



DURBAN UNIVERSITY OF TECHNOLOGY
INYUVESI YASETHEKWINI YEZOBUCHWEPHESHE

1 DECEMBER 2021 | 12:00





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FACULTY OF APPLIED SCIENCES

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Professor K Motaung
Director: Technology Transfer and Innovation

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Ms N Nyembezi
Chancellor

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Ms N Nyembezi
Chancellor

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Professor TZ Mthembu
Vice-Chancellor and Principal

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Dissolution of the Congregation

Ms N Nyembezi
Chancellor



MESSAGE FROM THE CHANCELLOR

Ms Nonkululeko Nyembezi

Dear Graduating students, class of 2021

Congratulations to our newest alumni, the graduating class of 2021. You have accomplished an enormous amount and you have even greater potential than when you began your studies here at Durban University of Technology. You have earned your qualification and you have accomplished so much.

For some, you will be earning your undergraduate degrees, for others, this will mark the culmination of your postgraduate and professional degrees. For all of us though, I am fully aware that our actions to prevent the further spread of COVID-19 may have caused a disruption to this special occasion. I am as heartbroken as you are that your graduation from the Durban University of Technology has been impacted by this global pandemic.

It is my utmost wish that you remain connected with your lecturers, your friends and your classmates. Remain steadfast, as I am in the knowledge that your DUT education and the relationships you made, the learning you achieved and the experiences you had during your time at DUT will serve you well in the years to come.

You are DUT for Life.

Ms Nonkululeko Nyembezi

Chancellor



Sibingelela abazokwethweswa iziqu zonyaka ka-2021

Siyanibingelela

Igama lami nginguNonkululeko Nyembezi, nginguShansela weNyuvezi yaseThekwini yezobuChwepheshe. Ngamandla enginikwe wona njengoShansela, ngithi usungaqala umcimbi wokwethweswa kweziqu weNyuvezi yaseThekwini yezobuChwepheshe ozobe ubonakala kumabonakude.

Halala kubafundi bethu abozokwethweswa iziqu, labo abaqede izifundo zabo ngonyaka ka-2021. Nizuze okukhulu kakhulu futhi seniqeqesheke kakhulu okudlula ngesikhathi niqala izifundo zenu lapha eNyuvesi yaseThekwini yezobuChwepheshe. Nizisebenzele iziqu zenu futhi nizuze okukhulu.

Abanye, iziqu zabo zokuqala lezi, abanye bazogogoda. Lokhu kuzokhombisa umphumela weziqu eziphezulu neziphathelene nomsebenzi enizowenza. Kithi sonke nokho, ngiyazi ukuthi ukwenza kwethu ukuvikela ukubhebhetheka kokhuvethe kungenzeka ukuthi kudale ukuphazamiseka kulomcimbi osemqoka kangaka. Nakumina kubuhlungu lokhu njengakunina ukuthi umcimbi wenu wokwethweswa iziqu waseNyuvesi yaseThekwini yezobuChwepheshe uphazamisekile ilolu bhubhane olusemhlabeni wonke.

Kuyisifiso sami ukuthi bungapheli ubudlelwano phakathi kwenu nothisha benu, abangani benu kanye nozakwenu. Ningaguquki, njengoba ngazi ukuthi imfundo yase-DUT kanye nobudlelwano enibenzile, enikufundile kanye nezinto enihlangabezane nazo ngesikhathi nisesa-DUT konke lokhu konisebenzela eminyakeni eyazo.

Niyohlezi ningabase-DUT.



MESSAGE FROM THE VICE-CHANCELLOR AND PRINCIPAL

Professor Thandwa Zizwe Mthembu

As we are all aware, Durban University of Technology (DUT) has produced thousands of graduates over the years. However, the 2021 cohort is the first since the start of implementation of *ENVISION2030* and the emergence of Covid-19 and all its ramifications on our teaching-learning arrangements we had to pivot from.

With the launch of **ENVISION2030** early last year, you would have had a taste of it including the idea of DUT's DNA and the DUT-Way that emanates from it. In future, when we reflect on the impact of the new strategy in all its facets, you will be the baseline cohort.

