Reverse Pharmacognosy: A Novel Strategy to Standardise ISM Drugs

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Presentation

- Why-Novel Strategy?
- What is Reverse Pharmacognosy?
- How do it?
  - FRLHT's Approach

Why A New Strategy?

ISM & Western Biomedicine are

TWO DIFFERENT KNOWLEDGE-SYSTEMS
THAT HAVE EVOLVED INDEPENDENTLY

….TWO DIFFERENT WAYS OF KNOWING

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Epistemology: TK is Eco-system based

Level of Use & Familiarity helps in correlation of purpose & standard

Purpose (Context)-Parameter-Standards

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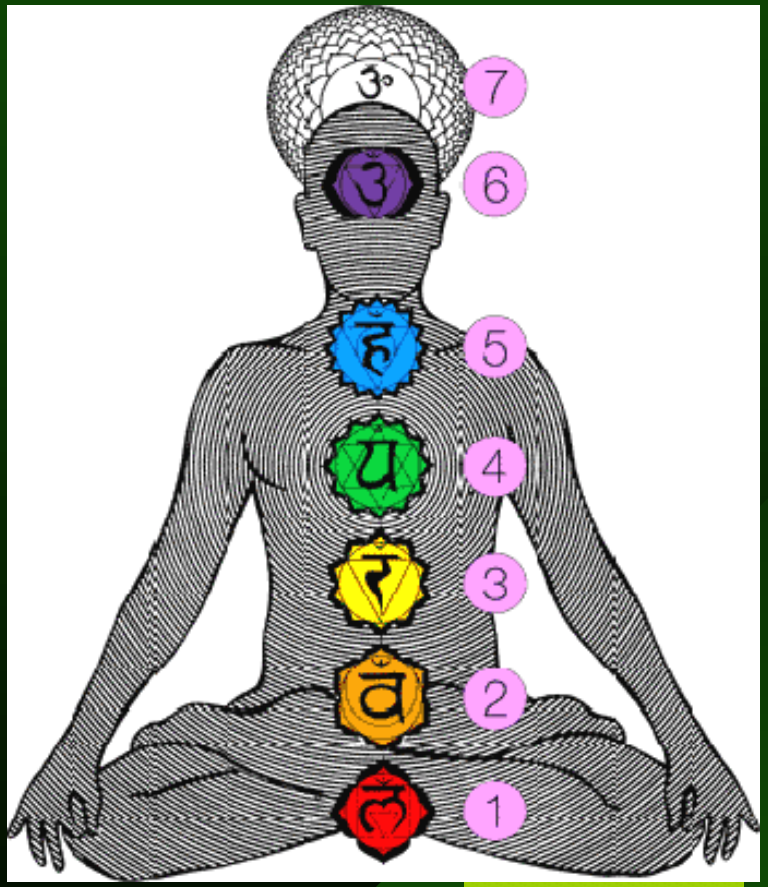
Current QS of ISM Drugs…

- Parameters & Standards are Non-contextual to the culture from which it evolved
- Do not reflect safety & efficacy; but at best identity, purity
- While Traditionally identity, safety and efficacy were an integral part of Drug Property (*Dravya guna*)



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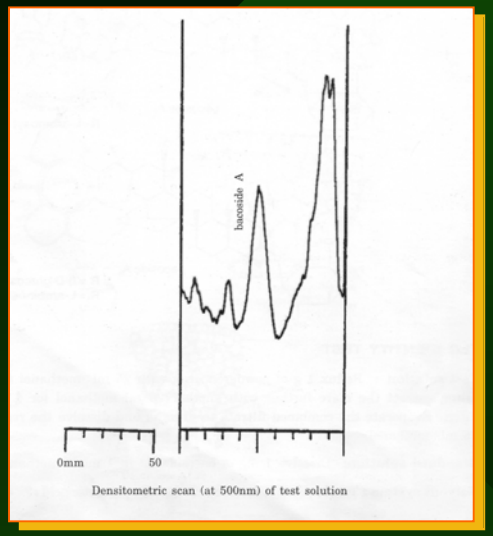
Parallel Systems of Knowledge with no dialogue

Bacopa monnieri (Brahmi)

Modern



Bacoside A (2.5 - 3 %), Bacoside B and other bacosides, Hersaponin, Betulic acid, Monnierin, Alkaloids - Brahmine (0.01-0.02 %) and Herpestine; Flavonoids; Saponin, D-mannitol, Nicotine, Saponins-Monierin . Sapogenins-Bacogenin A1-A4 . Bacosine

? ?

Ayurvedic

Rasa : Tikta Kasaya

Guna : Laghu, Sara

Virya : Sita

Vipaka : Madhura

Karma : V Kara, rasayana, medhya..

Varied Uses

Fever, Anaemia, Inflammation, Diabetes, Psychiatric disorders

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Our approach in Standardisation today…

Some ‘Phytomedicines’ that have ‘failed’ in modern times

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Non-Contextual Usage

Plant	Traditional Use	Recommendation	Modern use	Practice	Adverse Effects
Ephedra sinica	Asthma, cold	Under supervision, as a whole herb	Weight loss, Energiser Dietary supplement	Isolated compounds, Synthetic compound, Large dose	Stroke, heart attack
Piper methysticum	Calming	Aqueous preparation	Anxiolytic effect	Acetone/Methanol extract	Hepato-toxicity

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What is Reverse Pharmacognosy?

Pharmacognosy guided by Traditional Knowledge

Developing Contemporary Standards based on Traditional Advice, Parameters and tools

Factors Acknowledged by ISM

(What?) Identity of Ingredients

(When? Where from) Collection

(How? How long?) Processing & Storage

(For What?.... The Purpose)

Quality Standards

Diagnosis of the ailment

Constitution of Patient

Administration of the Drug

Who to? How? How much? How long?

Efficacy

Traditional Recommendations- General

Plant parts	Season of collection
Branches and leaves	Rainy (*Varsha*) and Spring (*Vasantha*)
Roots	Summer (*Greeshma*) or Late winter (*Shishira*)
Bark, Rhizome, Sap	Autumn (*Sharad*)
Heart wood	Early winter (*Hemantha*)
Flowers and fruits	As per Season

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Traditional Recommendations- Specific

Factor	Plant	Recommendation
Identity	*Vidanga (Embelia ribes)*	Chitra tandula, Kapaali
Collection	*Haridra (Curcuma longa)*	Collection at night
Processing	*Pippali (Piper longum)*	Should be boiled in milk (Kshirapaka)
Storage	*Vidanga (Embelia ribes)*	Should be used after storing for 1 year

