

2022— *Man on the Moon.....* R.E.M.

Letter from the Editor...

Welcome to the 2022 edition of the:

"InnoVenton Times".

This edition reflects some of the highlights at InnoVenton during the year.

Promising development work has been undertaken to establish a Biorefinery Program at InnoVenton. We also take a look at highlights for some of the Technology Development Projects completed during the year.

InnoVenton hosted 9 Interns, they all took part in a 10 month intensive Graduate Intern Training Program that covered various disciplines to promote cross learning experiences. Page through this edition to find out more about what they have been up to.

Several Short Learning Programs and workshops were presented to SME's these were; "A practical introduction to IoT and user interface programming", "ITO connectivity in remote areas", "An introductory guide to Cosmetic Formulation", "Process Safety", "Basic chemical engineering for operators", "Data analysis for Analysts, Scientists and Engineers", "Applied biostatistics with excel" and "Evaluating your business idea". These will all be on offer to interested parties in 2023, details are provided should you like to participate in one of them. You can follow our website or Facebook page for updates.

It goes without saying that our stakeholders play a pivotal role in ensuring the sustainability of the institute and enable us to contribute our expertise to several areas in the Chemical Technology and emerging Bio economy space. The balance between contract work and stakeholder funding ensures a base from which we can operate. This enables us to do what we do.

Health and Safety protocols implemented at InnoVenton aim to prevent incidents and promote a safe and healthy work environment for all.

InnoVenton
Dream. Innovate. Create.



We encourage colleagues and students to commit and foster an environment of awareness when it comes to the safety of working at InnoVenton. Yes, even when it comes to PPE. We continue to engage with the University to ensure the institute receives the support it needs with SHE and Technical Services related matters.

To our staff, thank you for your dogged resilience that has helped us soldier on through 2022. "Individuals play the game, but teams beat the odds" – SEAL Team saying.

Delight and surprise our customers. Amaze our stakeholders. And consider, "Just start by doing what is necessary, then what is possible, suddenly you will find yourself doing the impossible", (c/o Francis of Assisi)....Dr Melissa Gouws .

Biorefinery Program

___Dr Gary Dugmore



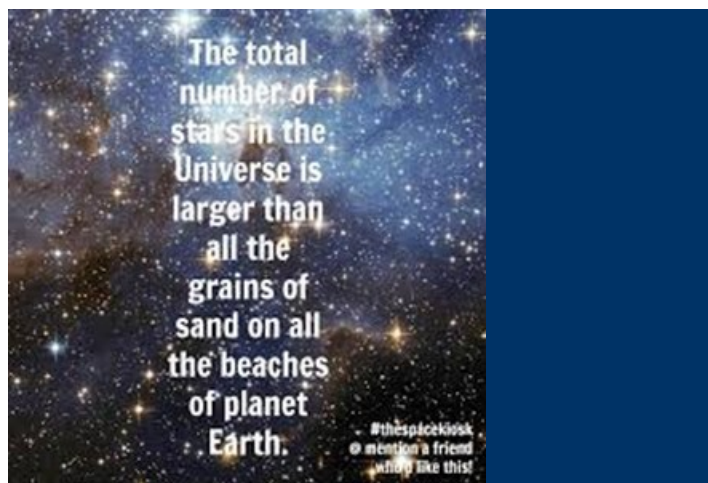
- ◆ Leverage concepts & research from HEI
- ◆ Transfer technologies and products to manufacturing and commercialization through SMME's, entrepreneurs, and larger commercial entities
- ◆ Develop integrated biorefineries from microalgal feed-stock
- ◆ Value propositions: cultivation technologies and product line formulations,
- ◆ Packaged Microalgae Biorefinery concepts,
- ◆ Formulation pilot facilities,
- ◆ Fractionation pilot facilities and process technology development and Biochemical/chemical derivatization product & process technology.
- ◆ Skills Development & Training can be actioned by developing and delivering appropriate Short Learning programmes to transfer skills and disseminate technology.

By embedding the Biorefinery program at InnoVenton alongside the existing Technology Station, we will be able to address the factors limiting the development of the microalgae value chain in the Bioeconomy. The program will provide a stable platform of resources to develop, package, transfer and support microalgae technologies and products to manufacturing and commercial activity through SMME's, entrepreneurs, and larger commercial entities.

This initiative aims to resource and structure microalgae technology development such that the challenges to commercialization are reduced and the technologies are accessible for transfer at (TRL5-8) and supported during/after commercial uptake. The Project Contract Funding Agreement has been signed, and we look forward to making a contribution to this area of innovation.