On behalf of DUT people, I take this opportunity to congratulate you on your important personal accomplishment. We recognize that this milestone carries with it important meanings, part of which suggests you have maintained the discipline of your thoughts and behaviour characteristic of DUT people. Without the requirement of discipline, this day may not have been possible for many of you. For this reason, I dare say that the very discipline you have demonstrated thus far will carry you through your next personal growth trajectories, ranging from further studies, starting a career, starting your own business to even starting a family.

To borrow from Jim Collins, a combination of a culture of discipline and an ethic of entrepreneurship produces "*the magical alchemy of great performance*". We, thus, have no doubt that focused and disciplined as you were during your studies, and with DUT entrepreneurial flair we have been instilling over a number of years now, you will be greatly successful in your pursuits.

More especially over the last few years of study at DUT, you would have appreciated the strategic approach, outcomes and impacts of our teaching-learning and research-innovation philosophy. We have sought to position DUT as a university of and for its broader society. We exist because our people must use their individual and collective creativity, innovation and entrepreneurial flair to solve perennial and new problems our broader society faces. Solutions to these must contribute towards improving the lives and livelihoods in our society. Through our '*Innovative Research and Curricula*', we expect you to become a model DUT '*Adaptive Graduate*' who will unleash your creativity and imagination to become the source of change and advancement. By 2030 we will be a vanguard of that change and advancement in society. We see you as an equal partner in this historic voyage we have just embarked upon.

Your graduation coincides with a myriad of challenges confronting the world, the African continent and South Africa as a nation. We do not expect you to feel sorry for yourselves or mourn the persistence of these problems. As DUT, we have accepted Pascal Finette's assertion that people are a source of everything that happens across all institutions of society. This means that it is people who are behind the problems we know. Similarly, we know that it is a different type of people who contribute ideas that will lead to lasting solutions. In the recent past, I said the following when unpacking the Stewardship Perspective of *ENVISION2030*:

It is about being true and selfless stewards of everyone and everything we are custodians of. It is about our deep conviction and purity of character in our collective quest to reach our ultimate goal. It is about something deeper, irreducible, somewhat intangible, that will sustain us on a flight to greatness. Allow me to say Stewardship is essentially our compass towards our ultimate and shared destiny of greatness.

As a DUT graduate, you should enthusiastically contribute towards the lives and livelihoods of all our people. In everything you do and will do onwards, may you demonstrate DUT's DNA and the DUT-Way. May you live all DUT's Values and Principles as part of your way of life. That way, you will stand out and be seen to be a distinctive DUT graduate that all will wish to associate with, perhaps employ and perhaps partner with on big and innovative projects.

We wish you all the best in your future endeavours. Become the change you have always yearned for.

UMLAYEZO KASEKELA SHANSELA NOPHINDE ABE NGUTHISHANHLOKO



Njengoba sonke sazi, iNyuvesi yaseThekwini yezobuChwepheshe (DUT) isikhiqize izinkulungwane zezitshudeni eminyakeni eyedlule. Noma kunjalo, labo abathweswa iziqu ngo-2021 bangabokuqala selokhu kusungulwe uhlelo olubizwa nge-ENVISION2030 kanye nokuvela kokhuvethe nezinguquko-ke obekufanele zenziwe ekufundiseni nokufunda.

Ngesikhathi kuqala i-ENVISION2030 ekuqaleni konyaka odlule, ngaleso sikhathi ubungabe usutholile ukuthi iyini yona okubandakanya nomqondo wolibofuzo lwe-DUT neNdlela ye-DUT esuka kuyo. Ngesikhathi esizayo uma sesibuka okwenziwe yileli su elisha kuzo zonke izinhlangathi zalo, niyoba yiqembu lokuqala okweqhathaniswa nalo.

Uma ngikhulumela abantu base-DUT, ngithatha lelithuba ukunihalalisela empumelelweni yenu emqoka kangaka. Siyaqonda ukuthi lempumelelo isho lukhulu kini, okunye kwakho kusho ukuthi nikwazile ukuqoqa imicabango yenu kanye nendlela yokuziphatha okuyinto efana nabantu base-DUT. Ngaphandle kokukwazi ukuziphatha ngendlela, lolusuku bekungenzeka lungabi yimpumelelo kwabaningi benu. Ngalokho ngithi, lindlela enikwaze ukuziphatha ngayo kuze kubemanje izoniqhuba kwenizokwenza kusukela manje, kungaba ukuqhubeka nezifundo, ukusebenza, ukuqala amabhizinisi enu noma ukuqala imindeni.