Abhava Pratinidhi Dravya

Concept of Legitimate Drug Substitution

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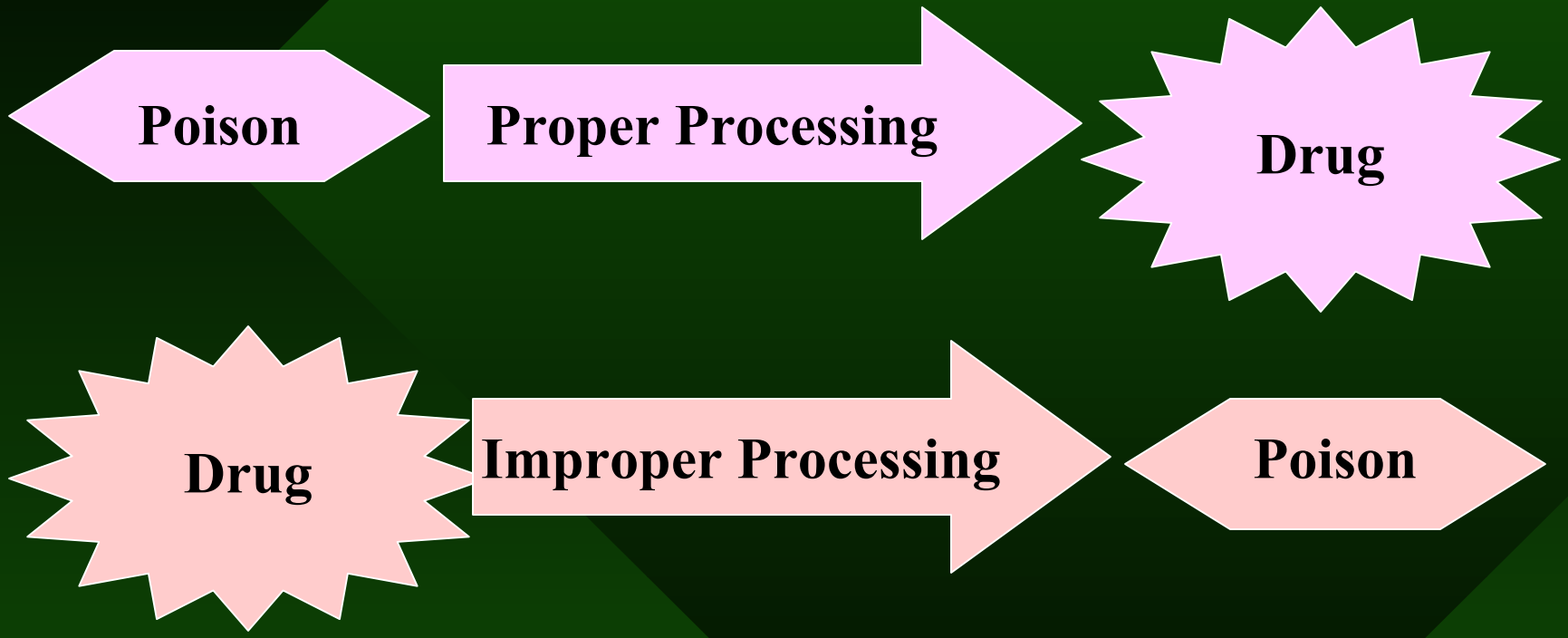
Importance of Processing



Yogadapi visham teekshnam uttamam bheshajam bhavet, bheshajam chapi duryuktam teekshnam sampadyate visham

(Cha. Su. 1.26)

Effect of Processing

- Rice- Uncooked- Very Heavy
- Cooked rice- Cooked with water- Comparatively light
- Kanji- Cooked with abundant water- light
- Puffed paddy-V.light

The changes in property of rice with cooking (Cha. Su.28. 271)

Tea Picking

- Picking early Spring & summer
- Hand pick only the top three leaves
- Put no pressure on the leaves in the basket
- Start processing promptly

Quality varies if long leaves are picked as opposed to young leaf buds

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We should be investing similarly into each of the TM plants to study their variations, potencies and to state their USPs

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We need RELEVANT Parameters, Protocols & Standards that not only reflect Quality but also Safety & Efficacy…

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Inter-cultural approach

1. Traditional recommendations?
2. Logic behind the recommendations?
3. Traditional quality parameters? How are they measured?
4. How do we make them contemporary and applicable to industry?

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How do it?

