Using technology for innovation and contribution to the economy; from South African medicinal Plants

Prof. Namrita Lall: University of Pretoria

Introduction : Traditional medicine

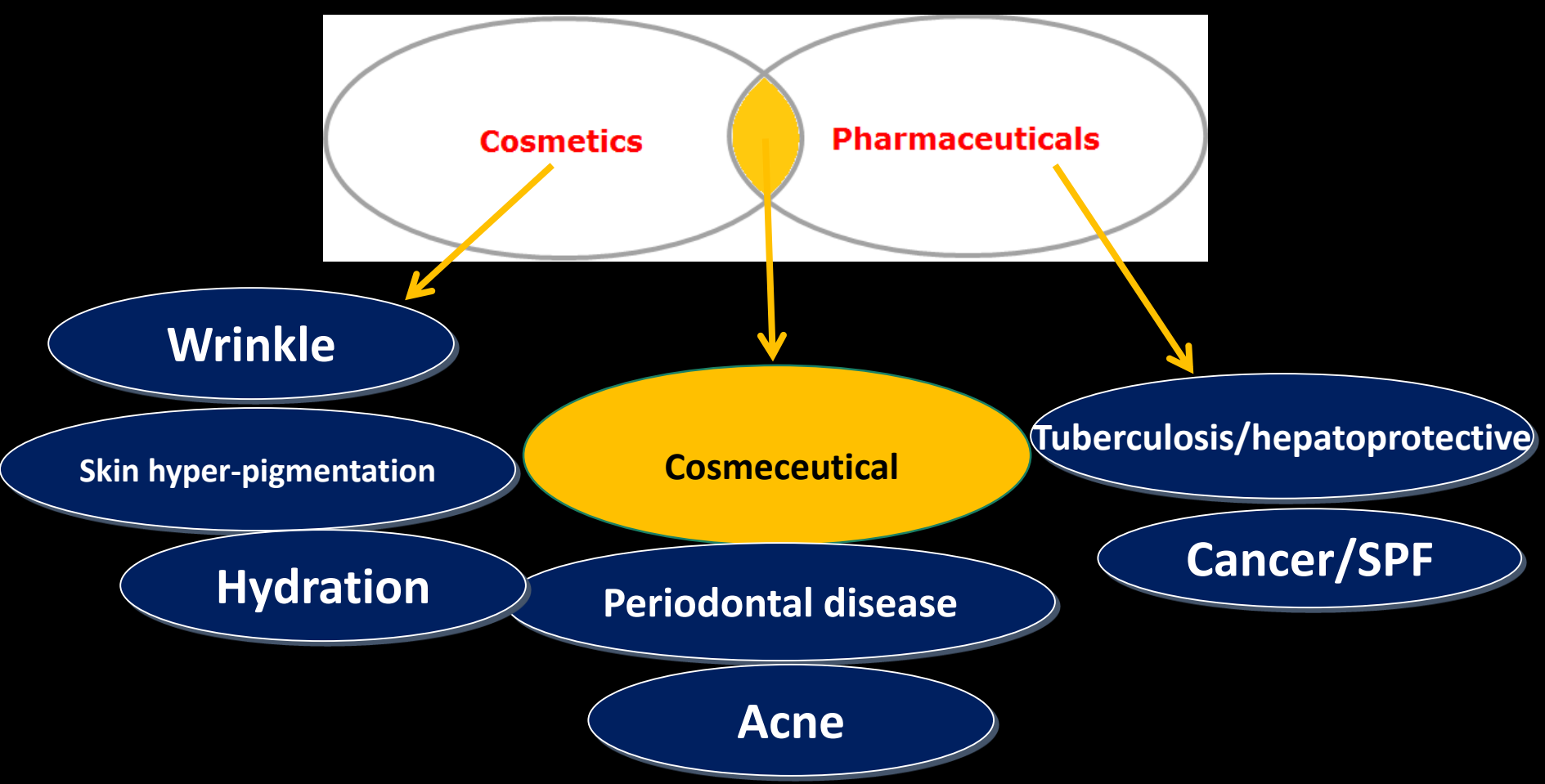
- Preferred form of primary health care for around 70% of South Africans
- Around 20 000 tons of medicinal plants are used in treatments
- Traditional medicine trade in SA
  - R2.9 billion (5.6% of National Health Budget)
- Mainly collected from terrestrial ecosystems