Ukuthatha emazwini ka-Jim Collins, isiko lokukwazi ukuziphatha kanye nendlela yokukwazi ukuphatha amabhizinisi lokhu kokubili kukhiqiza, *“the magical alchemy of great of performance”* okusho ukuthi “umlingo wenqubo yoguquko yokukhulu kokwenza umsebenzi”. Ngakho, asingabazi ukuthi indlela enikwaze ngayo ukugxila kwenikwenzayo nokuziphatha njengoba benenza ngesikhathi sezifundo zenu kanye nobuhle bokusungula amabhizinisi ebekufakwa ezingqondweni zenu e-DUT enqwabeni yeminyaka eyedlule, ngaleyo ndlela niyophumelela kukho konke enihlela ukukwenza.

Ikakhulukazi eminyakeni yokugcina yokufunda e-DUT, kufanele ngabe nithakasele izindlela zokwenza izinto, imiphumela yendlela izinto ezenzeka ngayo, kanye nemiphumela yendlela yokufunda-nokufundisa kanye nezindlela ezintsha zocwaningo zobunjalo bolwazi nezinto eziyiqiniso nezikhona. Sizame ukuthola indlela yokubeka i-DUT njengenyuvesi yomphakathi wonkana. Sikhona ukuze abantu bakwazi ukusebenzisa amakhono abo ngabanye nanoma futhi besebenzisana nabanye, ukukwazi ukufika namacebo okwenza izinto ngcono kanye nokukwazi ukwenza kahle kwezamabhizinisi bakwazi ukuxazulula izinkinga ezintsha kanye nalezo umphakathi wonkana osubhekene nazo inqwaba yeminyaka. Lezi zisombululo kufanele kube ukuthi zibe negalelo ekwenzeni ngcono izimpilo zabantu kanye nendlela yabo yokuphila emphakathini yethu. Nge, “Innovative Research and Curricular” silindele ukuthi nibe yisibonelo se-DUT, “izitshudeni esezigodile ezikwazi ukumelana noshintsho” ezizokwazi ukucabanga ngokusabalalisa umqondo kanye nekhono lokudala ukuze nibe umsuka woshintsho nokuthuthuka. Ngonyaka ka-2030 kuyobe kuyithi esihamba phambii ngezindlela ezintsha zokuthuthukisa umphakathi. Sinibona njengabalingani bethu kulomlando wohambo esilualayo.

Ukuthweswa kwenu iziqu kwenzeke ngesikhathi izwe libhekene nenqwaba yezingqinamba, izwekazi lase-Afrika kanye neNingizimu Afrika njengesizwe. Asilindele ukunibona nidabukisa okanye nikhungathwe ukuba khona kwalezi zinkinga ezingapheli. Njenge DUT, sesiwamukele umbono ka-Pascal Finnet othi abantu bawumsuka wayo yonke into eyenzakalayo kuzo zonke izikhungo zomphakathi. Lokhu kusho ukuthi ngabantu abayimbangela yezinkinga esizaziyo. Kuyefana nokuthi, siyazi ukuthi ngabantu abathile abayobamba iqhaza ngemibono eyoholela ezisombululweni ezohlala zikhona njalo. Esikhathini esingasingakanani esedlule, ngasho lokhu okulandelayo uma ngichaza ngoMbono wokuPhatha we-ENVISION2030:

Kumayelana nokuba ngumholi weqiniso nongayena ugombela kwesakhe kubantu nakho konke lokhu okudinga ukunakekelwa yithi. Kumayelana nokujula nokukholelwa kwethu kanye nobumsulwa bobuthina ekubambisaneni ekufuneni lokho okuwumgomo wokugcina, ongehliseki, ongasho nje ukuthi into engabambeki, lokho kuyosilondoloza size sifinyelele kokukhulu. Ngivumeleni ngisho ukuthi uBuholi buyinkombandlela bendawo yethu esiphokophelele kuyo neyokugcina yethu sonke yobukhulu.

