Plant Parts Controlled Vocabulary

Elizabeth Dauncey, PhD

Botanist/Taxonomist

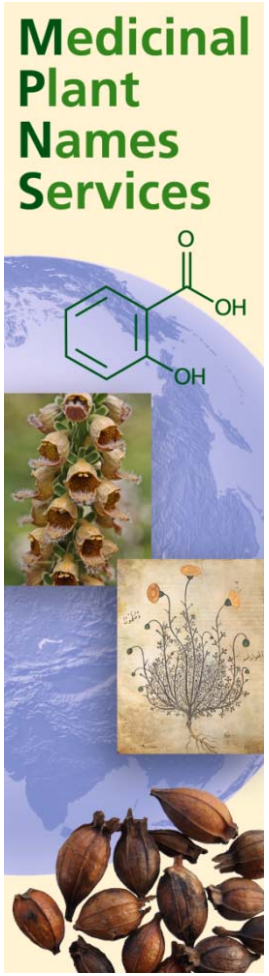
Medicinal Plant Names Services

Royal Botanic Gardens

Kew

e.dauncey@kew.org

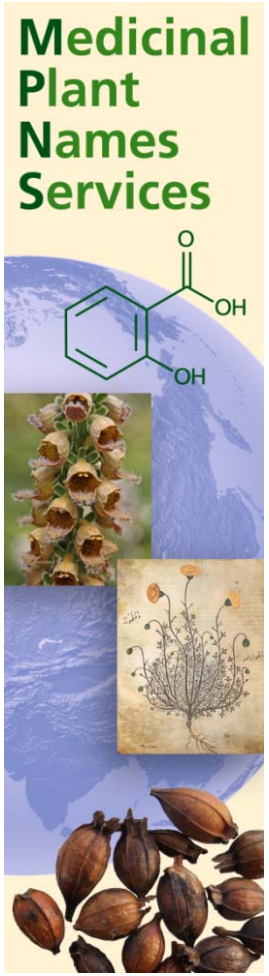
www.kew.org/mpns



Aristolochic acid nephropathy

Stephania tetrandra
han fang ji

Aristolochia fangchi
guang fang ji

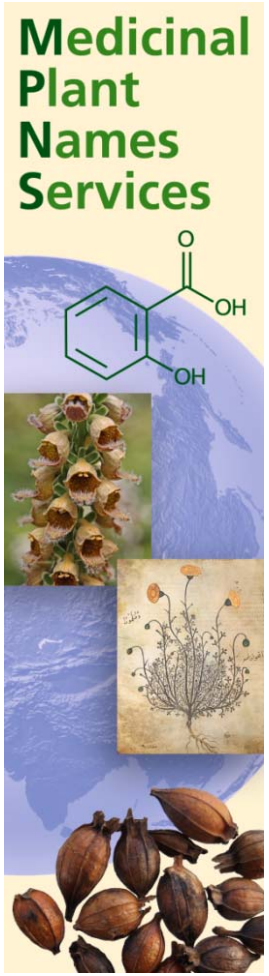


- Confusion caused by their pin yin names lead to ~ 105 cases of renal failure

Medicinal Plant Names Services (MPNS)

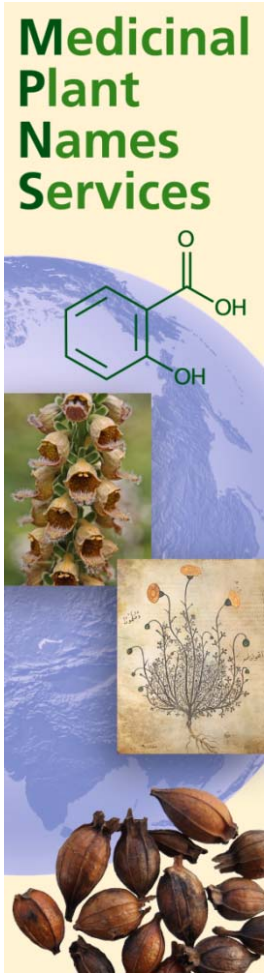
- Kew hosts and manages the major plant names and taxonomy databases
  - e.g. The Plant List
- Created by and for taxonomists and botanists
- Non-scientific names are not included