ASPALATHUS LINEARIS
(Rooibos)

Economic value of *ARTEMISIA AFRA* HERBA

- **Mostly traditional and informal**
- **A few commercial products**

Research on medicinal plants



Skin hyper-pigmentation

Greyia radlkoferi

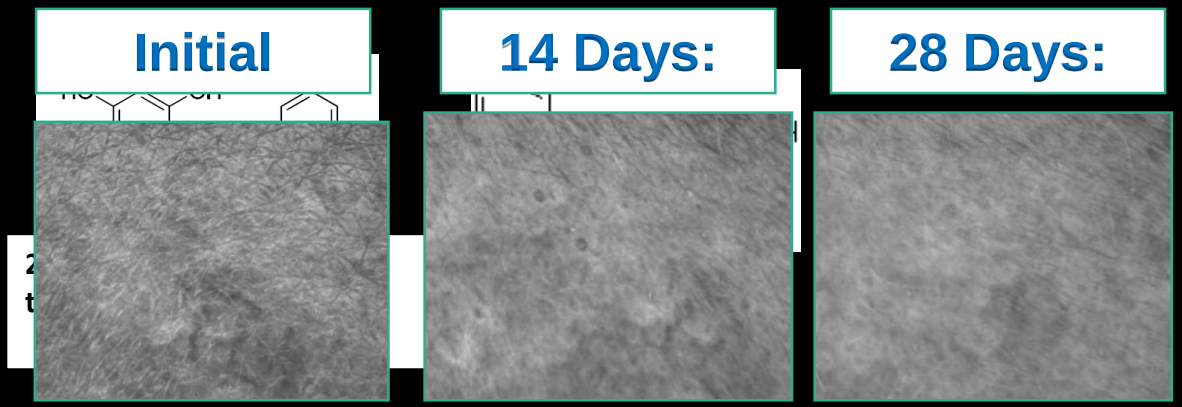
- No recorded medicinal usage

- Species in same family
  - Tyrosinase inhibition
  - Low toxicity
  - Bioactive compounds

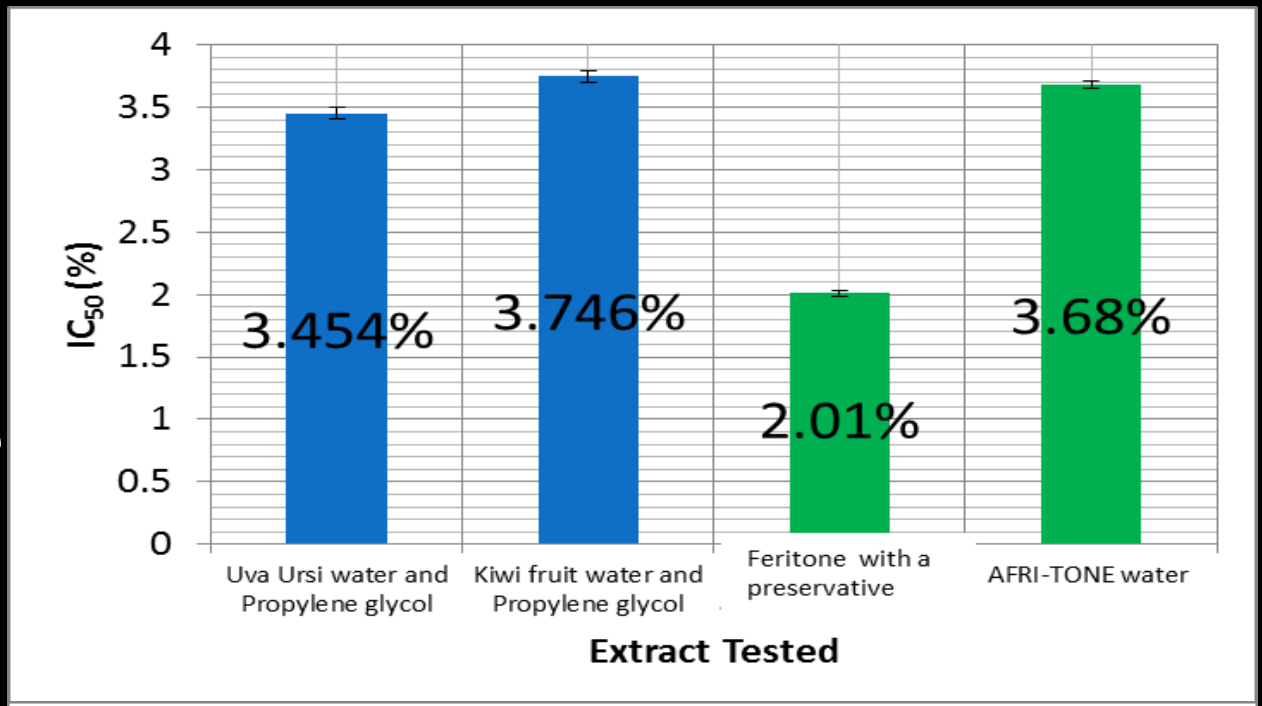
- Tyrosinase inhibition
  - 50% inhibition at 17.96µg/ml