The key elements of the program align with the countries Bioeconomy strategy and with InnoVenton in terms of its position in our Higher Education Institution (HEI) Faculty of Science and as a Host Technology Station. So, through the program we would be able to:

- ◆ Develop Microalgae as a renewable feedstock
- ◆ Develop and create productization steps of knowledge for the value chain



BIO ECONOMY: Low cost Spirulina Cultivation

___Dr Carla Kampman

The Technology Innovation Agency Agricultural Bio-economy Partnership Program funded the development of a low tech, cost effective, high yield Spirulina cultivation system, based on a simple bucket system, to produce fish (animal) feeds. This formulation replaces the fishmeal traditionally used with Spirulina, this product is easily comparable to commercial feeds when considering the pellet size and protein composition. The project milestones completed with the expected output of a Technology Transfer Package are firstly, to demonstrate an integrated Low-Tech process. To achieve this, the Spirulina is cultivated in buckets, harvested, dried, the feed formulated and manufactured. Secondly, the formulated Tilapia Fish Feed needs to be fit for purpose in that it is nutritionally stable, floats and keeps its physical form during use. Ensuring the feed is palatable for the fish also ensures product success. Optimizing the cost of growing, harvesting and drying Spirulina makes the process viable.



Photos: Spirulina Biomass and Fish Feed

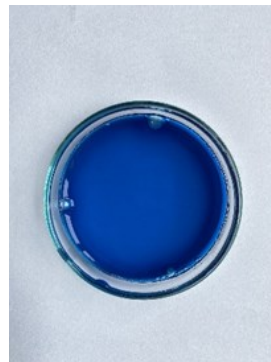
BIO ECONOMY: Phycocyanin production and extraction

___Dr Anna Collins and Mr Peter Grant

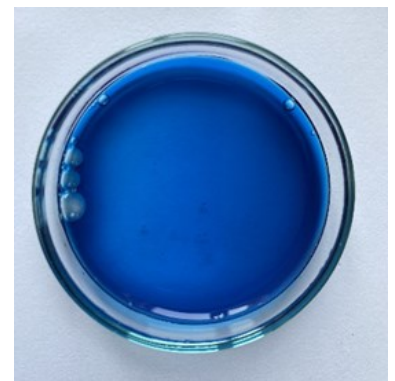


This project will demonstrate an integrated pilot scale system for phycocyanin production and extraction from Spirulina, for which the laboratory prototype system has been developed in a previous TIA Seed Funded project.

The aim is to document a technology transfer package at TRL 6, to produce a prototype food grade Phycocyanin product and to set up a Technology Demonstration facility of the production, for the purposes of eventual deployment by an entrepreneur. Progress has been made on the spray drying parameters, while ongoing experimental work is done on scalable product purification steps.



Photos: Membrane filtered extract



BIO ECONOMY: Bio stimulant Formulation Algal Biomass

___Dr Gary Dugmore



The aim of this project was to develop a liquid extract biofertilizer product from *Spirulina platensis* biomass in collaboration with Omnia. A crude Bio stimulant whole lysate was produced in an integrated demonstration scale facility in a controlled environment. The microalgae were cultivated in an open raceway system and harvested by filtration. Cells were ruptured by assisted mechanical abrasion and the resulting liquid lysate was separated from solids and cellular debris by filtration. The liquid lysate was preserved and packaged in 5L plastic containers.

The resultant bio stimulant will undergo plant growth trials at Omnia.



Photos: Our own plant growth experiments.at various stages.

InnoVenton

Downstream Chemicals

Technology Station

From its inception the Technology Station activities at InnoVenton have been fully integrated into the larger institute to maximise the impact that we have externally.

InnoVenton/DCTS strives to provide specific technology support and innovation in the areas of:

- ◆ Product replacement; extension or formulations
- ◆ Improving production/process flexibility;
- ◆ Reducing production lead times; Reducing environmental impacts; improving product quality; improving working conditions/safety;
- ◆ Providing expert technology, analytical, testing services; and
- ◆ Providing custom designed short learning programs for industry
- ◆ Kilo-lab, Distillation and Process Plant Facilities
- ◆ TIA Seed Funded Projects, Major Projects and Youth development Projects.

Enquiries: Mrs Louise Hamilton T 041 504 3281

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Does anyone else
put things
in a safe
place
and then
forget
where
that safe place is??





InnoVenton Presents

An introductory Guide to Cosmetic Formulation

Are you interested in setting up your own natural skin care business, but don't know where to start? Join us for a day to find out.

You don't even need a scientific background.

The course will cover

- Evaluating your formulation idea
- Introduction to formulation terminology and the language of formulation

Who should attend? Inventors and entrepreneurs who would like to acquire basic tools to better understand and evaluate their idea

Ms Zoleka Nyati

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E Zoleka.Nyati@mandela.ac.za



InnoVenton

Collaborations

Would you and your Team like to collaborate with
InnoVenton ?

For more information contact Dr Gary Dugmore .

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SPACE to Grow and Serve

Plans to set up a "Launch Pad" at InnoVenton where SME's can engage with our staff and get guidance on "how to do" their business, remain on the agenda. As the institutes projects evolve it becomes a challenge to create space for process demonstrations at InnoVenton. We are also working towards having a Client Friendly Cosmetic Formulation Laboratory, where new lotions and potions can be created with the help of our Formulation Scientists.