- Kew's Medicinal Plant Names Services:
  - Builds on these databases
  - Created a global resource for medicinal plant names



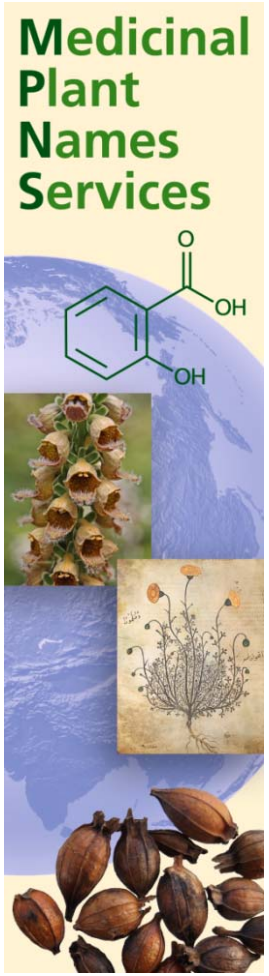
MPNS Resource

- Designed for the health, pharmaceutical, research and regulation communities
- Includes scientific, pharmaceutical, common, and trade names
- From pharmacopoeias, legislation, and other medicinal plant literature
- Mapped onto correctly spelt scientific name and current taxonomy
- Continuously added to and updated



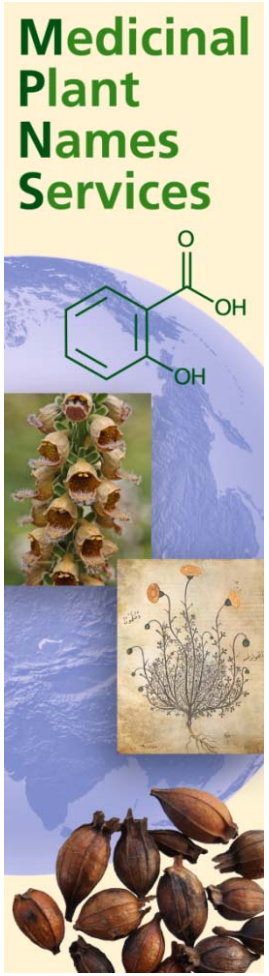
Services

- Online portal – enables individual searches
  - beta version at www.kew.org/mpns
- Validation – clients' lists are verified and enriched
- Machine to machine (API) – clients' systems will access MPNS for updates
- Controlled vocabularies – tailored datasets, e.g. by region or reference
- Consultancies and Guidelines
- Training



Plant Parts

- MPNS has collected plant part details from medicinal plant references
- Examples of their application e.g. in Chinese, European and Ayurvedic pharmacopoeias
- Want to use a standard in MPNS
- Familiar with some existing standards
- Kew's expertise in descriptors and standards

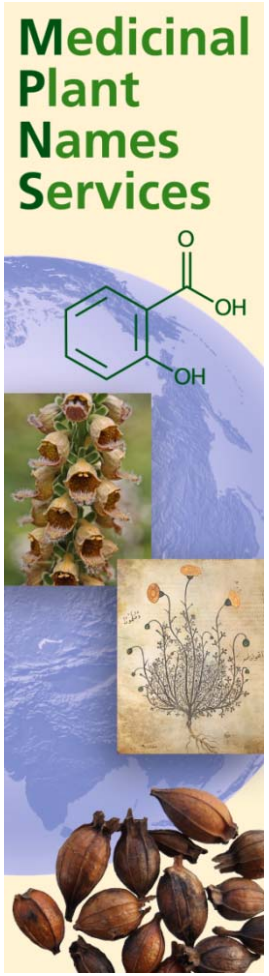


- Beentje, H. (2010). The Kew Plant Glossary: an illustrated dictionary of plant terms. Kew Publishing, Royal Botanic Gardens, Kew.
- Cook, F. (1995). Economic Botany Data Collection Standard – Biodiversity Information Standards (TDWG)