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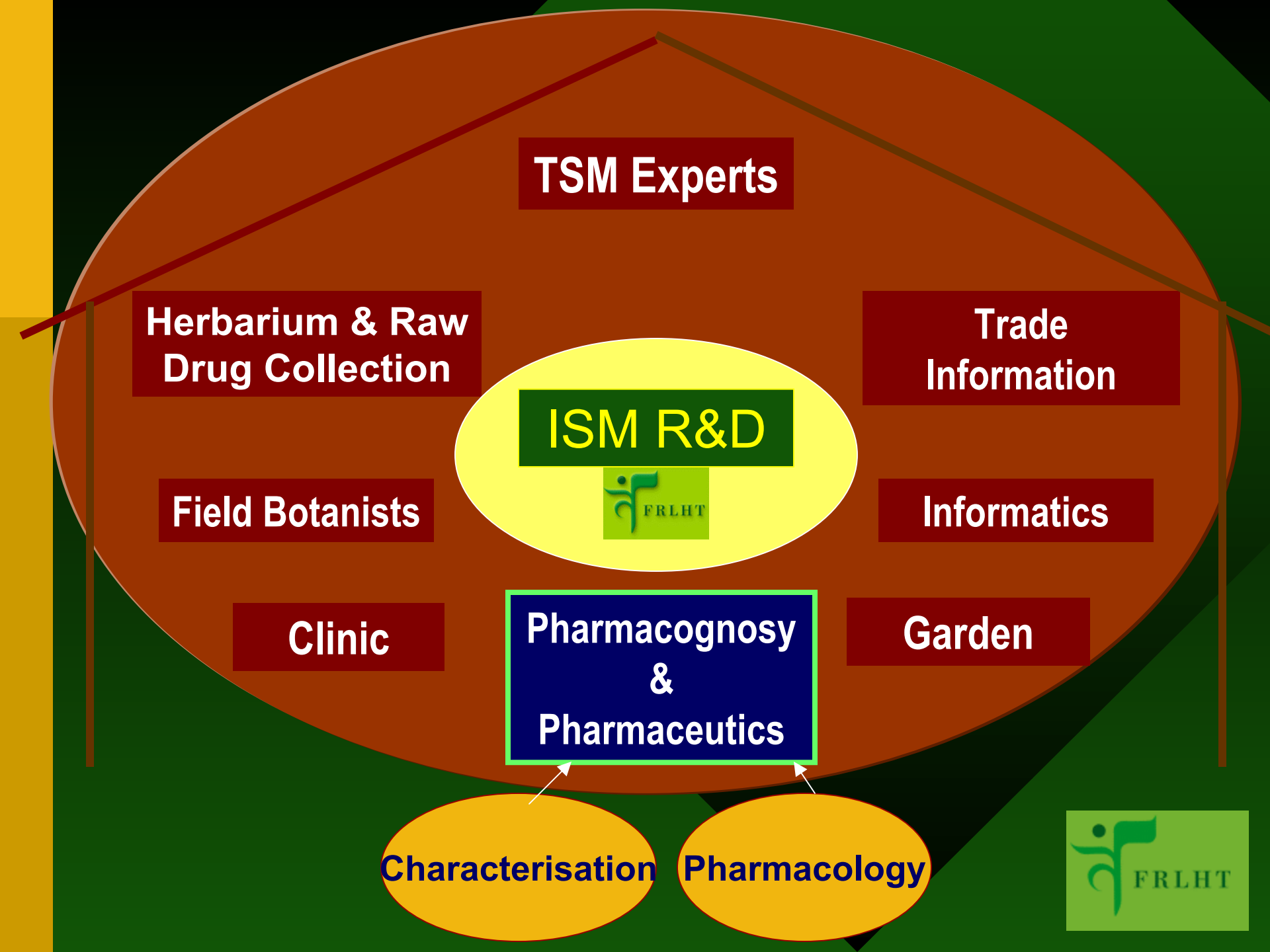
TSM Experts
Herbarium & Raw Drug Collection
Trade Information
ISM R&D
FRLHT
Field Botanists
Informatics
Clinic
Pharmacognosy & Pharmaceutics
Garden
Characterisation
Pharmacology
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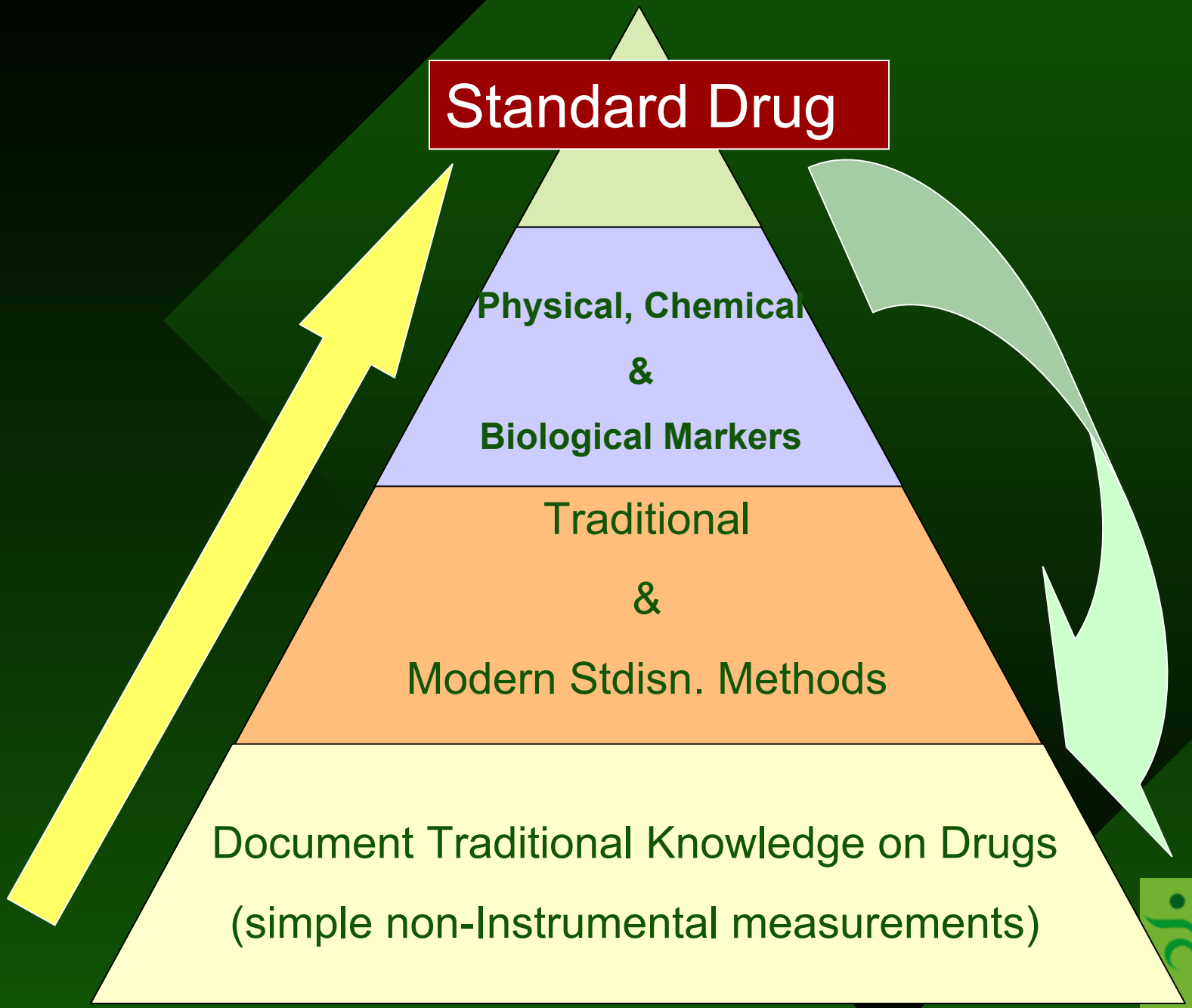
Standard Drug
Physical, Chemical
&
Biological Markers
Traditional
&
Modern Stdisn. Methods
Document Traditional Knowledge on Drugs
(simple non-Instrumental measurements)
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Documentation

From

Texts

&

Traditions

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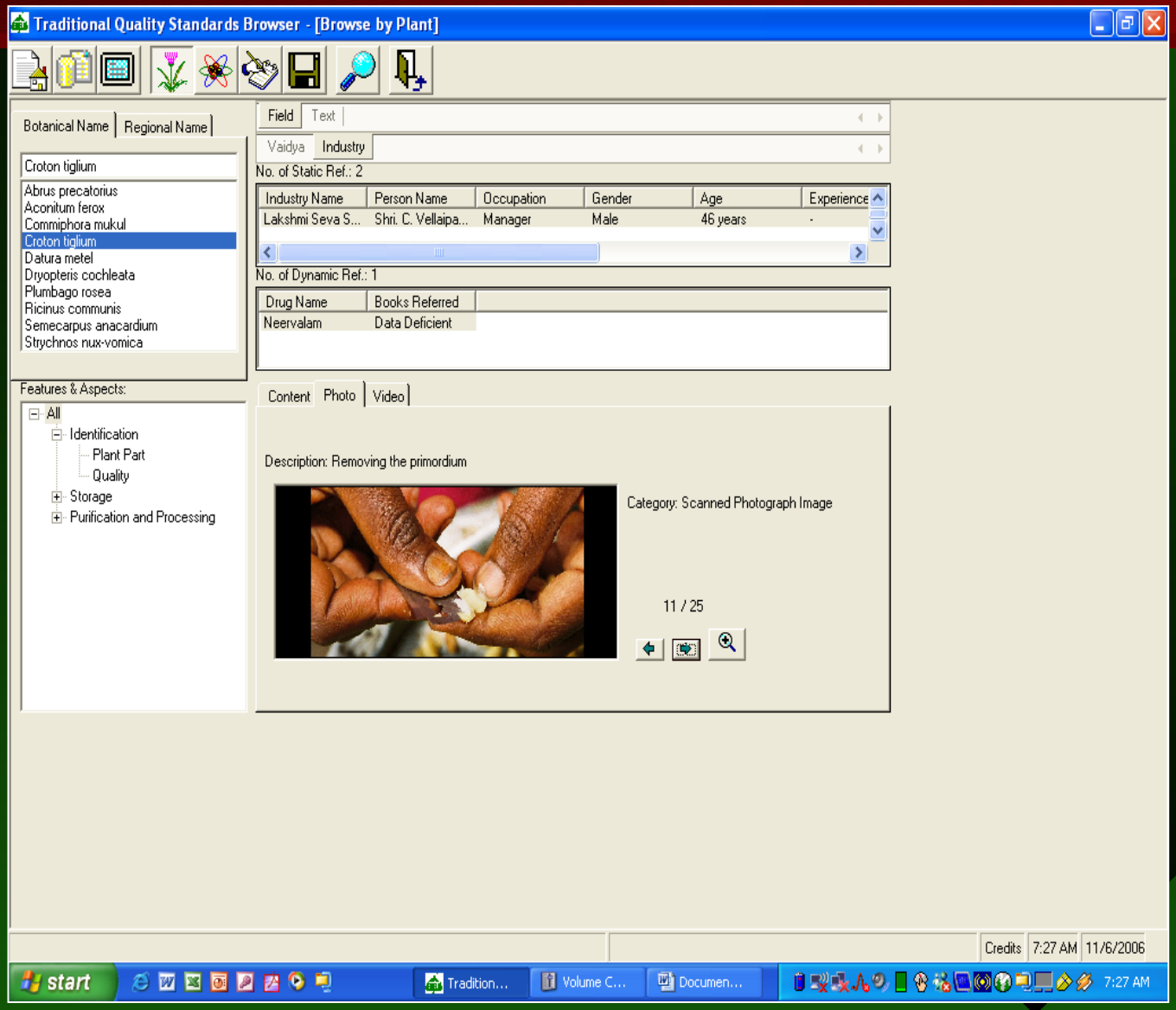
TQS Informatics