InnoVenton

Dream. Innovate. Create.

Specialist Analytical Services

Gas Chromatography

- ◆ GCMS, (Fingerprinting comparison of volatile/semi-volatile organic compounds)
- ◆ SIMDIS, (Simulated Distillation of Fuels)
- ◆ GC x GC, (Separation of complex hydrocarbon mixtures)

Coal and Biomass Analysis

- ◆ Thermal Gravimetric Prox-Analysis (moisture, volatiles, ash, fixed carbon)
- ◆ Calorific Value

Spectroscopy

- ◆ UV/Vis, Qualitative and Quantitative analysis
- ◆ FTIR, Raw material fingerprinting

Fuel Analysis

- ◆ Flash point, Density, Viscosity, Cetane number
- ◆ Copper Strip, Iodine Value
- ◆ CFPP, Cloud Point, Oxidation Stability
- ◆ Vapour Pressure, Distillation Points
- ◆ Energy Value, Carbon Residue
- ◆ Sulfated Ash, Total Contamination

**Our Technology Station is willing to assess
and assist you with your testing and analysis
requirements.**

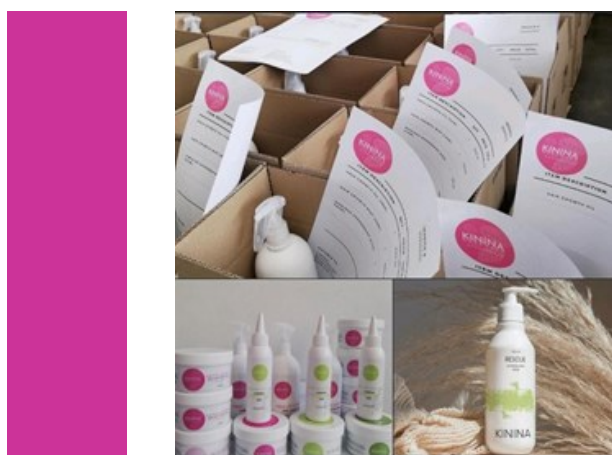
2022 TS projects

Toronto M Personal Care Product Development

The client (Kinina Hair Care Products) has 5 products which have basic formulations for hair care products, which require improvement. Kinina currently has 4 handmade product offerings, a Moringa peppermint Hair mask, Hair Growth Mist, peppermint shampoo and hair growth oil. The products are infused in various herbs which are proven to promote hair growth, which is the main focus of their brand (hair growth and clear skin). Their target market is black and coloured females ages 14-59. The clients research shows that black South Africans will spend money on hair and beauty products and have no problem buying wigs, hair pieces, hair creams, shampoos and all others chemical associates with quality hair treatments. The product development service aims to help the client improve their products but to safely scale up and eliminate any safety concerns potential customers might have, this would also enable them to access retailers with ease. There is a great demand for the clients' products in various neighbouring countries.



Photos: Toronto M for Kinina Hair Care Products- prototypes



Photos: Kinina products ready for shipping

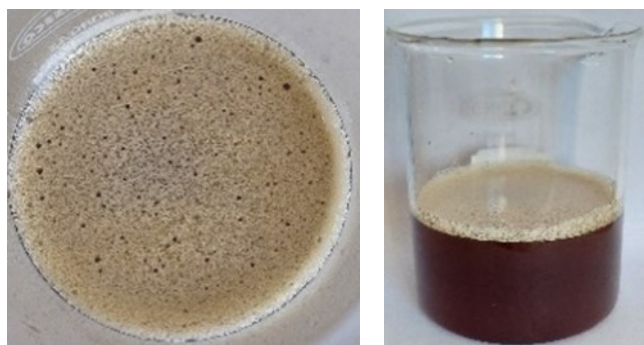
Mwani Zanzibar Personal Care Product Development

The philosophy behind the business is to provide a premium product, using locally sourced ingredients which incorporate locally grown, harvested and processed seaweed extract.

The client is working with Prof M vd Venter and her PhD student, Donne Kritzenger, from the Department of Biochemistry and Microbiology (NMU), to develop the process of extracting the actives from three locally sourced seaweeds and evaluating the bioactivity thereof. Once characterised, the project aims to evaluate potential synergies between the various extracts to propose an optimal blend to be incorporated into selected Mwani products. Prof vd Venter is also assisting the client with other R&D related process development steps, looking at methods to wash and dry the seaweed while providing support with regards to the selection of a process and the materials required to produce the extract given the objective to scale operations in Zanzibar. After an initial consultation and report on assessment of the clients' formulations, the client has requested a scope and costing for Formulating 2 products as per existing formulation, with the addition of seaweed extract (new raw material).