Njengomfundi wase-DUT othweswe iziqu, kufanele niphonse esivivaneni ezimpilweni zabantu bethu kanye nendlela abaziphilisa ngayo. Kukho konke enikwenzayo nenizokwenza ukuya phambili, sengathi ningakhombisa uLibofuzo lwe-DUT neNdlela ye-DUT. Sengathi ningaphila ngazo zonke izinto ezibalulekile neziyigugu nezimiso ze-DUT njengengxenywe yempilo yenu. Ngaleyo ndlela, niyogqama niphinde nibonakale ukuthi ningabafundi abathweswe iziqu e-DUT abantu bonke abayofisa ukwazana nabo, mhlampe babaqashe okanye babe ngabalingani babo emisebenzini emikhulu yokuqhamuka nezinto ezintsha.

Sinifisela okuhle kodwa kulokhu enizokwenza kusasa. Yibani ushinto enanikade nifisa ukuba yilo.



MESSAGE FROM THE PRESIDENT OF CONVOCATION

Mr Siyabonga Vezi

Class of 2021. Congratulations on your well-deserved success!

You should be extremely proud of your accomplishment. One's graduation is always a momentous occasion, but completing your studies and graduating during the midst of a world-wide pandemic is nothing short of extraordinary. You have made it through a very challenging time. Your indomitable spirit and a thirst for success has propelled you to work hard and see this through. Well done! These are the very skills that will hold you in good stead and give you the confidence to overcome hurdles and continue with the journey ahead.

ENVISION2030 speaks of producing adaptive graduates – developing graduates with the acumen to initiate and/or respond to change. The Class of 2021 epitomises that. You were faced with uncertain times but your resilience and fortitude endured and here you are, today, celebrating all the hard work that led to this victory. As you celebrate let us pay homage to those that have made sacrifices to ensure you fulfil your potential as a contributing member of society. Pay it forward as you, too, seek to *Improve Lives and Livelihoods*. To make a donation to DUT go to www.dutalumni.com and click on “Ways to Give”. Select one of the three payment options. It is that easy.

Having being ranked among the top five Universities in South Africa, according to the Times Higher Education World Rankings, as DUT we are confident that we have produced graduates with a social conscience who will make an indelible mark on the world and who will certainly become members of a global community.

We hope that you have created fond memories of your time at DUT and we look forward to welcoming you back should you choose to continue with postgraduate studies. The Executive Committee of Convocation is proud to be part of one of your greatest achievements. We look forward to great things from the graduating Class of 2021. I humbly request that you make contact by continuously updating your details so that you maintain your lifelong link with DUT, your *Alma Mater*.

UMLAYEZO KAMENGAMELI WENHLANGANO YABAFUNDI ASEBETHWESWE IZISU



Ukwethweswa kwezisu kwasebusika 2021

Bafundi bango-2021. Halala empumelelweni yenu enifanele!

Kufanele niziqhenye ngesenikuzuzile. Umcimbi wokwethweswa izisu ungumcimbi uhlale ungomqoka kakhulu, kodwa-ke ukuqeda izifundo zenu niphinde nithweswe izisu ngesikhathi izwe libhekene nobhubhane emhlabeni wonke lokho kuyisimanga esikhulu. Niphumelele kunzima. Umoya wokuphikelela kanye nokomela impumelelo kunenze nasebenza kanzima kwaze kwaba manje. Nisebenzile! Lawa ngamakhono ayonigcina aphinde aninike ukuzethemba okuyonenza nikwazi ukumelana nezingqinamba niphinde niqhubeke nohambo enibhekene nalo.

Uhlelo i-ENVISION2030 lukhuluma ngokukhiqiza izitshudeni ezikwazi ukumelana nezimo ezahlukene-ukuthuthukisa izitshudeni ngobuchule ukuze zikwazi ukuqala kanye/noma zikwazi ukuthi zenzenjani uma kufika ushintsho. Abafundi baka-2021 bayisibonelo esihle ngokweqile salokho. Benibhekene nesikhathi esinzima kodwa nibekezele ngenxa yamandla nesibindi, namhlanje nizobungaza ukusebenza ngokuzikhandla okuholele kulempumelelo. Nisabungaza, ningakhohlwa ilabo abadele konke ukuqinisekisa ukuthi ningalabantu eniyibona namhlanje abaneqhaza abalibambayo njengamalungu omphakathi. Khokha ngendlela yokuthi nawe uyafuna ukuthi *Izimpilo zabantu zibe ngcono kanye neNdlela abantu abaphila ngayo*. Uma ufuna ukuphonsa esivivaneni e-DUT ungangena ekhasini le-internet: www.dutalumni.com bese ucofa lakuthi, “iziNdlela zokuNikela.