Working Group

- Frank Switzer, Chemist, FDA Substance Registration System
- Maged Sharaf, Chief Science Officer, American Herbal Products Association
- Steven Casper, Ethnobotanist, New Dietary Ingredients Review Team, FDA

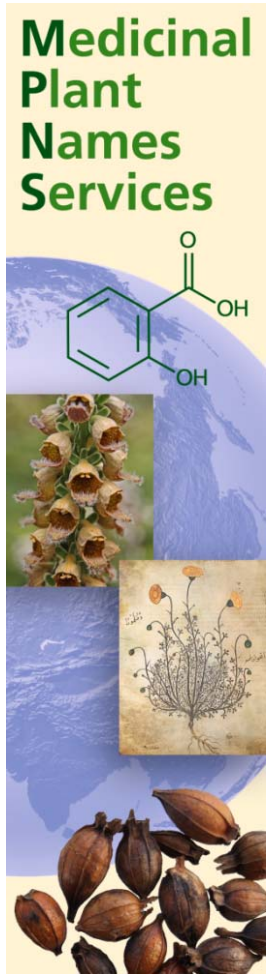
- Vikesh Srivastava and Denis Gingras, Natural Health Products Directorate, Canada
- Larry Callahan, FDA and Noel Southall, NIH/NCATS



Existing Lists

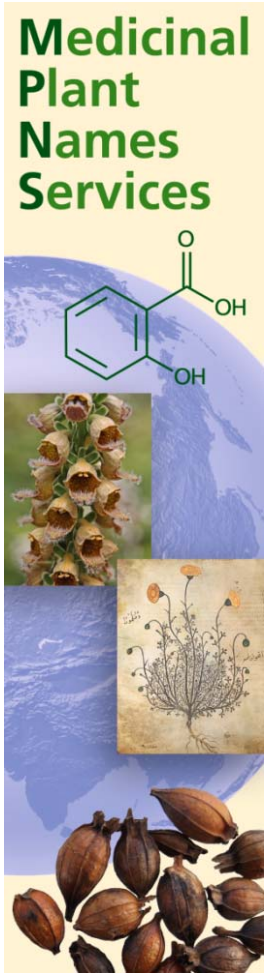
- SRS – FDA Substance Registration System
- NCIt – National Institutes of Health thesaurus
- FDA/EMA (2009)
- Economic Botany – Biodiversity Information Standards (TDWG)
- NHPID – Natural Health Products Ingredients Database, Health Canada

- AGROVOC – Food and Agriculture Organisation (FAO)
- Plant Ontology



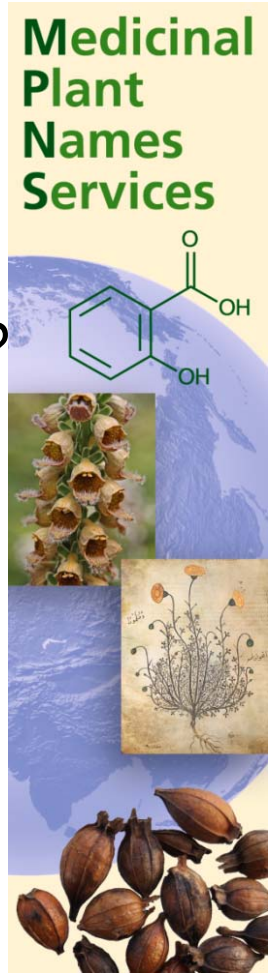
Method

- Existing lists were mapped onto each other
- Possible synonymy/associations suggested
- Definitions gathered; NCIt, FDA/EMA, Kew
- Illustrated with examples from Pharmacopoeia
- Terms excluded:
  - Exudates e.g. resin, gum
  - Processed forms e.g. oil
  - Developmental stages e.g. young
  - Composites e.g. whole, aerial parts
  - Too specific e.g. stoma (stomata)
  - Not plant parts e.g. algae terms such as holdfast