Photos: Mwani Zanzibar Facial and body toning cream- prototype



Photos: Mwani Zanzibar: Facial cleanser and Mask - prototype

Herbicide Prototype Production

The client's vision is to bring manufacturing of fine/speciality chemicals back to South Africa. One way to do this is through a re-industrialization project, the first of which involves a herbicide active ingredient used to control brush encroachment in rangeland.

Photo: Acid Scrubber setup at the Kilolab.



The clients are conducting laboratory scale validation of the proposed process after which pilot trials will be required to:

- Validate the process technology at pilot scale by considering the process performance/efficiency. This one way to demonstrate that the technology works.
 - Produce data and prototype samples for registration
- InnoVenton have a suitable multipurposed pilot facility with two Buchi Chemreactor systems (CR30 and CR51K) and have been contracted to assist.

Photo: Re-industrialization – Fine Chemical Manufacturing



Splash be gone - GIP

The analysis of the suitable ingredients that can be added in the formulation of Splash Be Gone that will reduce the surface tension of the water whilst also changing the viscosity of the water, to ensure that splash back produced is eliminated, requires a surfactant combination that produces dense foam and foam that will last a prolonged time. It was found that the packaging is also an important factor for Splash be Gone toilet product, the foam product formulated should have a bottle with a foam applicator top that ensures the foam released is of the desired product parameters, the recommended container should be a foam aerosol spray container or the plastic foam



applicator with small tops as they will produce small bubbles which in essence produced dense thick stable foam. Skills transfer has been completed, and the prototype accepted, stability testing has been concluded. The client is currently considering her options for taking the product to market.

Photo [LHS]: Foam Splash Be Gone Formulation.



Essential Sterolin PROJECT.

Essential Sterolin Products (Pty) Ltd (ESP) requested InnoVenton DCTS to evaluate the technical feasibility of producing β -sitosterol- β -D-glucopyranoside using the kilo lab facility located at InnoVenton. ESP provided their proprietary synthesis technology that was developed and tested by Dr H Jordaan (Imagichem), on which the evaluation was based. The process is a four-step synthesis starting from glucose and β -sitosterol.

One kilo lab trial run was conducted which highlighted issues with filtration, material handling, product isolation, and process complexity. The laboratory runs confirmed the issues with filtration, solubilities, process complexity and provided insights for potential optimisation. It was recommended that the process undergo optimisation to inform the development of an efficient, robust, economical and practical technology.

A rigorous process of development was undertaken in the laboratory, where critical process parameters were identified and necessary adjustments made, informed by the initial scale up process, to enable more practical large-scale manufacture.

To date a total of 5 kilo lab scale production runs have been completed in the kilo lab. The client spent a week with us during the last Kilo Lab manufacturing run, to assess progress, and the way forward.

InnoVenton has produced 5kg of a total of 10kg of product for the client. Access to the US export market is anticipated.

Photos:

Kilo Lab Trial Prototyping, Dr Dugmore and Jarryd Cuthbertson



Flameless Heater Element

The intent of this research project was to develop a catalytic heater element which burns illuminating paraffin by a flameless chemical reaction between paraffin and air, facilitated by a catalyst. The catalytic heater element would be used either as a room heater or a cooker.

When heated to a high enough temperature the catalyst facilitates, in this case, the reaction between paraffin and air, creating heat. The heat released needs to be high enough to keep the reaction running so it becomes self-sustaining in the same manner as an open flame.

In order for a paraffin flameless heater to fully burn paraffin and be reliably reignited, a balance between the amount of paraffin that is wicked onto the catalyst metal must be sufficient to maintain the heat generating reaction but not too much to cover the catalyst with a liquid film which smothers the reaction. The aim was to produce a round, flat disk, catalytic element that could be started by dripping some paraffin onto it, lighting it with a match and when the flame burnt out, there was to be sufficient heat for the flameless paraffin combustion to be self-sustaining.

Critical function and proof of concept have been achieved at TRL 3.

We have demonstrated a flameless oxidation

catalyst element but further optimization is needed to ensure more complete paraffin combustion to eliminate or reduce the paraffin smell and to make the manufacturing process more reliable.

Although we have not been able to fully develop a catalytic heater element for the flameless combustion of paraffin that is safe and easy to ignite, as we were unable to achieve the right combination of a low ignition temperature catalyst and correct rate of paraffin wicking in the



catalyst support, the future technology development pathways have been identified.

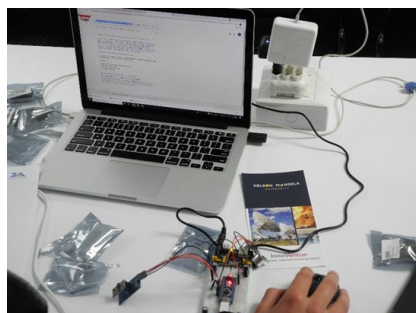
Photo: Catalyst Discs



Photo: Proof of concept rough prototype and prototype burner housing

InnoVenton Workshop

A practical introduction to IoT and user interface programming



Join us for two days practical introduction to the concept of The Internet of Things, and microcontrollers programming with cell phone applications

What the course will cover

- Understand and explain the concepts of IoT, microcontrollers and communication methods
- Programme an Arduino board
- Be able to communicate with their chosen application via a cell phone

Who should attend?