Software

to store, retrieve and analyse data

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Develop Relevant Parameters, Methods and Standards

- Sensory Evaluation
- Morphology
- Microscopy
- Chemistry
- Molecular Markers
- Bioactivity

Bio-chemical Standards

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Why Sensory Evaluation for Quality Control?

- Sensory Parameters were used to evaluate quality of *Dravya* (substance) particularly for on-line process control
- It is still the widely accepted, scientific technique for QC in Food & Beverage industries and Perfumeries

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Uniqueness about Human perception

- All five senses-perceived & analysed by ONE instrument-the Human Body
- Cognition adds value—mental processor
- Sensitivity- more sensitive
  - Nose: 0.00025ppm; x1000 times better
- Correlation specific to requirement
  - E.g., unripe & ripe mango-purpose
- Measures characteristic differences

- Subjectivity..reduced by training panel

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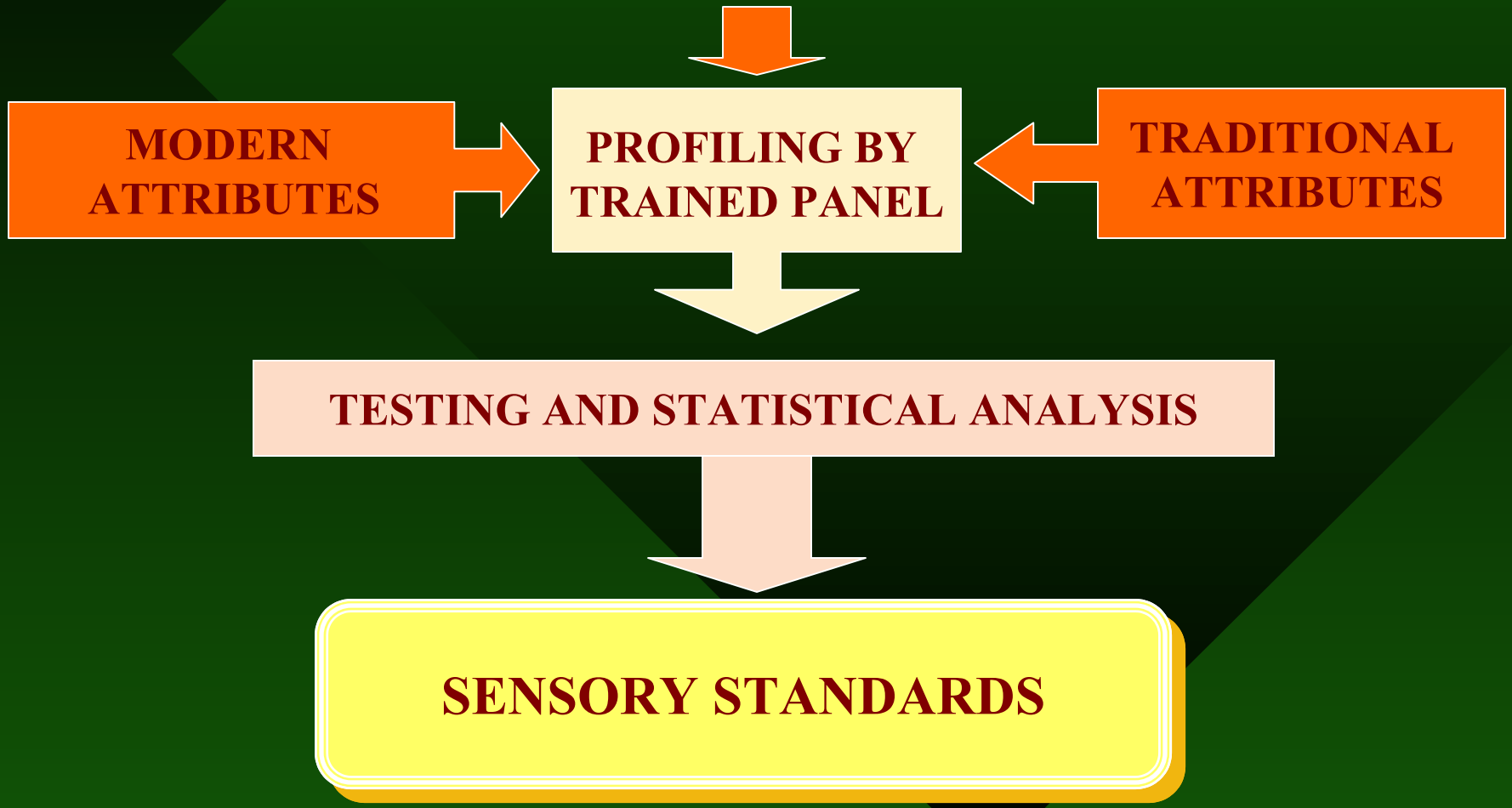
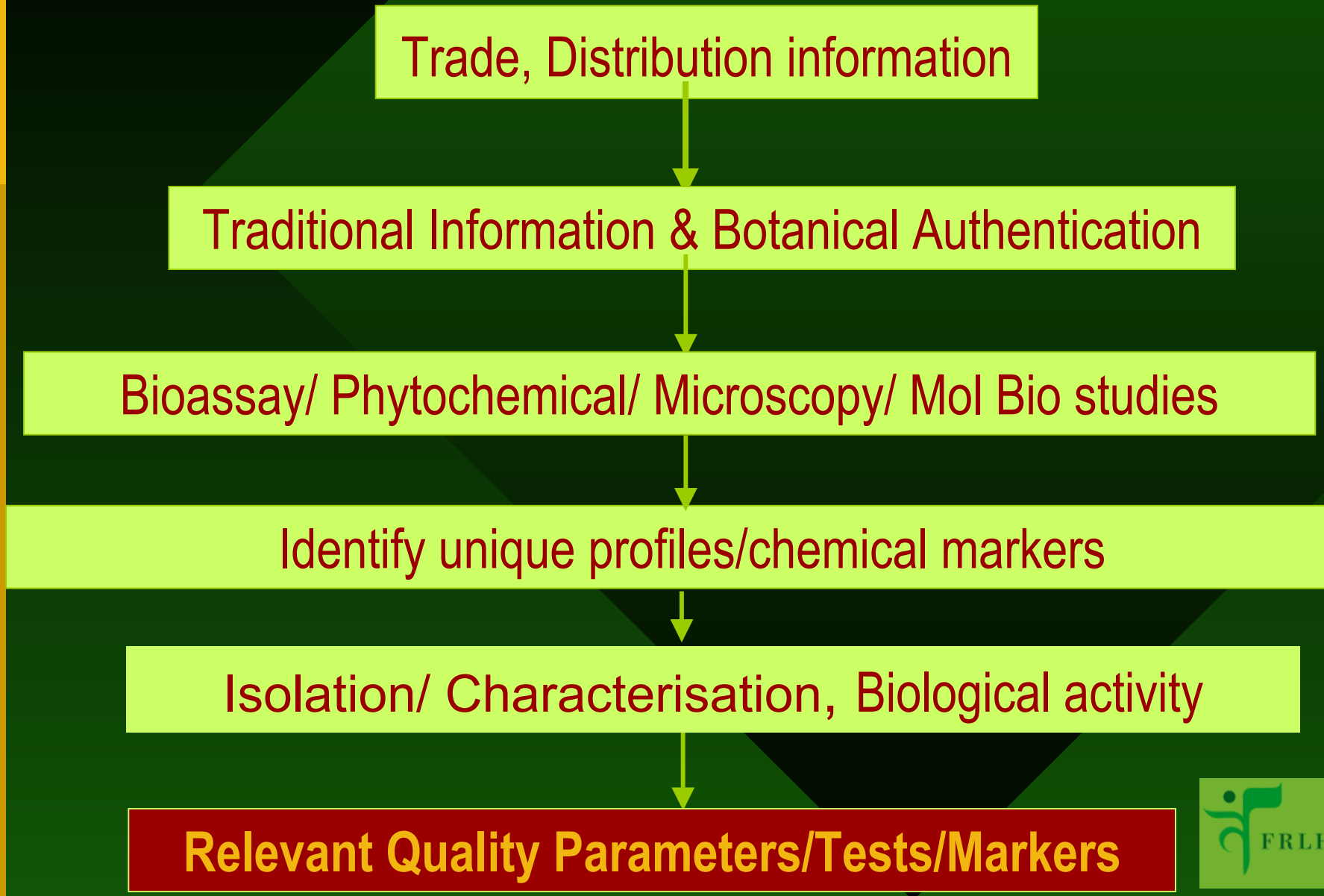
Sensory Analysis