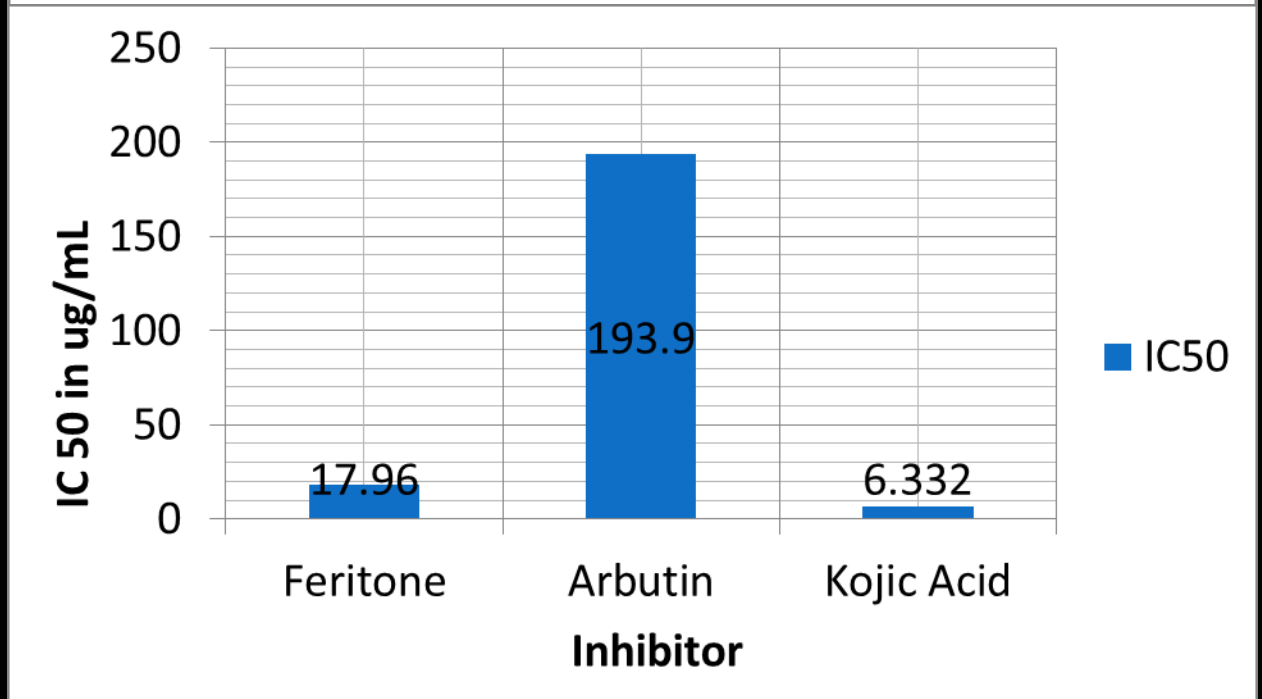
- Melanocytes – low toxicity
- Inhibits melanin content in treated melanocytes