Ukubekwa kanye namanyuvesi amahlanu aphezulu ohlwini eNingizimu Afrika, ngokwe-Times Higher Education Worlds Rankings, njenge-DUT siyazethemba ukuthi sikhiqize izitshudeni ezikwaziyo ukuphila nabantu eziyoyibeka induku ebandla, futhi ezizoba amalungu omphakathi omhlaba jikele.

Sithemba ukuthi nizenzele izinkumbulo ezithandekayo zesikhathi senu e-DUT kanti singakuthokozela ukubuya kwenu uma nikhetha ukuqhubeka nezifundo zenu. Ikomidi Elikhethekile leNhlango yasebethweswe izisu liyaziqhenya ngokuba yingxenywe yenye yempumelelo yenu enkulu kangaka. Sibheke okuhle kodwa ezitshudenini zango-2021 ebezithweswa izisu. Nginyaninxusa ukuthi nixhumane nathi ngokuthi niqhubeke nokubuyeka imininingwane yenu ukuze nigcine ubudlelwano benu ne-DUT njalo, inyuvesi yenu ebenifunda kuyo.

Khumbulani ukuhlala ngokuqhelelana, ukugeza izandla imizuzwana engama-20 bese-ke njalo nifaka isimfoyo uma niphumela phandle.

Niphephe. Nibusiseke.

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Chairperson of Council

Ms B Ntombela

Vice-Chairperson of Council

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Convocation

Mr M Shange

Convocation

Mr D Makaya

Convocation

Mr SH Vezi

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Ms B Chiliza

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Mr S Sibiya

Council Appointee

Mr B Singh

Council Appointee

Ms G Twala

Council Appointee

Cllr. W Mapena

eThekweni Municipality

Vacant

Minister of Higher Education

Vacant

Minister of Higher Education

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Vice-Chancellor and Principal

PhD (Wits); MSc (Vanderbilt); BSc Hons (UFH)

Professor M N Sibiya

Deputy Vice-Chancellor:
Teaching and Learning

D Tech (DUT); M Tech (TN); BCur Hons (UniZulu)

Vacant

Deputy Vice-Chancellor:
People and Operations

Professor S Moyo

Deputy Vice-Chancellor:
Research, Innovation and Engagement

PhD (UND); M TEM (UniMelb); MSc (UND)

Dr M J Nkonoane

Registrar

PhD (CUT); MEd (VISTA); B Paed (UniZulu)

Professor O O Olugbara

Executive Dean:
Accounting and Informatics

PhD (UniZulu); MSc (Unilorin)

Professor S Singh

Executive Dean:
Applied Sciences

PhD (UDW)

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Executive Dean:
Arts and Design

PhD (UP); NHD (TUT)

Professor B Twala

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Engineering and the Built Environment

PhD (OU); MSc (Southampton); BA (UNESWA)

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Health Sciences

PhD (UKZN)

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MCom (UP); PGD Auditing (UniSA); BCom (UniVenda)

Dr Q P T Mtshali

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PhD (NSU); BSc (SUNY)

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Chief Risk Officer

MPhil (UP); MBL (UniSA); B Com (WSU)

Dr J M Moletse

Director: Midlands Campuses

PhD (PSU); MBA (UCT); MSc (HU); BSc Hons (Wits)

Dr D Mohale

Director: Special Projects

DLitt et Phil (UniSA); MMPP (Wits); BA (Cum Laude) (CUT)

Dr V L Mthethwa

Senior Director:
Human Resources

PhD (UKZN)

