GRINDELIA

Grindelia robusta Nutt.

Family

Asteraceae or Compositae (the daisy or sunflower family). There are 40 to 60 species of grindelia throughout North and South America which are not well differentiated and the taxonomy of the genus is not well understood. *Grindelia robusta, camporum* and *humilis* are synonyms for *Grindelia hirsutula*. *Grindelia squarrosa* is its own species.[1]

Parts Used

Herb.

Description

A perennial, or biennial, herb that grows up to one metre high with bright yellow flowers that are sticky to touch. The toothed leaves are light green in a basal rosette.[2,3]

Traditional Use

The genus name Grindelia is derived from the name of the German botanist David Grindel (1766-1836). Commonly called gumweed, or gumplant, grindelia is a traditional medicine of Californian Native Americans such as the Chumash people. The Blackfeet Native Americans refer to grindelia as akspeis which translates to stickyweed. The Native Americans used it to treat bronchial problems as well as skin afflictions of all kinds, including allergic reactions to the poison ivy plant. This plant contains a sap called urushiol which causes severe allergic reactions in case of contact with skin. Grindelia was also used in combination remedies for asthmatic conditions. These remedies also often contained *Lobelia inflata, Euphorbia hirta* (pill bearing spurge) and *Glycyrrhiza glabra* (liquorice). The medicinal value of grindelia was not recognised by the

orthodox practitioners of medicine in the United States until the middle of the 19th century after which it came into prominence as a major medicinal plant. Official recognition of grindelia came with the introduction of the herb in the Pharmacopoeia of the United States from 1882 to about 1926. The British Herbal Pharmacopoeia 1983 lists the specific indication as bronchial asthma with tachycardia. It helps to relieve the wheezing, coughing and bronchial restriction associated with asthma.[4,5,6]

Constituents

Resin containing diterpenoid acids including grindelic acid, phenolic acids, flavonoids, tannins, essential oil and small amounts of saponins. The resins produced by grindelia are similar in chemistry and physical properties to those obtained from pine trees for use in the naval stores industry which collects, processes and markets forest products refined from the oleoresin of the slash pine and longleaf pine trees *(genus Pinus)*. The industry was associated with the maintenance of the wooden ships and sailing tackle of pre-20th century navies, which were caulked and waterproofed using the pitch (or resin, also known as tar) of the pine tree. Resins from various species of grindelia have been patented for use in adhesives, rubber, coatings, textiles and polymers.[7]

Actions

Anti-inflammatory, antispasmodic, spasmolytic, bronchodilator, expectorant, alterative, antibacterial, demulcent, diuretic, hypotensive, sedative, vulnerary.

Pharmacological Activity

There is a dearth of controlled human clinical research assessing the effects of grindelia. *In vitro* and *in vivo* experiments on antibacterial, fungistatic, antispasmodic, antioxidant and anti-inflammatory activity have been conducted on enriched extracts and different constituents within grindelia, including the essential oil, resins, saponins and phenolic acids, but there is a lack of studies on whole plant grindelia. These constituent studies will not be included in this monograph. Caution must be taken in extrapolating these results to human use due to many factors acting upon these processes and this information is regarded as only of tentative relevance to a clinical situation. Simultaneously there is accumulating data that suggests that the synergistic effects of the constituent phytochemicals in plants are accountable for their actions. Despite the absence of data from clinical studies, published literature and information on the use of grindelia, the data on traditional use is considered sufficient. Efficacy is plausible on the basis of long-standing use and experience.[8,9]

Anti-inflammatory Activity

Grindelia showed anti-inflammatory potential in an *in vitro* experiment. A whole plant methanolic extract of grindelia showed up to 4.5-fold inhibition of nitric oxide (NO) production without cytotoxicity in rodent immune system blood cells during inflammatory stimulus. It also significantly reduced the protein levels of inducible NO synthase and cyclooxygenase-2. Fluid in which experimental cells were growing that had been treated with grindelia indicated three to five-fold reduction of tumour necrosis factor-alpha. Grindelia significantly inhibited (by 50%) IL-1beta and IL-12 secretions and also prevented mediated nuclear translocation of nuclear factor-kappaB.[10]

Indications

- Respiratory disorders including asthma, whooping cough, bronchitis, hay fever, upper respiratory catarrh, the common cold
- Heart disease including tachycardia and palpitations
- Bladder and urinary tract infections
- Externally for hot and dry skin conditions especially poison ivy dermatitis

Energetics

Cooling, moistening, pungent, bitter.