- Clinical trial
  - 3% in aqueous cream base



- Inhibition of tyrosin enzyme by Feritone compared with imported actives





- Clinical trial at 10% in gel cream base (alone)
  - Reduces the number of acne lesions
    - Comedones
    - Whiteheads
    - Papules
    - Pustules

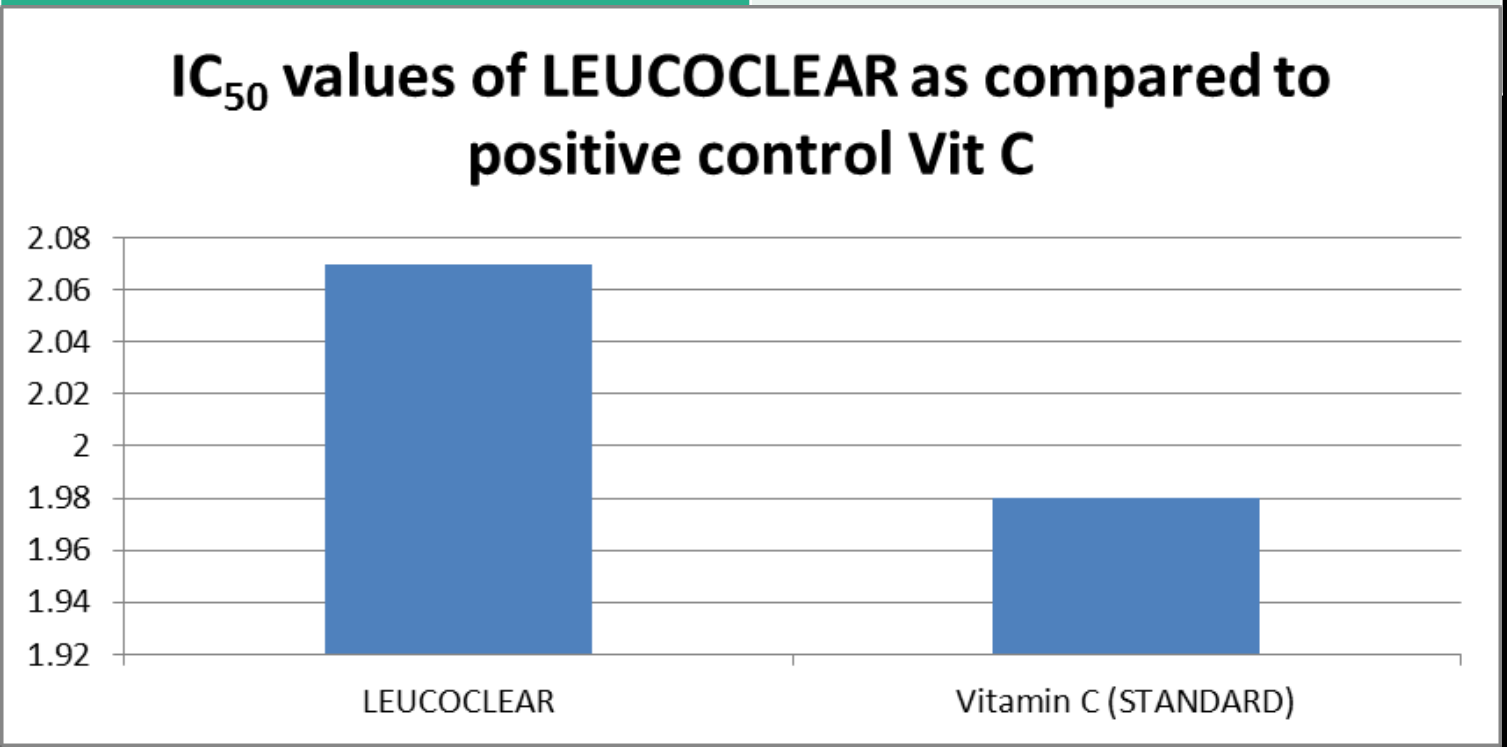


  - Reduces the number of acne lesions (combination)
    - Comedones
    - Whiteheads
    - Blackheads
    - Papules
    - Pustules