Individuals interested in learning about IoT for professional or personal use
No prior knowledge or experience of programming or electronics required

Course Requirements

Laptop with an internet connection and a Cellular phone

BOOK NOW AS SPACE IS LIMITED

For more information and bookings please contact:

Ms Zoleka Nyati
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E Zoleka.Nyati@mandela.ac.za

Graduate Intern Training Programme

InnoVenton set up an intensive training programme focusing on developing and upskilling the individual. The idea is to end up with analytical and process chemists, software developers, administrators and formulation scientists, who have credible knowledge which they can share and be skilled enough to contribute. This way they can add value to operations at InnoVenton and other companies.



Some of the Interns Activities in 2022

The 2022 Interns were placed in areas of Product Improvement and Development, Monitoring and Testing, Microalgae bioprocessing, IOT, Business process support and Medical Nanotechnology. They are Siphosethu Dyalvane (Formulation Science), Akhona Jada (Process Chemistry), Thobile Malinga (IOT), Olebogeng Mogapi (Analytical Chemistry), Abongile Sonjani (Analytical Chemistry), Sibhekokuhle Masuku (Process Chemistry), Anneke van Rooy (Formulation Science), Zoleka Nyati (Receptionist and Public Administration). Let's not neglect to mention that Vuyisa Ntsundwana (Nano Technology Student) was a finalist (2nd) in the 2022 Eastern Cape FameLab competition.

Photos: InnoVenton Graduate Interns 2022





Masses of Marketing

The International Organising Committee for the African School of Fundamental Physics and Applications included a visit to InnoVenton, Downstream Chemical Technology Station, as part of its tour of Gqeberha. The IOC site visit was to assess the readiness of Nelson Mandela University to host the 7th Biennial African School of Fundamental Physics and Applications, which took place from 28 November – 9 December 2022.

As part of a work shadow week experience, with the DSI-Mandela Nanomedicine platform, for two Kariega based high school students, a visit to InnoVenton was a chance to see science in action.



Photo: The CPT first year class visited BASF on a guided excursion to experience first-hand what industry expects of them as they prepare for their careers.



Photo: The CPT 2nd and 3rd year students went on an excursion to Cerebos to learn how salt is processed and prepared for the market.

InnoVenton hosted a training workshop with CIPC and the TIA discussing ways to enhance the disclosure of IP and how to assist clients to register their businesses.

The Technology Innovation Agency Board, visited our facilities as part of their tour of the Technology Station Network.



Delegates from Eskom and TIA visit InnoVenton to discuss ways we can engage with them to development and transfer skills.



Photo: The 2022 SACI Career and Innovation Day at Rhodes was a great opportunity to spend time with graduates and share what InnoVenton is all about and what we do. Many had questions about starting their own businesses, taking products to the market and IP associated with their ideas. This is an area where InnoVenton can make an impact and assist budding entrepreneurs. Dr Melissa Gouws engaged with the students.



InnoVenton organised a hybrid Algae Cultivation and Aquaculture Workshop. This engagement opportunity created a platform where stakeholders, established producers and new SME's could meet with project leaders to discuss opportunities for new ventures, development and technology advancement in algae cultivation, fish feed products, system techno economics, scaleup and regulatory issues.



The Vice Chancellor's Excellence Awards

Dr Shawn Gouws received the **Nelson Mandela University Distinguished Teacher Award**. Dr Gouws believes as chemical process operator skills are scarce in South Africa, it is critical to establish in our society, a foundation of knowledge for students, who are trained to solve problems. He exposes his students to simulations and practical experiments that enable them to understand the principles of the task. Colleagues and stakeholders commented in support; "This is a fantastic achievement in academia and a testament to your hard work"- Teaching Colleague. "It is well deserved, and we are proud to be associated with yourself and the program."- UMICOR.

James Moir Medal Recipients

Celebrating excellence at InnoVenton, our Director Dr Gary Dugmore and the BSc Masters student, **Jarryd Cuthbertson** both won the prestigious **James Moir Medal** of the **South African Chemical Institute** awarded to the best Honours or postgraduate Diploma student in any branch of Chemistry at each university. The medals were awarded for achievement in 1990 and 2021 respectively. Jarryd received his medal at a ceremony at Fort Hare in October.



Photo: Dr Dugmore congratulating Jarryd Cuthbertson on his achievement.

InnoVenton

Product Formulation

*Have you ever wanted to Formulate your own product?
But weren't sure where to start?*

InnoVenton can help you understand how to mix and blend various components in a way so that they don't react but instead interact to provide a final product with very specific desired properties or functions.