HEADS OF DEPARTMENTS

FACULTY OF APPLIED SCIENCES

Biotechnology and Food Technology	Professor F M Swalaha	PhD (DUT); MSc; BSc Hons (UDW)
Chemistry	Professor N Deenadayalu	PhD (UN); BSc (UDW)
Food and Nutrition Consumer Sciences	Dr H Grobbelaar	PhD (DUT)
Clothing and Textile Studies	Dr A Fassihi	PhD (NMU); M Eng (MSU)
Horticulture	Dr I Matimati	PhD (UCT); MSc (UWC); M Phil; (UZ)
Maritime Studies	M Manqele	MSc (UKZN) BSc Hon (UniSA); BA (SU)
Mathematics	Professor D Lortan	PhD (UKZN)
Physics	Dr S Moola	PhD (UKZN)
Sports Studies (Interim)	Dr S Currie	PhD (UniZulu)
Statistics	Dr A Anand	PHD (UKZN)



Faculty of Applied Sciences

Degree of Doctor of APPLIED SCIENCES

MUGABI Francis

Title of Thesis

Modelling the transmission dynamics of bluetongue disease with controls, stochasticity and migration in patchy environments

Summary

Bluetongue (BT) is a viral disease of ruminants such as sheep, cattle, and goats. In terms of economic impact, BT is regarded as one of the most serious livestock diseases worldwide. BT is transmitted either through an infected midge biting an animal, transplacentally from an infected animal to the foetus or directly from one animal to another by contact. This research utilised ordinary differential equation and stochastic models to demonstrate the impact of the disease's transmission routes. The importance of cattle or midge movement in the spread of the disease can be shown using these models. Optimal control methods are then used to evaluate the effectiveness of control strategies, such as vaccination, quarantine, insecticide spraying or the use of repellents, in reducing the disease transmission.

This study resulted in three peer-reviewed publications and was presented at one national mathematics conference and one international conference.

Supervisor Prof KJ Duffy

Co-Supervisors Prof JYT Mugisha
Dr OC Collins

Degree of Doctor of FOOD SCIENCE AND TECHNOLOGY

MATIZA RUZENGWE Faith

Title of Thesis

Enzymatic modification of Bambara groundnut protein for the production of hydrogels

Summary

Bambara groundnut is an underutilised drought-tolerant legume which can be a potential alternative to the widely used soya grains in various applications including the production of hydrogels. However, like most plant proteins, the use of Bambara groundnut protein in native form is associated with inadequate crosslinks between polymers, which could limit its application in hydrogels. The use of enzymes to modify the protein hydrogel properties can overcome these challenges. In this study, crosslinking enzymes (transglutaminase and laccase) were used to modify Bambara groundnut protein for the production of hydrogels. Modification of Bambara groundnut protein using a combination of crosslinking enzymes increased the crosslinking density and promoted the formation of strong hydrogels. The hydrogels effectively encapsulated and prevented the early release of a heat sensitive compound (riboflavin) under simulated gastric and intestinal conditions.

This is the first report on the modification of protein using an optimised combination of crosslinking enzymes in gelation. This research resulted in two publications in high impact factor journals and two manuscripts are currently under review. Research data were also presented at local and international conferences.

Supervisor Prof T Kudanga

Co-Supervisor Prof EO Amonsou

Degree of Doctor of Philosophy in BIOTECHNOLOGY

AMOBONYE Ayodeji Emmanuel Tope

Title of Thesis

Biochemical characterization of selected carbohydrases from *Beauveria bassiana* and their potential applications

Summary

The study highlighted *Beauveria bassiana* as an important source of carbohydrase enzymes, which form a significant share of the multi-billion-dollar enzyme market. *B. bassiana* is an entomopathogenic fungus widely known for its industrial use as a biocontrol agent; it also resides inside plants in a beneficial endophytic relationship. Preliminary studies had shown that a strain of the fungus, *B. bassiana* SAN01, isolated in our laboratory, utilized different agricultural residues for the economical production of various industrially important enzymes. Using RNA-seq and phenotypic microarray, *B. bassiana* SAN01's transcriptome was elucidated to gain insights into its remarkable enzyme-production ability, as well as into the metabolic/physiological changes it undergoes while transiting from its more popular role as an endophyte to a biomass-degrading microbe. Subsequently, the production of *B. bassiana* SAN01 amylase, cellulase, pectinase and xylanase were optimized using statistical techniques to levels that are currently the highest for any *Beauveria* strain. Further, the biochemical characteristics of the enzymes were determined, and their biotechnological potentials in the saccharification of plant biomass, juice clarification and wastepaper deinking were also demonstrated. Finally, insights were gained into the structure-function relationship of selected *B. bassiana* enzymes using a computational approach. Besides the contribution to knowledge, findings from this study have highlighted novel enzymes, from a safe unexplored microbe, for future use in various biotechnological processes.