  - Moisturising agent after 24hrs – conventional treatment side effects

Table 1: IC value of LEUCOCLEAR compared with Vit C used in this experiment as the positive control

Sample	IC_{50} µg/ml
LEUCOCLEAR	2.07



Prototypes that may one day reach market

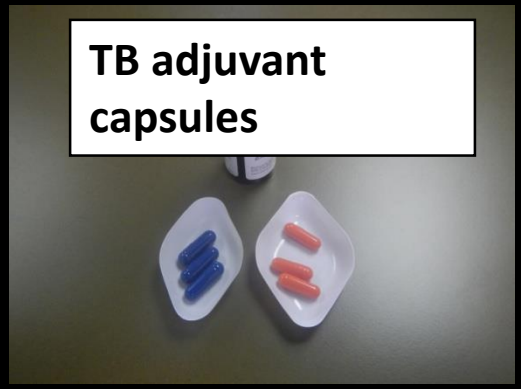
Wrinkle cream

Even skin tone cream

Blackhead removal cream

Acne cream

Oral rinse



TB adjuvant capsules

SPF cream

Case Study 1: Lead with SPECIFIC community

- *Greyia radlkoferi* & *Greyia flanaganii*
- Indigenous South African species
- Endemic to Eastern Cape region

- Ndabakazi community was identified as local community
- Tribal community and authentic tribal leader was identified: Chief of Ndabakazi

First meeting: Introduction and briefing on the project

- Chief and tribal headmen present
- Members of DST and Bioprospecting Flagship project

Second meeting: Q & A session with community and signing of MTA and

Third meeting: Commencement of royalty negotiations between UP and Ndabakazi



- Negotiat[illegible]n discussed betweer[illegible]s

DEPARTMENT:
WATER AND ENVIRONMENTAL AFFAIRS
REPUBLIC OF SOUTH AFRICA

Permit No. BP 0015

BIOPROSPECTING PERMIT

(Issued in terms of the Regulation 11 of the Bioprospecting, Access and Benefit Sharing Regulations under the provisions of the National Environmental Management: Biodiversity Act 2004, Act 10 of 2004)

NAME OF ISSUING AUTHORITY

Name: DG (Director-General) (Acting)
Address: Environment House
473 Steve Biko Road,
Arcadia, pta, 0001

1. DETAILS OF PERMIT HOLDER

Name: University OF Pretoria	ID/Passport No.: 5812080270187
Surname: Prof. B Wingfield	E-mail: namrita.lall@up.ac.za
Tel./Cell No. 012 420 2524	Fax: 012 362 5099
Postal Address: University OF Pretoria, Dept. OF Plant Sciences, office 3-39, Plant Science Comp	
Residential Address:	
Name and ID No./Passport No. of person in charge of Bioprospecting *(if different from permitholder)*.	Prof. Namrita Lall 6807100115189

2. DETAILS OF OTHER APPLICANTS *(IF APPLICATION WAS A JOINT APPLICATION)*

Name:	ID/Passport No.:
Surname:	E-mail:
Tel./Cell No. Not Applicable	Fax:
Postal Address:	
~~Residential Address:~~	

3. NATURE OF PERMIT

THIS PERMIT AUTHORISES THE PERMIT HOLDER TO USE THE FOLLOWING INDIGENOUS BIOLOGICAL RESOURCES FOR THE PURPOSES OF BIOPROSPECTING IN THE QUANTITIES SPECIFIED AND COLLECT THE INDIGENOUS BIOLOGICAL RESOURCES IN THE AREAS SET OUT BELOW:

Type of organism	Family, genus or species (scientific and common names) (If possible)	Part of organism to be collected	Quantity	Full locality data (GIS readings if possible)
EXAMPLE: *PLANT*	*ALOE FEROX*	*LEAVES*	*6 kg*	*HEIDELBERG AREA*
Plant	Greyia flanaganii	leaves and petioles	210kg	Plot 23 Boekenhoutskloof Cullinan; Mothong trust Section J Mamelodi West, University of Pretoria LC de Villiers experimental farm; ARC and Ndabakazi EC