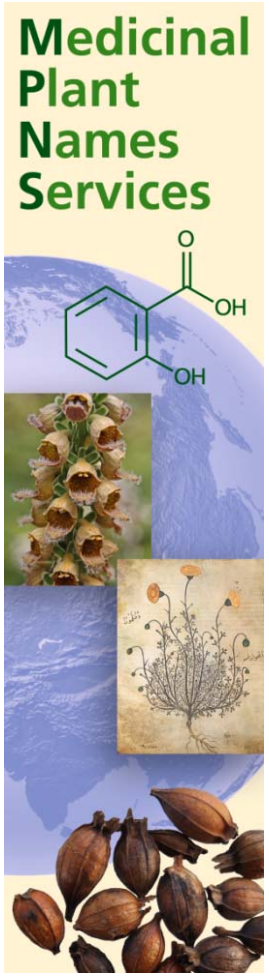
Structure in GInAS

- Agile software development
- <SUBSTANCE_TYPE> STRUCTURALLY_DIVERSE
  - ☒ <SOURCE_CLASS> ORGANISM
    - ☒ <ORGANISM_TYPE> PLANT – Higher plant?
      - <PART_CLASS> FLOWER/FRUIT/LEAF/STEM/ROOT
        - <PART> e.g. Branch
        - <EXUDATE> e.g. Gum
        - <PROCESSED_FORM> e.g. Juice
        - <PART_DEVELOPMENTAL_STAGE>



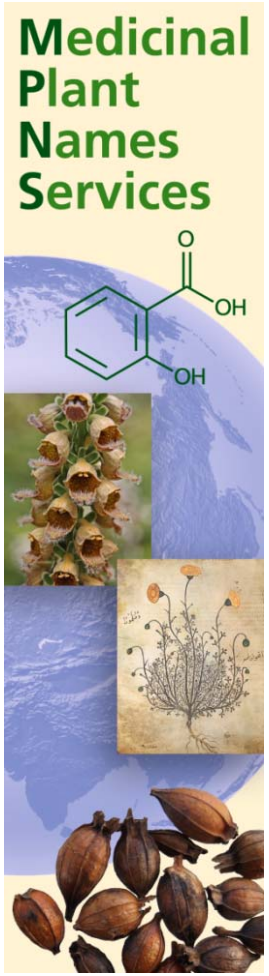
- <SUBSTANCE> fresh material
- <SPECIFIED_SUBSTANCE_LEVEL_1> for any form of processed material, e.g. dried or sliced

- <DEVELOPMENTAL_STAGE> applies to the whole organism, e.g. Flowering
- <PART_DEVELOPMENTAL_STAGE> e.g. Young/Immature
- *Free text description of part(s) used*



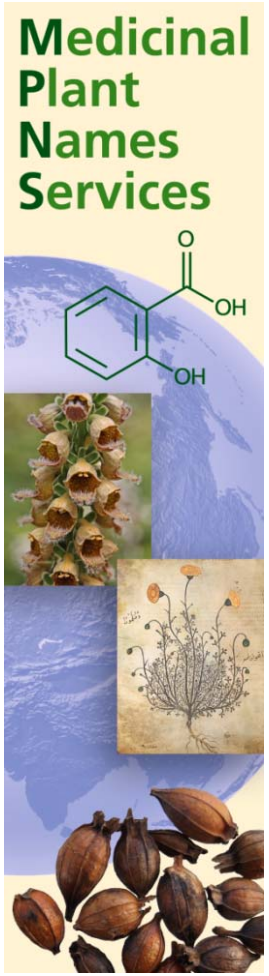
Plant Exudates

- Substance produced naturally by a plant or plant part that does not require extensive processing to be obtained
- Terms include: Balsam, Gel, Gum, Latex, Mucilage, Oleo-resin, Resin, Sap
- HMC calls them ‘Plant Products’
- NHPID treats as ‘Plant Parts’
  - Flower bud resin, Fruit resin, Leaf resin



