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

Cosmeceutical

- Wrinkle
- Skin hyper-pigmentation
- Hydration
- Periodontal disease
- Acne

Pharmaceuticals

- Tuberculosis/hepatoprotective
- Cancer/SPF
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

Initial | 14 Days: | 28 Days:

![Image of skin condition before and after treatment]
• Inhibition of tyrosinase 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**

<table>
<thead>
<tr>
<th>Sample</th>
<th>IC(_{50}) µg/ml</th>
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<tbody>
<tr>
<td>LEUCOCLEAR</td>
<td>2.07</td>
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**IC\(_{50}\) values of LEUCOCLEAR as compared to positive control Vit C**
Prototypes that may one day reach market

- Wrinkle cream
- Even skin tone cream
- Oral rinse
- TB adjuvant capsules
- Blackhead removal cream
- Acne cream
- 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 BSA documents

- Plant was identified for use against eczema, a skin condition
- Some healers were reluctant to discuss the use
- Other traditional uses included:
  - Preventing diarrhea and vomiting
  - Aromatic
  - Gastroenteritis
Third meeting: Commencement of royalty negotiations between UP and Ndabakazi

- Negotiation of percentage royalty was discussed.
- Royalty from sales of commercialized extract and final products will be paid to Ndabakazi.
- BSA includes non-monetary benefits also.
- Negotiation on percentage royalty was then discussed between both parties legal representatives.
Current status:
• Permit for Greyia radlkoferi and Greyia flanaganii have been granted
• Granted permits include conditions outlined by DEA
• Commercialization must follow the conditions outlined in the permit
Patented/ challenges

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

- Percentage royalty for the community has not been decided.

- Main challenge: manufacturer and formulator will need permit.

- The permit for UP will expire.
- No royalty 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.

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14 November 2014

Honourable Minister of the Department of Environmental Affairs
315 Pretorius Street
Pretoria
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Dear Mrs Edna Molewa,

APPLICATION FOR A BIOPROSPECTING PERMIT FOR COMMERCIALISATION OF SA INDIGENOUS BIOLOGICAL RESOURCE IN RESPECT OF *EUCLÉA 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
Cultivation of medicinal plants
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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• Main challenge: manufacturer and formulator will need permit.

• The permit for UP will expire.
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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