the community on access and benefit sharing (ABS).
- Market testing has been completed in Harare with 48 randomly selected participants – this has provided valuable data on how to market and promote the Resurrection bush herbal tea, and on what blends may be most popular, in the local market.
- A marketing partner has been selected and the first product is expected in supermarkets in the next few months.

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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.

SEED
PROJECT

BROILER CHICKEN FEED WITH MORINGA OLEIFERA

SUMMARY

The project seeks to commercialise sustainable broiler chicken feed with *Moringa oleifera* as a partial substitute for soya cake in Zimbabwe and South Africa. The business is already producing the Moleifera broiler feed that results in reduced mortality and morbidly rates, tasty meat of low fat content, longer shelf life and meat of appealing golden brown colour. The project will improve chicken nutrition through the utilisation of Moleifera feed within the SADC region.

The strategic key partners to this business include two universities, an industrialist and a funding partner. The two universities are responsible for research, product development, development of type two feed and IP issues. The industrial partner is involved with processing, packaging and distribution logistics of the product, while the financial partner assists with co-funding of the project. Some MOUs have been signed by the cooperating parties.

PROGRESS

To date:

- Partnerships have been formed with moringa farmers, agro-dealers, agents (www.smartconnect.biz) and contract farmers. The farmers supply the feed raw materials, while the agro-dealers and agents distribute broiler chicken feed.
- The product is distributed mainly in Harare and its environs and 1 tonne of feed has so far been distributed to farmers. Another 15 tonnes will be distributed in the coming three months.

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BioFISA II Funding Value

R1 000 000

OUTCOME AND IMPACT

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.

In order to address the issue of availability and the price of moringa leaf powder, the business is promoting an outgrower programme so as to increase the supplier base, also providing the outgrowers with added income.

The economic benefits of the project also include the reduced costs to small scale farmers who are in poultry production. Furthermore, the social benefits derived from using Moleifera feed include improved diets and employment generation.

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SEED
PROJECT

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).

PROGRESS

To date:

- The pilot phase of the project has now been validated and stability data on the product established. Production batch manufacturing has commenced. The product has been tested and optimised based on the feedback from over 100 potential customers in Botswana, Zimbabwe and South Africa.
- A decision was made to enter the market through street vendors and a network of 37 vendors has been set up in Botswana. The vendors will be trained on the product attributes and given branded cooler boxes and umbrellas. An initial 1500 litres will be distributed through these channels every month.

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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-sized 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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SEED
PROJECT

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.

PROGRESS

To date:

- Two new working decorticating machines have been set up in Oodi and Machaneneng.
- Blue Pride has already received a purchase order for one metric tonne of oil and made its first sale of marula seed oil to the United States.
- Blue Pride's 100% marula seed oil will also be sold through a chain retailer of natural products with six outlets in Gaborone.
- Marula candies have been made in collaboration with Wild Foods (Pty) Ltd and Top Snack & Spread using dried marula fruit.
- Blue Pride has signed purchase agreements for marula pulp.
- Directors have passed an Understanding ISO 9001 course.

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Mr Gert Lubbe
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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.

NOTES
& CONTACTS

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