An Important QC tool for ISM Drugs



Bio-Chemical Markers



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Identity….?
Correct Botanical Correlation
Substitutes
Adulterants

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Vidari

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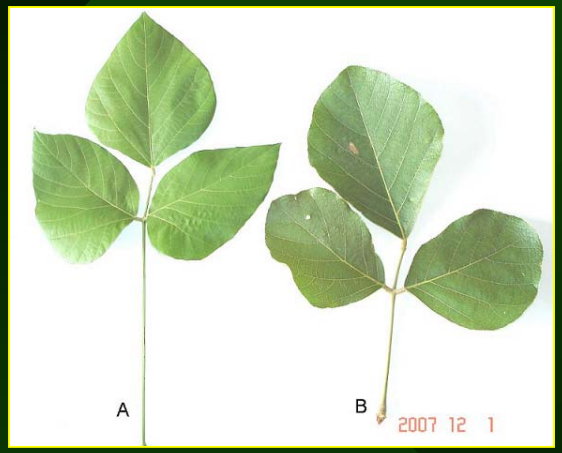
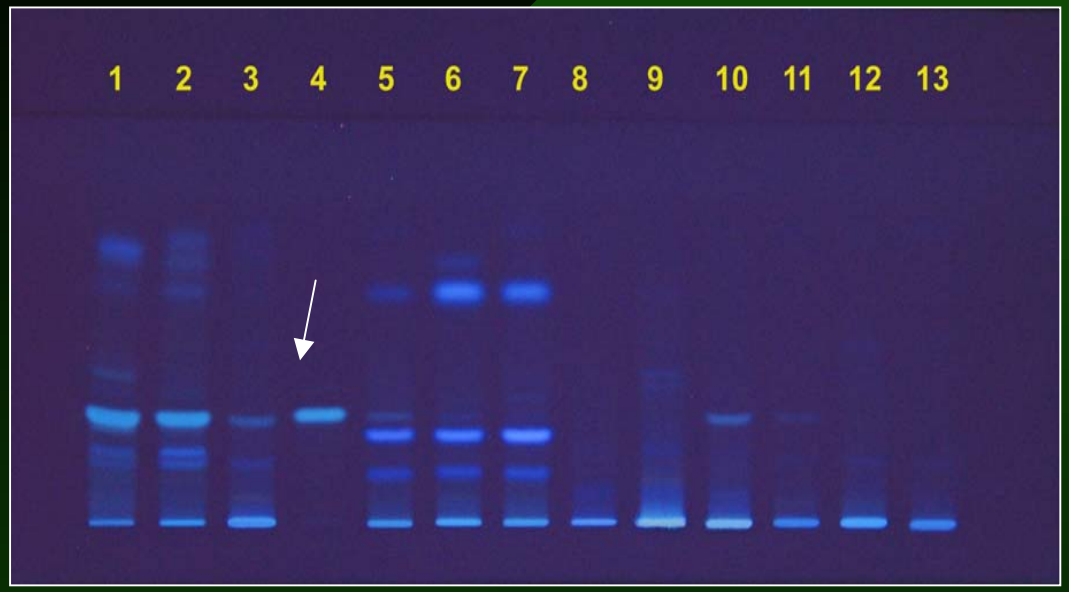
Etymological Analysis of Ayurvedic Synonyms