You would have access to Chemical Research and Development expertise and Technology Support as you design your formulation.

Some products developed in our laboratories include: personal care products, household cleaning products, pharmaceutical products, industrial chemical products and water treatment products to name a few.

We would help you design and optimise your
formulation.

Enquiries: Dr Carla Kampman T 041 504 3281

E: Carla.Kampman@mandela.ac.za



2022 NMU Long Service Award Recipients

Congratulations to staff members who were acknowledged for Long Service Awards from the Nelson Mandela University;

15 Years: Dr Melissa Gouws

10 Years: Mrs Louise Hamilton and Mr Philip Van Zyl.

Formulation Science Showcase 2022

The BSc Formulation Science Students, “Class of 2022” exhibited an inspirational range of products at their annual product showcase held in December at InnoVenton.

The class of 2022 BSc Honours in Formulation Students showed their mettle at their recent year-end showcase, presenting the products that they have formulated during their year in the programme.

From a natural 2-in-1 surface cleaner and insect repellent to mineral, tinted sunscreen powder – this cohort of nine students were very innovative in their approach to their research projects.

The students presented their innovative consumer products for final assessment, offering academic staff and visitors an opportunity to interact with the products and ask questions about them.

The BSc (Honours) Formulation Science degree was developed to provide the consumer products industry in South Africa with skilled formulators who understand and can apply the theoretical principles of blending various raw materials and active ingredients in different phases to produce stable, homogeneous, and useable consumer products, as well as to develop entrepreneurial skills for the establishment of SMEs.

Formulation Science is concerned with the knowledge and practice of blending and mixing of various components (chemical compounds) in a way that they don’t react but interact to provide a final product with very specific desirable properties or functions.

An eco-friendly laundry detergent with designer fragrance and Devil’s Thorn saponin extract was the product of **Sefenya Letsoalo’s** hard work – offering two different fragrances, one more feminine and the other more masculine.

Aviwe Dangazele came up with a dark chocolate that contains almost no sugar and includes other beneficial health ingredients such as polyphenols, which are antioxidants.

Caring for the environment and using natural ingredients was certainly the order of the day, like **Princess Mtayisi’s** all-natural body care products. Continuing in this vein is **Qhawekazi Nqayi’s** natural and mild

creamy bodywash with baobab oil. And on the household cleaning front, **Sanelisiwe Dyani** was extremely enthusiastic in “selling” her natural 2-in-1 surface cleaner and insect repellent containing lemon grass.

Cecile Witbooi is of the opinion that headache powders leave a bad taste in the mouth, so she came up with a sublingual, pleasant-tasting headache powder.

For smokers, **Zamokuhle Ngcoko** formulated a Taste Clinic Care Kit – a mouth gel and lozenges to restore damaged tastebuds and eliminate bad breath.

If you are concerned about the harmful rays of the sun, then **Chrizé van den Heever’s** mineral, tinted sunscreen powder may be the product you are looking for! This face powder can easily be reapplied during the day, providing a high sun protection factor.

Completing the group’s product list is **Miracle Sekomo’s** eco-friendly non-permanent fabric glue, allowing you to temporarily fix a fabric tear in fabric when sewing is not an option.

“We are proud of the fact that these students will now be moving out into the workplace having gained valuable formulation, entrepreneurial and marketing skills” says Senior Lecturer and Formulation Science coordinator, Dr Nicole Vorster.

Dr Nicole Vorster is the programme’s coordinator, for more information feel free to contact her at:

Nicole.Vorster@mandela.ac.za



Photo: Formulation Science Class of 2022 with their lecturer, Dr Nicole Vorster (far RHS).



Sefenya Letsoalo - Eco-friendly laundry detergent with designer fragrance and Devil's Thorn saponin

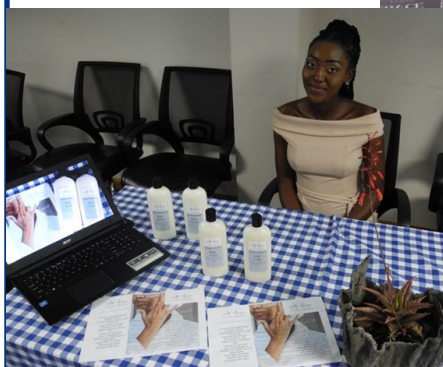


Miracle Sekomo - Eco-friendly non-permanent fabric glue

Aviwe Dangazele - Sugar-free dark chocolate



Chrizé van den Heever - Mineral tinted sunscreen powder



Princess Mtayisi - All-natural bodycare products



Sanelisiwe Dyani - Natural 2-in-1 surface cleaner and insect repellent

Cecile Witbooi - Sublingual great-tasting headache powder



Zamokuhle Ngcoko - Taste Clinic Care Kit – mouthgel and lozenges to restore damaged tastebuds and eliminate bad breath

Qhawekazi Nqayi - Natural and mild creamy bodywash with baobab oil



New Equipment Acquisitions



A laboratory **spray drier** was purchased for producing spray dried powder samples and for determining the most suitable process conditions for spray drying of products.