The candidate published eight articles in DHET accredited peer-reviewed journals during the doctoral study and presented his research at national and international conferences.

Supervisor Prof SKK Pillai

Co-Supervisor Prof S Singh

Degree of Doctor of Philosophy in CHEMISTRY

KABANE Bakusele

Title of Thesis

Application of selected ionic liquids for different separation problems: Liquid-liquid equilibria and activity coefficients at infinite dilution

Summary

Thermodynamic properties of liquid mixtures and their correlation, separation of azeotropic mixtures and the removal of sulphur compounds from fuel streams are important and essential in industrial processes. In this study, the use of greener solvents such as ionic liquids and deep eutectic solvents were examined for possible use as potential replacement extracting solvents instead of the currently used volatile organic solvents in the separation industries. The ionic liquids investigated were imidazolium, phosphonium and pyrrolidinium based, as well binary deep eutectic solvents.

The investigated solvents used for extraction were found to be beneficial to the chemical separation industry and may be proposed for possible use in the local petroleum industry. In addition, the unique properties of the chosen solvents allow them to have multiple applications, as well as being easy to recycle for reuse in keeping with current environmental measures.

The candidate has published eight papers in peer-reviewed journals and participated in both National and international conferences. Furthermore, the candidate was awarded the Faculty of Applied Sciences Top Published Doctoral student award in 2020.

Supervisor Prof GG Redhi

SHANGE Sindisiwe Fortunate

Title of Thesis

Development of CIELAB colour system for colorimetric detection of heavy metals in wastewater using metal nanoparticles

Summary

In her thesis, the *promovendus* developed an innovative, simple, sensitive, selective, cost-efficient colorimetric sensors for the detection of potent and hazardous metal ions (hexavalent chromium, lead and manganese). The sensor composed of synthesized ligands and their integration with gold and silver nanoparticles. The detection of metal ions was facilitated by using a CIE L*a*b* colour system, where a combination of smartphone (Color Grab 3.6.1 app) and spectroscopic systems were used. The smartphone was used to capture and detect colours from samples containing metal nanoparticles with different concentrations of analyte standards. The RGB values obtained were compared with those obtained from spectrophotometer. The interaction of the colorimetric sensor with analyte was also supported by molecular dynamics theoretical studies. The study resulted to three peer-reviewed journal articles, hence making a substantial contribution to scientific knowledge.

Supervisor Prof PS Mdluli

Co-Supervisor Dr M Mlambo

* Dean's Merit Award for Academic Excellence

Degree of Master of Applied Science in CHEMISTRY

CIBANE Nozipho Sinenhlanhla
(Full Research)

Title of Dissertation

The efficiency of phytoremediation using *Panicum maximum* and TiO₂ nanoparticles

Supervisor Prof PS Mdluli

Co-Supervisors Prof KG Moodley
Prof DG Arthur

MAJOLA Senzekile
(Full Research)

Title of Dissertation

Green synthesis, characterization, biological and electrochemical studies of indole pyrazole capped nanomaterials

Supervisor Dr M Sabela

Co-Supervisors Prof RM Gengan
Dr TR Makhanya

SIGONYA Sisonke
(Full Research)

Title of Dissertation

Optimization of extraction techniques for the isolation and pre-concentration of pharmaceuticals in aquatic environments

Supervisor Prof PS Mdluli

Co-Supervisor Prof L Chimuka

Degree of Master of Applied Science in FOOD AND NUTRITION

REDDY Anjellah
(Full Research)

Title of Dissertation

Barriers and facilitators of brown rice consumption, sensory acceptability and its effect on blood glucose level among university staff