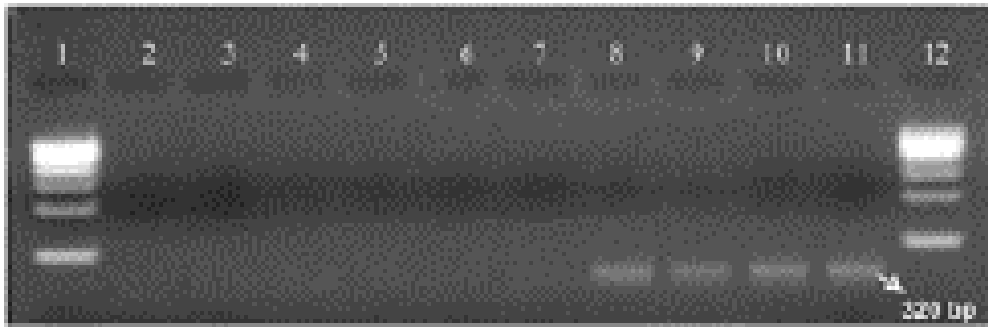
A. *Pueraria tuberosa*
B. *Palasha* (*Butea monosperma*)

Triparni: Three-leaved
Palashparni: Leaves similar to *Palasha*

White tubers of *Pueraria tuberosa* (*Shuklakanda, Sitha*)



TLC of *Pueraria tuberosa*

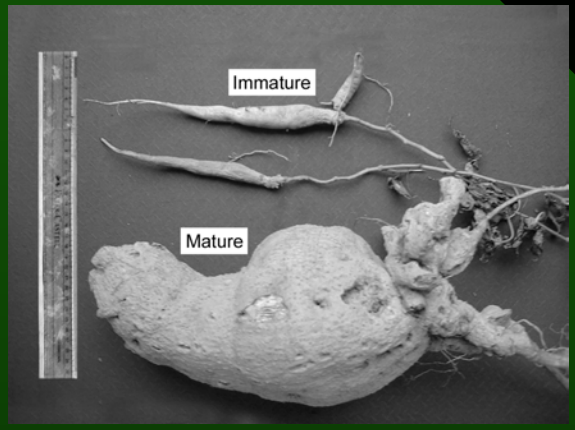


SCAR marker of *Pueraria tuberosa*

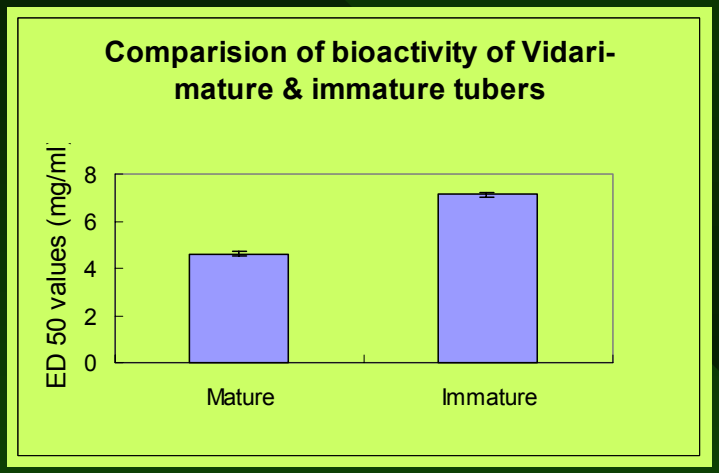
(CURRENT SCIENCE, VOL. 94, NO. 10, 25 MAY 2008)

Collection: Maturity

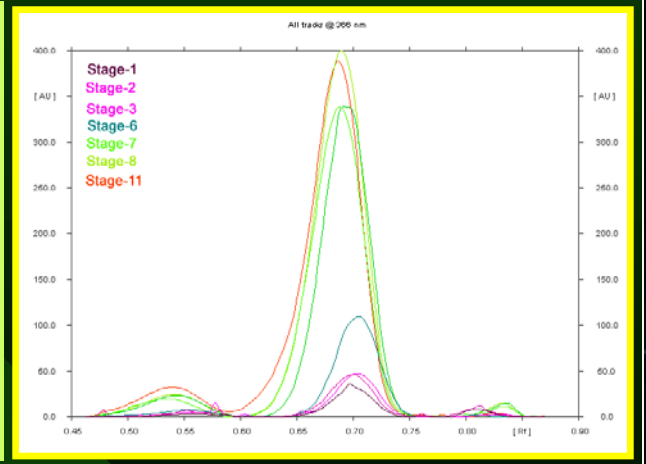
Ipomea mauritiana Jacq. (tuber)



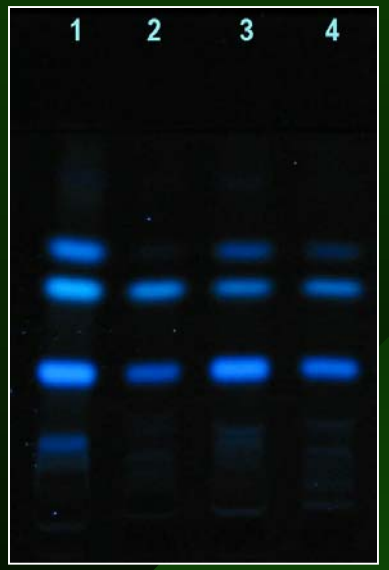
Same Botanical identity but different stages of maturity



Bioactivity



Preliminary HPTLC of tubers @ 366 nm at different maturity stages



TLC @ 366 nm

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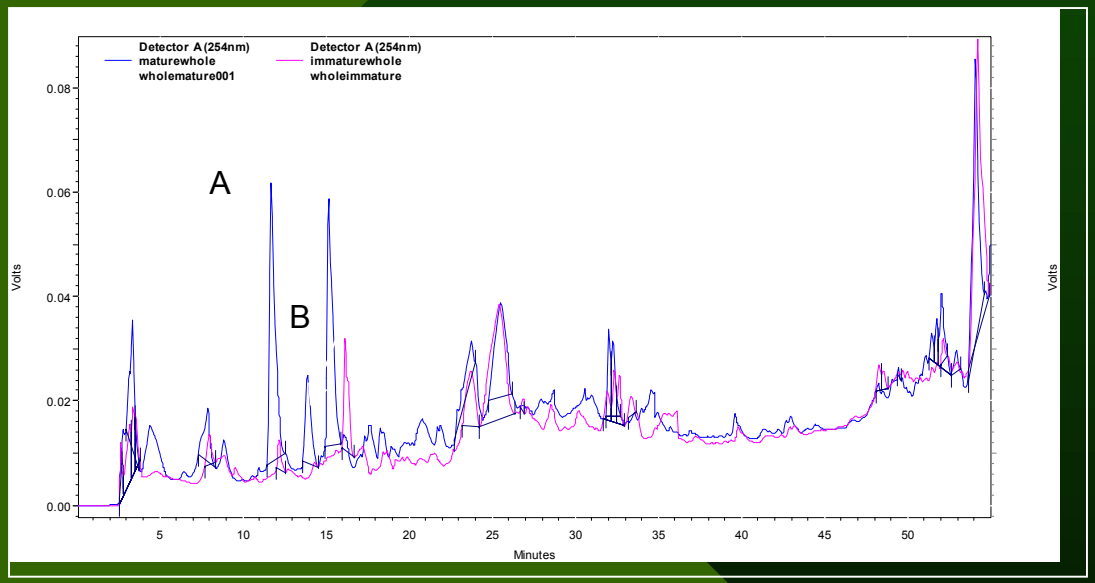
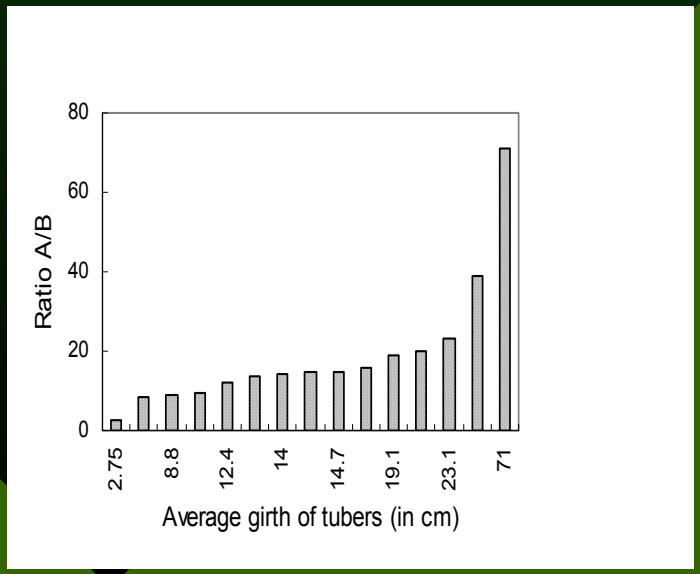
Mature & Immature Tubers