Processed Form

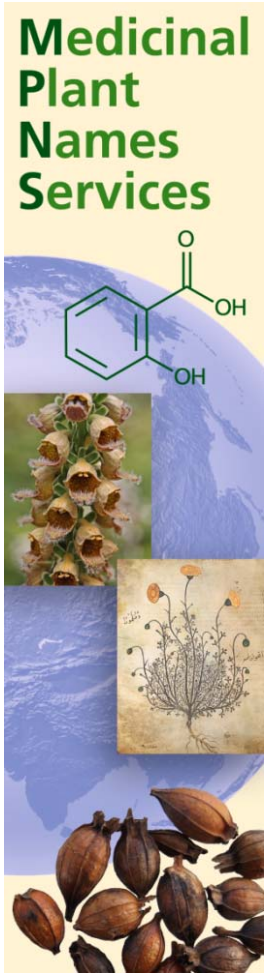
- Plant material that has been subjected to processing e.g. grinding to powder. Examples of processed plant forms are powders, juices, extracts and fractions, but not isolated pure compounds
- Terms include: Fibre, Juice, Oil (Expressed), Oil (Volatile), Pulp, Wax
- HMC calls them ‘Plant Processed Forms’
- NHPID treats Fibre and Pulp (Fruit without juice) as ‘Plant Parts’; and Juice and Oil as ‘Preparations’



Method (2)

- Iterative process, trying different approaches, discussing, refining or reversing decisions
- Teleconferences and email exchanges
- Evolving Excel worksheets

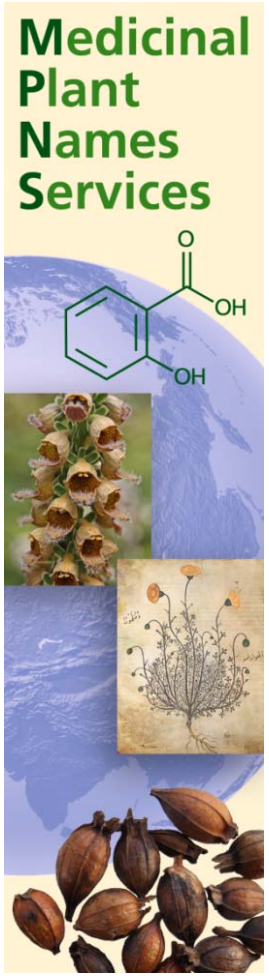
- Main examples of changing ideas
  - Composite terms
  - Stem



Composite terms

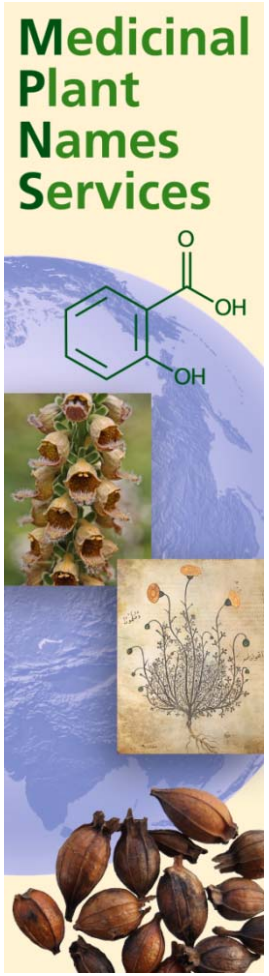
- Whole plant
- Herb
- Flowering tops

- Frequently used in substance definitions
- Considered including in CV
- Aim of CV – to collect details of which plant parts can be used in a medicinal substance
- Composite terms potentially ambiguous
- Rejected from CV – all possible parts have to be specified



Stem

- Mapping existing lists exposed a large number of stem terms
- First approach was to simplify the terminology
  - Twig, Branch, Trunk, etc. all scored as ‘Stem’
- Doesn’t collect enough information
- ‘Stem’ now restricted to herbaceous plants
- Twig, Branch and Trunk for woody plants
- Bulb, Corm, Stolon, Rhizome, Tuber
- ‘peeled/debarked’ and ‘peel/bark’



Next Steps

- c.100 terms
  - 13 Flower
  - 19 Fruit including 8 Seed
  - 9 Leaf
  - 35 Stem
  - 13 Root
- Editing and writing Definitions
- Populating with more examples
- Collecting final comments
- Please ask for a copy!