Supervisor Dr A Naicker

Co-Supervisor Ms E Singh

Degree of Bachelor of Applied Science in BIOTECHNOLOGY

DUKU Landile
NKOSI Thato
NYAMBI Nicholas Sipho

Degree of Bachelor of Applied Science in FOOD SCIENCE AND TECHNOLOGY

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TSHESANE Jane

Advanced Diploma in CONSUMER SCIENCES IN FOOD AND NUTRITION

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MBONGWA Gugulethu Andile

Degree of Bachelor of Technology in HORTICULTURE

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Diploma in ANALYTICAL CHEMISTRY

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NZAMA Sanele

Diploma in NAUTICAL STUDIES

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GOVENDER	Shaun
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KUNENE	Sakhile Siphamandla
MANKAZANA	Bulela Fika
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MDA	Mava Experience Zamani
MEYIWA	Nothile
MHLONGO	Zama Thandokuhle
MTHEMBU	Fezile Wendy
NDLOVU	Vumani Sibani
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NGQULUNGA	Busisiwe
NKOSI	Bonisile Petunia
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RADEBE	Samkelo
SHANDU	Asanda Thandolweqiniso
SHANGE	Nkosingiphile
SITHOLE	Philani Sandile
XIMBA	Lethokuhle Mzomusha
ZIQUBU	Nokulunga Ayanda
ZUCULA	Lucy Nokuthula

Diploma in SHIPPING AND LOGISTICS

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CIBANE	Boniswa Gugulethu	CUM LAUDE
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DUMAKUDE	Siyabonga Langelihle	CUM LAUDE
KAMNQA	Azola	
KHUMALO	Zandile Nonhle	
MABUNGA	Prince Ngcebo	

MADLALA	Nqobile	
MCHUNU	Silindile Millicent	
MCHUNU	Siphosonke	
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MTHETHWA	Nompumelelo	
MTULI	Lindokuhle	
NDLOVU	Simphiwe	
NGCOBO	Mbalenhle Pearl	
NGWENYA	Loveness	
NJAPHA	S'thembile Goodgirl	
ODAYAN	Thuvín	CUM LAUDE
SIKHOSANA	Ntokozo Percival	
SILAWULA	Fundiswa Yoliswa	
*SIZIBA	Nomcebo	CUM LAUDE
ZULU	Nontobeko Precious	
ZULU	Siyethemba	CUM LAUDE

Diploma in SUSTAINABLE HORTICULTURE AND LANDSCAPING

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DLUDLA	Minenhle	
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KUNENE	Mzwakhe Dion	
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MAGWAZA	Ayanda	
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MANQELE	Nothando Martinat	
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MTHEMBU	Fezeka Andiswa	
MTHEMBU	Thobeka Assia	
NDLOVU	Nobuhle Pretty	
NDWANDWE	Noxolo Agrineth	
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NGCOBO	Samukelisiwe Nomusa	
NGUBANE	Julile	
NXUMALO	Sipho Mazwi	
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VAKELE	Ongeziwe	
*ZONDI	Fanelesibonge	
	Sibonakaliso Qaphelani	CUM LAUDE
ZONDI	Sthabiso	
ZUNGU	Gcinile	
ZWANE	Siphelele Promise	

Diploma in TEXTILE TECHNOLOGY

GUMEDE	Mpilonhle Phiwamandla
KWEZI	Nandipha
LOBAKENG	Lerato

MAPHUMULO	Skhulile Charil
MAZIBUKO	Lindokuhle
MLENZANA	Sithembele
MTHEMBU	Siphokuhle Asanda
NKABINDE	Nokuthula Bongekile
NQUBUKA	Ntombenhle Silindokuhle
QAMZA	Sbahlé
THUSI	Simo Sfundo
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National Diploma in ANALYTICAL CHEMISTRY

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National Diploma in BIOTECHNOLOGY

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NGUBANE	Bonokuhle
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SAMBO	Nhlanhla Prince
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National Diploma in CONSUMER SCIENCE: FOOD AND NUTRITION

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National Diploma in HORTICULTURE

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GUMEDE	Sbusiso
KHUMALO	Lindani Alfred
MADLALA	Ntombikhona Happiness
MASINGA	Sindiswa Eutricia
MKHIZE	Sanele Precious
MOTHIBELI	Nomvula Kanetso Naomi
NGIDI	Thobile Princess
NYIDE	Thembeke
ZWANE	Khethokuhle Fortune



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