Ipomea mauritiana Jacq.



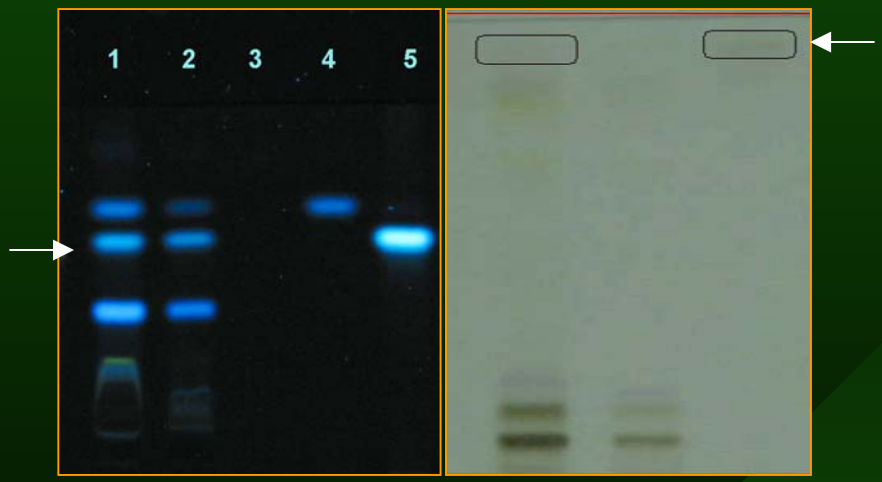
HPLC

Ratio of peaks Vs girth



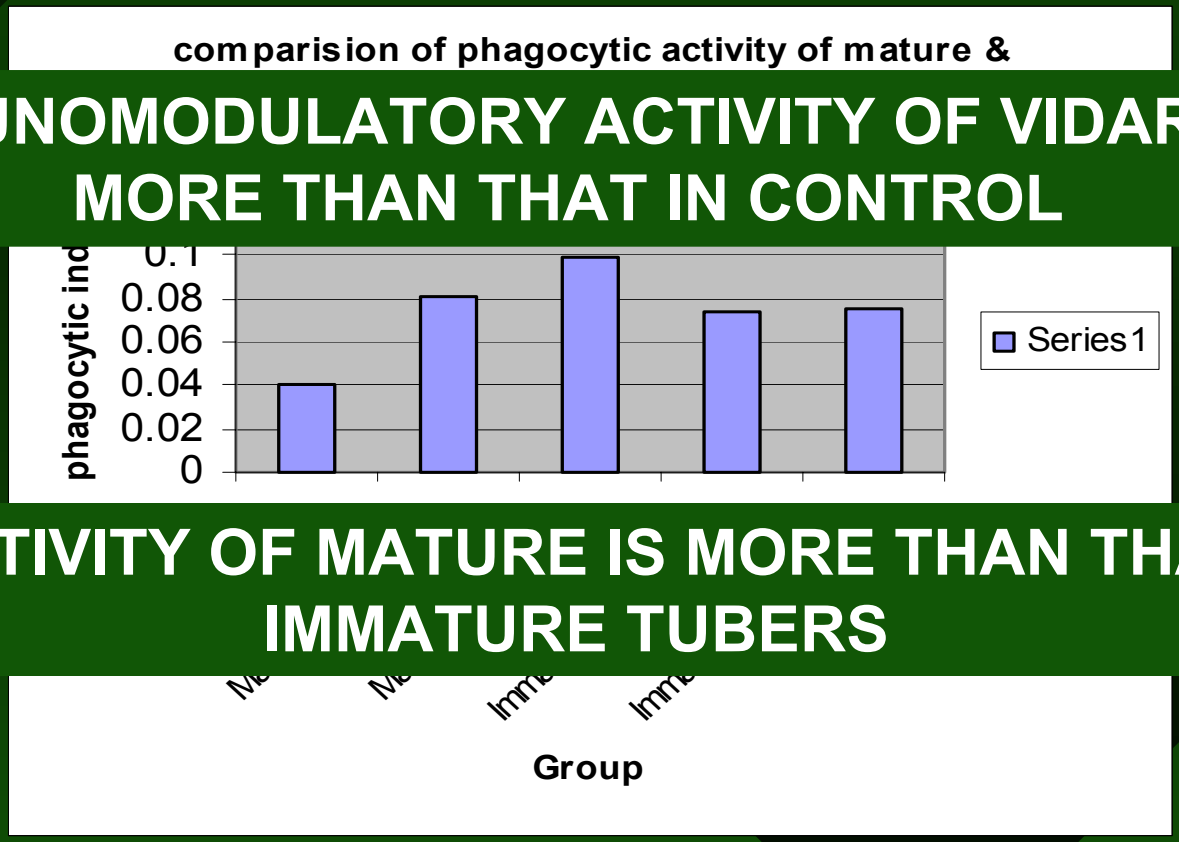
Compounds of interest

- At least 3 compounds- identified that appear to be related to maturity
- Isolation has been completed
- Characterisation is ongoing in collaboration with IISC
- Scopoletin and B-sitosterol seem to be present in both mature & immature
- One compound, may be a plant sterol, significantly higher in mature