Presently successfully used to spray dry, heat sensitive proteins and suitable for producing fine powder samples of most water-based samples.

The drier will be used for future in-house spray drying applications and is available to provide small-scale spray drying services to customers.

Black Hole SUDOKU

Each row, column and square (9 spaces each) needs to be filled out with the numbers 1-9, without repeating any numbers within the row, column or square. After all that heavy reading you may need something to flex your brain a bit.

	9				1	2		
	1		9	2				
		7					1	6
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InnoVenton

Technology
and
Specialized Development

InnoVenton/DCTS strives to provide specific technology support and innovation in the areas of:

◆ Research

- Applied Chemistry in Product and Process Development

◆ Teaching and Learning

- Short learning programs, workshops.

◆ Engagement and Services

- Technology Support
- Technology Demonstration
- Analytical and testing services

Our experts are willing to assess and assist you with your process and development requirements.

The Big Bang Theory Wordsearch

S	A	A	T	R	A	U	T	S	A	E	T	O	L
C	C	O	M	I	C	B	O	O	K	M	T	T	O
I	E	A	C	R	R	J	A	L	L	S	Y	E	H
E	B	J	E	S	C	I	E	N	T	I	S	T	O
N	W	S	G	O	O	O	T	H	E	O	R	Y	W
C	B	H	P	R	N	E	S	P	A	C	E	N	A
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N	G	L	R	J	A	P	H	Y	S	I	C	S	D
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A	A	O	E	S	E	A	G	N	I	Z	A	B	P
G	N	N	H	H	Z	T	I	W	O	L	O	W	C
T	G	E	O	C	D	S	A	E	A	T	D	O	S
A	N	E	D	A	S	A	P	E	A	M	A	B	G
T	E	R	D	C	A	L	T	E	C	H	E	A	P

RAJESH

AMY

THEORY

BIG BANG

PHYSICS

COMIC
BOOK

CHEESECAKE

LEONARD

PASADENA

HOWARD

STUART

SCIENTIST

SCIENCE

WOLOWITZ

PENNY

BAZINGA

CALTECH

SHELDON

SPACE



Photo: Formulation Science Class of 2022 making mayonnaise emulsions.

The concoctions were tasted, judged, and rated. The students had a chance to see the physical properties used in culinary formulations.



"The chemistry of cooking" so to speak.

InnoVenton

Our role is to provide technology support services, skills development training and a technology development capability for basic research and client projects. This includes improving the alignment of basic research and formal teaching with needs.

InnoVenton continues to respond to client needs through provision of technology support services that include **consultation & feasibility studies, non-routine testing, prototyping & toll sample preparation, technology demonstration and short learning programs.**

Facilities, Safety, Health & Environment



InnoVenton is committed to Health and Safety and encourages staff and students to work towards promoting a safe, healthy working environment at the institute. Our relationship with the Faculties SHE committee keeps channels of communication open and enable findings to be reported and addressed with commitment. Special mention can be made of Mr Donevin Lesch and Prof Ernst Ferg who have the safety of staff at heart. The University Technical Services Department and their Teams have worked with us to keep the building utilities in working order, we continue to work closely with them to maintain the buildings and laboratories. Mr Peter Peters and Mr Melvin Syce have been willing and helpful in responding to tasks seen as important to InnoVenton.

Responsible waste management practice remains part of our institutional culture. Reduce, Reuse and Recycle continue to be principles on which our waste management is based on. Special thanks to ChemSolve for their ready co-operation in safely removing spent materials from site again this year.

The implementation of stock control logs to trace chemicals on site is showing its usefulness. We have been reducing chemical stock holdings on site makes for a safer environment. Our Chemists are encouraged to make use of designated storage areas for their project reagents and in doing so decrease the volumes of reagents in the laboratories.



InnoVentons

2023 Strategic Priorities

- Capitalize on the experience of our staff
- Leverage our reputation and resources
- Promote our core activities
- Increase collaboration within the Faculty
- Align research with stakeholders requirements
- Build core technology capability
- Ensure excellence and efficiency
- Increase Customer Focus
- Optimise the balance of activities (Services/ Technology Development/ Research/ Engagement)

ISO 9001 Accreditation

InnoVenton is working towards obtaining ISO 9001 Accreditation for the institute. To do this we need a Service Policy and a couple of Objectives...this is what we came up with...

Policy

InnoVenton Management is committed to developing technologies for (socio) economic impact, through the creation of a High-Performance Team and delivering these for the downstream chemical and the emerging Bioeconomy sectors.

Through strategic partnerships with the Department of Science and Technology and Technology Innovation Agency's Technology Station Programme, our aim is to contribute to improving the competitiveness of industry through the application of specialized knowledge and technology; and facilitating the interaction between industry (especially SMEs) and academia to enable innovation.