4. PERMIT VALIDATION

PERIOD OF VALIDITY From: 17 June 2015 To: 16 June 2020 Application Reference No.: BABS/001714P

5. BENEFIT SHARING AGREEMENTS AND MATERIALS TRANSFER AGREEMENTS

THIS PERMIT MUST BE READ WITH THE FOLLOWING BENEFIT SHARING AGREEMENTS AND MATERIAL TRANSFER AGREEMENTS ENTERED INTO WITH STAKEHOLDERS ENVISAGED IN SECTION 82(1) OF THE BIODIVERSITY ACT.

four BSA's and MTA's Concluded between University OF Pretoria and Mothong Trust, ARC, Afriflowers and Ndabakazi Community

DEPT. VAN OMGEWINGSAKE
PRIVAATSAK / PRIVATE BAG X 447
Date Stamp
2015 -06- 17
PRETORIA 0001
DEPT. OF ENVIRONMENTAL AFFAIRS

SIGNATURE OF THE ISSUING OFFICER

If insufficient space is provided in this permit, additional information may be included by way of annexures.

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WATER AND ENVIRONMENTAL AFFAIRS
REPUBLIC OF SOUTH AFRICA

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PERIOD OF VALIDITY From: 17 June 2015 To: 16 June 2020 Application Reference No.: BABS/000613P

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Patented/ challenges

- Potential licensee has been identified.
- Negotiation for licensing out is underway.

- Percentage royality for the community has not been decided.

- Main challenge : manufacturer and formulator will need permit.

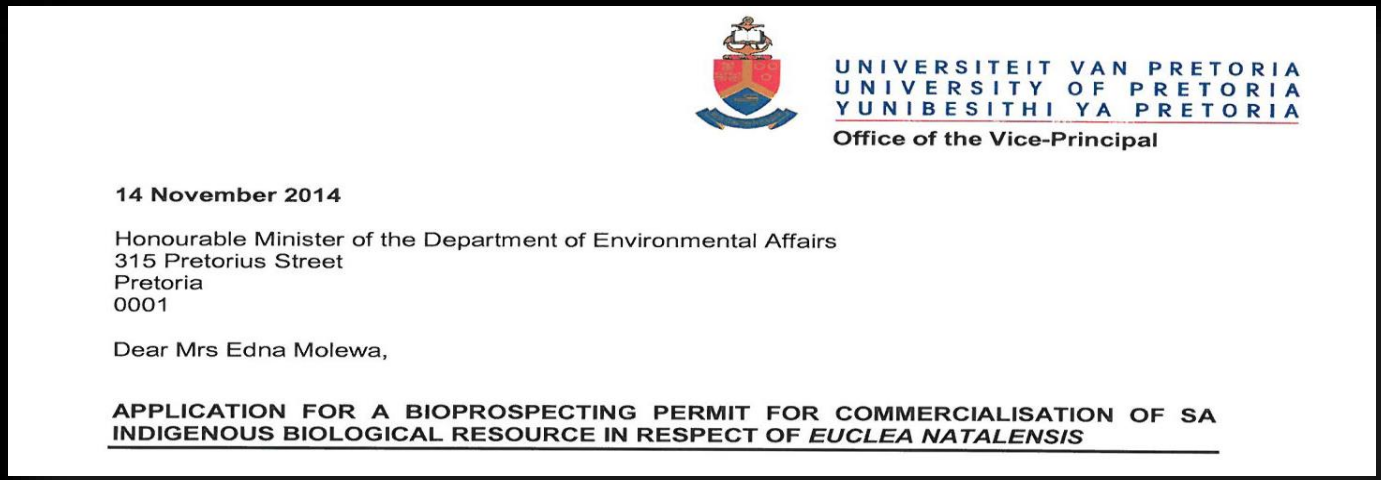
- The permit for UP will expire.
- No royality for the community if the product is not sold.