Use in Pregnancy

Insufficient reliable information is available so avoid using.

Contraindications

Use with caution for those with acute kidney infections.

Drug Interactions

None known.

Administration and Dosage

Liquid Extract:	1:1
Alcohol:	60%
Weekly Dosage:[11]	10 to 20mL

References

1. Tropicos.org. Missouri Botanical Garden. [Internet] Accessed 10 Feb 2019 Available from <http://www.tropicos.org/Name/2724222>
2. Brown K. Gumweed [Internet]Herbal Roots Zine. August 2016 8:9 [cited 2019 February 27] Available from https://herbmentor.learningherbs.com/articles/kid-stuff/hrz-gumweed/
3. McLaughlin SP. Grindelia. New Crop Factsheet. [Internet] University of Arizona: Office of Arid Land Studies; 1995. [updated 1998 February 24; cited 2019 February 26] Available from https://hort.purdue.edu/newcrop/CropFactSheets/grindelia.html
4. European Medicines Agency, Committee on Herbal Medicinal Products (HMPC). Assessment report on Grindelia robusta Nutt., Grindelia squarrosa (Pursh) Dunal, Grindelia humilis Hook. et Arn., Grindelia camporum Greene, herba [Internet]. London: European Medicines Agency; c1995-2018 [updated 2012 Mar 27;cited 2019 Feb 28]. Available from https://www.ema.europa.eu/en/documents/herbal-report/draft-assessment-report-grindelia-robusta-nutt-grindelia-squarrosa-pursh-dunal-grindelia-humilis_en.pdf
5. Therapeutic Research Center (US). Gumweed [Internet]. Somerville (MA): Natural Medicines; 2019 [reviewed 2018 March 5; cited 2019 February 28]. Available from https://naturalmedicines.therapeuticresearch.com/databases/food,-herbs-supplements/professional.aspx?productid=167
6. Brown K. Gumweed [Internet]Herbal Roots Zine. August 2016 8:9 [cited 2019 February 27] Available from https://herbmentor.learningherbs.com/articles/kid-stuff/hrz-gumweed/
7. McLaughlin SP. Grindelia. New Crop Factsheet. [Internet] University of Arizona: Office of Arid Land Studies; 1995. [updated 1998 February 24; cited 2019 February 26] Available from https://hort.purdue.edu/newcrop/CropFactSheets/grindelia.html
8. Yang C, Gundala SR, Mukkavilli R, Vangala S, Reid MD, Aneja R. Synergistic interactions among flavonoids and acetogenins in Graviola (Annona muricata) leaves confer protection against prostate cancer. Carcinogenesis. 2015 Jun;36(6):656-65. doi: 10.1093/carcin/bgv046. Epub 2015 Apr 11.
9. European Medicines Agency, Committee on Herbal Medicinal Products (HMPC). Assessment report on Grindelia robusta Nutt., Grindelia squarrosa (Pursh) Dunal, Grindelia humilis Hook. et Arn., Grindelia camporum Greene, herba [Internet]. London: European Medicines Agency; c1995-2018 [updated 2012 Mar 27;cited 2019 Feb 28]. Available from https://www.ema.europa.eu/en/documents/herbal-report/draft-assessment-report-grindelia-robusta-nutt-grindelia-squarrosa-pursh-dunal-grindelia-humilis_en.pdf
10. Verma N, Tripathi SK, Sahu D, Das HR, Das RH. Evaluation of inhibitory activities of plant extracts on production of LPS-stimulated pro-inflammatory mediators in J774 murine macrophages. Mol Cell Biochem. 2010 Mar;336(1-2):127-35. doi: 10.1007/s11010-009-0263-6. Epub 2009 Oct 8.
11. Grindelia. British Pharmaceutical Codex. Director of the Council of the Pharmaceutical Society of Great Britain. The Pharmaceutical Press:London. 1949.