Achieving excellence through innovation and learning that ensures stakeholder expectations are met by competent staff that uphold values of integrity and candor and are well conversant in the application and continuous improvement of an ISO9001-2015 compliant management system that meets statutory and regulatory requirements.

Training Offered

In 2022 a range of Learning Programs were offered; we plan to host most of these again in 2023. Updated course dates and rates can be found on our website or social media. Enquiries should be directed to Zoleka.Nyati@mandela.ac.za.

- ♦ Chemical Process Technology (Formal NMU Diploma)
- ♦ Chemical Formulation Science (Formal NMU Honors)
- ♦ Basic Chemistry (SLP)
- ♦ Basic Chemical Engineering (SLP)
- ♦ Data Analysis with Excel for Analysts, Scientists and Engineers (SLP)
- ♦ A practical introduction to IoT and user interface programming Workshop
- ♦ Evaluating your Business Idea Enabling Technology Development Workshop
- ♦ An introductory guide to Cosmetic Formulation Workshop
- ♦ Creams and Lotions Workshop
- ♦ NRF24 Radio Transceiver Workshop
- ♦ Radio link Workshop



Looking forward - 2023

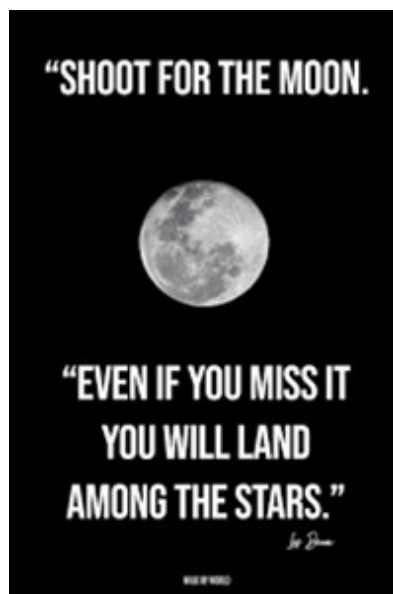
2023 promises to be another project packed year. The following are a few of the main activities planned :

Biorefinery Program: The program, funded by the DSI will provide a resource platform to develop and support microalgae technologies. Setup transfer packages and product ideas for manufacturing and commercial activities.



Client Projects:

Cosmetic Formulation Improvement: Clients have requested assistance to improve formulations for body lotions and face creams using various specialized key ingredients.



We look forward to being able to display the SABS 9001 logo as proof of a successful accreditation for InnoVenton in 2023.



Process Safety SLP

This course will provide a broad understanding of the tools and problem-solving techniques used in process safety.



The course covers different hazards found in the chemical industry, safe work permits, consequences of toxic vapours, fires and explosions the SHE considerations regarding these consequences, process design and operations, asset integrity, legal aspects, management of change and safety cultures. The format of the presentations will be on MS Teams.

Who would benefit:

- Anyone involved with a role that does not have direct line responsibility for process safety
- Anyone who would like to develop a broad understanding of process safety

InnoVenton

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NELSON MANDELA
UNIVERSITY

Looking forward - 2023

Moon Mac & Cheese

For a truly “out of this world” Mac & Cheese... Takes 1 1/4 hours,
Prep time 20 minutes, Serves 6.



Ingredients

- For the white sauce:
- 4 T butter
- 4 T flour
- 1 cup milk
- 1 cup cream
- Salt and freshly ground black pepper, to taste
- 2 T olive oil
- 1 medium onion, finely diced

- 4 garlic cloves, crushed
- 300 g pork rashers, chopped (or bits of bacon)
- 500 g macaroni, cooked *al dente*
- 250 g mature Gouda, grated
- Salt and freshly ground black pepper, to taste
- For the topping:
- 1 T butter, melted
- 2 T Fresh parsley, chopped
- 1 ciabatta roll, torn into crumbs

Cooking Instructions

Preheat the oven to 200°C. To make the white sauce, melt the butter in a saucepan, add the flour and mix to form a paste. Cook for 1 minute, remove from the heat and gradually whisk in the milk and cream. Return to the heat and simmer for 5 minutes, whisking continually, until thick. Season to taste.

Heat the olive oil in a pan, soften the onion and garlic, then add the pork rashers and fry until golden.

Fold in the macaroni, white sauce and 3/4 of the Gouda and season to taste. Transfer to an ovenproof dish or individual dishes and sprinkle over the remaining cheese and the topping. Bake for 20–25 minutes, or until golden and bubbling.



InnoVenton

InnoVenton/DCTS plans to expand and focus on development services in the areas of:

♦ Chemical Process Development

- Product and Process Development for tailored solutions.

♦ Bio Energy Solutions

- Gasification and biogas process development.

Our experts are willing to assess and assist you with your process and development requirements.



For More About InnoVenton

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