Medicinal compounds from plants Cheat Sheet

by MJC3 via cheatography.com/212269/cs/46154/

1. Collection & preparation of plant material

1. Collection & preparation of plant material:	**Selecting** the appropriate plant species known for containing the target compound.
	Harvesting the **correct parts** of the plant (leaves, roots, stems, etc) based on the phytochemicals of interest.
	Drying & grinding the plant material to increase surface area for extraction.

Isolating potential drugs from plants involves several systematic steps, dependent on the specific compound/class of compounds

4. Concentration

4.Concentration:	**Evaporating the solvent** (using rotary evaporators) to concentrate the extract, yielding a crude extract that contains a mixture of compounds.

7.Activity testing

7.Activity testing	Assessing the bioactivity of the isolated compounds through pharmacological tests to determine their potential medicinal properties

Poisonous Plants - Aconitine

Diterpene alkaloid obtained from Aconitum species (250 species) aka monkshood & wolfsbane – considered Britain's most toxic plant (an ornamental) Used at one time to treat trigeminal neuralgia (sudden/severe facial pain).

Alkaloid content varies with growth stage Roots previously used for pain relief Roots have been mistaken for horseradish fatalities 5 mg considered enough to kill.

Poisonous Plants - Aconitine (cont)

Aconitine & related structures are complex terpene esters & neurotoxins acting on Na+ channels. No antidote available! Symptoms of poisoning include burning of the mouth & throat, abdominal pain, intense thirst, headache, slow pulse, paralysis, convulsions, delirium & coma. Treatment would be symptomatic.

2. Extraction

2.Extraction	Using **solvents** (e.g., water, ethanol, methanol or hexane) to dissolve the desired compounds. Solvent depends on nature of the compounds (polar vs. non-polar).
	Common extraction method:
Maceration:	Soaking plant material in solvent at room temperature for long period
Percolation:	allowing solvent to pass through the plant material in column-like setup
Soxhlet extraction:	Repeatedly washing the plant material with boiling solvent

2. Extraction (cont)

Repeatedly washing the plant material with boiling solvent

5.Purification

5.Purification:	**Separating** specific compounds from the crude extract using techniques such as:
Chromatography:	column chromatography, thin-layer chromatography (TLC), high-performance liquid chromatography (HPLC) to separate, identify & purify compounds
Crystallisation:	recrystallising desired compound from solution to increase purity
Filtration/distillation:	depending on chemical nature of compounds

3. Filtration

3.Filtration:	Removing solid plant material from the liquid extract using gravity/vacuum filtration

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6.Characterisation

6.Characterisation	Analysing the isolated compounds to confirm their identity & purity using various techniques:	mass spectrometry (MS)
		nuclear magnetic resonance (NMR) spectroscopy
		infrared (IR) spectroscopy

Poisonous Plants

Poisonous plants & fungi may be divided into 3 groups:

Plants that are **undoubtedly toxic** but have medical application in defined doses e.g., Deadly nightshade (Atropa belladonna)

Plants that are **toxic & have no medicinal potential** or not yet realisede.g., Hemlock water-dropwort (aka deadman's fingers) (Oenanthe crocata) – contains oenanthotoxin – a polyyne compound; Death cap (Amanita phalloides) – contains amatoxins (peptides that inhibit RNA polymerase II that converts DNA to mRNA)

Plants & fungi that are toxic **& are abused for their hallucinogenic properties** e.g., nutmeg & liberty cap (Psilocybe species)