Case Study 2: Leads with VARIOUS communities

- *Leucosidea sericea*, *Myrsine africana*, *Heteropyxis natalensis*, *Euclea natalensis* & *Helichrysum odoratissimum*
- All these leads are used by a number of communities
  - i.e Venda, Zulu, Tsonga
  - Outlined in literature searches and internet searches
- Who are the indigenous knowledge holders in this case?

Case Study 2: Step 1

- DEA was contacted to inform them of the problem of various communities using the leads for a number of different uses
- Letter was directed to the Minister of Environmental Affairs, identifying the problem of selecting a community



UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA
Office of the Vice-Principal

14 November 2014

Honourable Minister of the Department of Environmental Affairs
315 Pretorius Street
Pretoria
0001

Dear Mrs Edna Molewa,

APPLICATION FOR A BIOPROSPECTING PERMIT FOR COMMERCIALISATION OF SA INDIGENOUS BIOLOGICAL RESOURCE IN RESPECT OF *EUCLEA NATALENSIS*

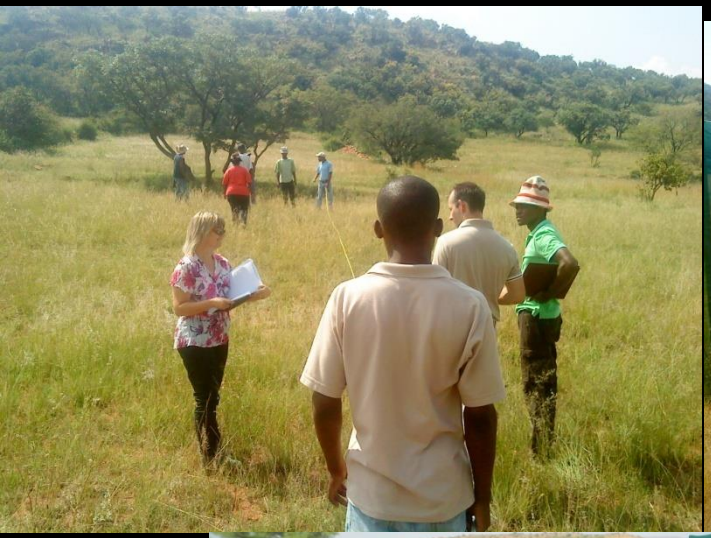
Case Study 2: Step 2

- The application included a document requesting the Minister to hold any monetary benefits in trust and once a community was identified they would be reimbursed

- Application also underwent public participation
  - Newspapers
  - Government gazettes
  - Magazines

- Any community with claim to the traditional knowledge would then be able to benefit
  - Approximately 30 days after publication in gazette

- Leads with no claim to traditional use
  - Permits granted
  - Benefits paid into Bioprospecting Trust and distributed accordingly




ENGADINI
VEGETABLE,HERB
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Cultivation of medicinal plants

science
& technology
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Mothong

Problems with permit applications

- Lengthy process
  - i.e. *Greyia radlkoferi* submitted 2013 and granted only in 2015
  - Public participation
  - Negotiations of monetary benefits due to legal processes

- Length of permit grants
  - Licensing of technologies for manufacturing of extracts take time and permits only last 5 years
  - Researchers apply for permits and realise that manufacturers actually need the permits to produce products

More questions arising from project

- Who needs to acquire permits?
  - Do researchers need to apply for permits if they are going to license out to manufacturers and formulators?
  - Can permits be transferred from researchers to manufacturers provided that they follow conditions thereof
  - Are permits required by manufacturers and formulators different as they will trade the biological resources?

Patented/ challenges

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- Negotiation for licensing out is underway.

- Percentage royality for the community has not been decided.

- Main challenge : manufacturer and formulator will need permit.

- The permit for UP will expire.
- No royality for the community if the product is not sold.

Recommendations based on experience

- Applicants for permits should be told whether they need to apply directly or the manufacturers and formulators should apply

- Permits should take into account lengthy periods of time it takes to negotiate royalties and licensing of technologies to possible manufacturers

Thank you for your Attention