ANIMAL STUDIES

Mice model using colloidal Carbon

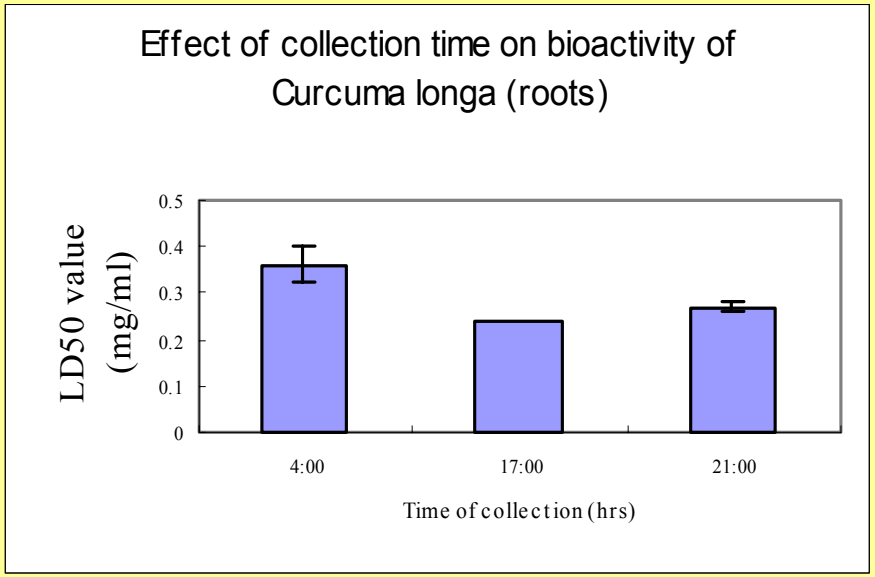


IMMUNOMODULATORY ACTIVITY OF VIDARI IS MORE THAN THAT IN CONTROL

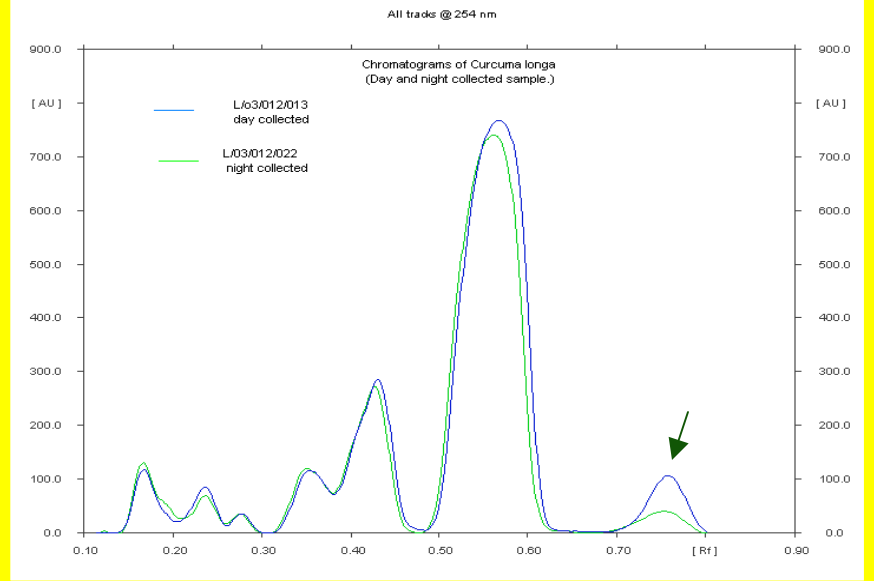
BIOACTIVITY OF MATURE IS MORE THAN THAT OF IMMATURE TUBERS

Day & Night collection of *Curcuma longa* L.

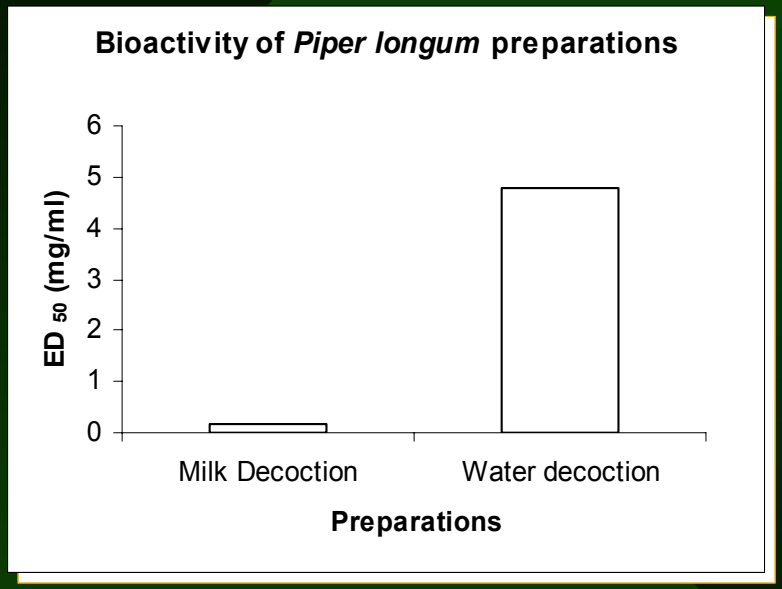
Bioactivity of *C. longa*

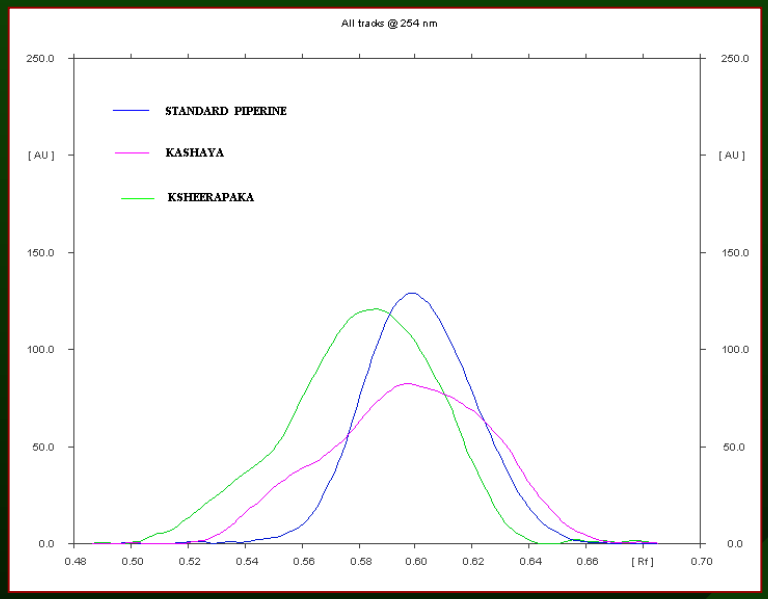


Densitometric scans @ 254nm of *C. longa*



Piper longum L. (fruits)





Bioactivity of water decoction & milk decoction

Samples : water decoction, milk decoction & standard Piperine(0.5µg)

Piperine Extracted

Milk Decoction: 0.17%

Water Decoction: 0.12%

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In conclusion…

Conclusion

- Reverse Pharmacognosy is a contextual strategy to develop relevant standards
- Trans-disciplinary and inter-cultural objective parameters, protocols and standards need to be developed
- Research into TM principles, science and practice in order to understand the recommendations

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Conclusion

Way forward

- Document TQS
- Select Top 100 traded drugs & their TQS
- R&D at 10 Research Partners
- Develop TK based objective methods & standards that not only reflect identity but activity as well, through modern tools
- Convert them to simple parameters & standards possibly non-instrumental

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Challenges…

- Inter-cultural, Inter-disciplinary understanding
- Cost-effective QC Diagnostics for the industry
- Cost-effective Drugs for Consumers

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Thank You!

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