Devil's Claw

url: https://medlineplus.gov/druginfo/natural/984.html  
  
  
Devil's Claw  
What is it?  
Devil's claw (Harpagophytum procumbens) is an herb. It has been used by mouth for back pain and arthritis, but there is little evidence to support these uses.  
  
Devil's claw is native to south Africa, including the Kalahari Desert, where it's been used traditionally for many conditions. Devil's claw contains chemicals that might decrease swelling. Because of this, it is often used to treat conditions that involve both pain and inflammation.  
  
Devil's claw is most commonly used for back pain and osteoarthritis. It is also used for rheumatoid arthritis (RA) and other conditions, but there is no good scientific evidence to support these uses. There is also no good evidence to support using devil's claw for COVID-19.  
  
  
How effective is it?  
Natural Medicines Comprehensive Database rates effectiveness based on scientific evidence according to the following scale: Effective, Likely Effective, Possibly Effective, Possibly Ineffective, Likely Ineffective, Ineffective, and Insufficient Evidence to Rate.The effectiveness ratings for DEVIL'S CLAW are as follows:Possibly effective for...Back pain. Taking devil's claw by mouth seems to reduce lower back pain. Devil's claw seems to work about as well as some non-steroidal anti-inflammatory drugs (NSAIDs).  
Osteoarthritis. Taking devil's claw by mouth alone, with other ingredients, or along with nonsteroidal anti-inflammatory drugs (NSAIDs) seems to help reduce osteoarthritis pain. Some people taking devil's claw seem to be able to lower the dose of NSAIDs taken for pain relief.  
  
There is interest in using devil's claw for a number of other purposes, but there isn't enough reliable information to say whether it might be helpful.  
  
  
Is it safe?  
When taken by mouth: Devil's claw is possibly safe for most adults when taken for up 12 weeks. The most common side effects are diarrhea and indigestion. Devil's claw may also cause allergic skin reactions.   
When applied to the skin: There isn't enough reliable information to know if devil's claw is safe or what the side effects might be.  
  
  
Special precautions & warnings:  
Pregnancy: Devil's claw is possibly unsafe when used during pregnancy. It might harm the developing fetus. Avoid use.   
Breast-feeding: There isn't enough reliable information to know if devil's claw is safe to use when breast-feeding. Stay on the safe side and avoid use.  
Heart and circulation problems: Devil's claw may affect heart rate, heartbeat, and blood pressure. It might harm people with disorders of the heart and circulation. If you have one of these conditions, talk with your healthcare provider before starting devil's claw.  
Gallstones: Devil's claw might increase bile production. This could be a problem for people with gallstones. Avoid using devil's claw.   
Low levels of sodium in the body: Devil's claw might decrease levels of sodium in the body. This might worsen symptoms in people who already have low levels of sodium.  
Peptic ulcer disease: Devil's claw might increase the production of stomach acids, which might harm people with stomach ulcers. Avoid using devil's claw.  
  
  
Are there interactions with medications?  
ModerateBe cautious with this combination.Medications changed by the liver (Cytochrome P450 2C19 (CYP2C19) substrates)Some medications are changed and broken down by the liver. Devil's claw might change how quickly the liver breaks down these medications. This could change the effects and side effects of these medications.Medications changed by the liver (Cytochrome P450 2C9 (CYP2C9) substrates)Some medications are changed and broken down by the liver. Devil's claw might change how quickly the liver breaks down these medications. This could change the effects and side effects of these medications.Medications changed by the liver (Cytochrome P450 3A4 (CYP3A4) substrates)Some medications are changed and broken down by the liver. Devil's claw might change how quickly the liver breaks down these medications. This could change the effects and side effects of these medications.Warfarin (Coumadin)Warfarin is used to slow blood clotting. Devil's claw might increase its effects and the chances of bruising and bleeding. Be sure to have your blood checked regularly. The dose of your warfarin might need to be changed.MinorBe watchful with this combination.Medications moved by pumps in cells (P-glycoprotein Substrates)Some medications are moved in and out of cells by pumps. Devil's claw might change how these pumps work and change how much medication stays in the body. In some cases, this might change the effects and side effects of a medication.Medications that decrease stomach acid (H2-blockers)H2-blockers are used to decrease stomach acid. Devil's claw can increase stomach acid. Taking Devil's claw might decrease the effects of H2-blockers.   
  
Some common H2-blockers include cimetidine (Tagamet), ranitidine (Zantac), and famotidine (Pepcid).Medications that decrease stomach acid (Proton pump inhibitors)Proton pump inhibitors are used to decrease stomach acid. Devil's claw can increase stomach acid. Taking devil's claw might decrease the effects of proton pump inhibitors.   
  
Some common proton pump inhibitors include omeprazole (Prilosec), lansoprazole (Prevacid), rabeprazole (Aciphex), pantoprazole (Protonix), and esomeprazole (Nexium).  
  
  
Are there interactions with herbs and supplements?  
There are no known interactions with herbs and supplements.  
  
  
Are there interactions with foods?  
There are no known interactions with foods.  
  
  
How is it typically used?  
Devil's claw has most often been used by adults in doses of 108-2400 mg daily for 8-12 weeks. Speak with a healthcare provider to find out what dose might be best for a specific condition.  
  
  
Other names  
Devils Claw, Devil's Claw Root, Garra del Diablo, Grapple Plant, Griffe du Diable, Harpagophyti Radix, Harpagophytum, Harpagophytum procumbens, Harpagophytum zeyheri, Racine de Griffe du Diable, Racine de Windhoek, Teufelskrallenwurzel, Uncaria procumbens, Wood Spider.  
  
  
Methodology  
  
 To learn more about how this article was written, please see the Natural Medicines Comprehensive Database methodology.   
   
  
  
References  
Diaz-Silveira GL, Deutsch J, Little DP. DNA Barcode Authentication of Devil's Claw Herbal Dietary Supplements. Plants (Basel) 2021;10:2005. View abstract.  
Vu N, Nguyen TTT, Parmenter BH, Thouas GA. Safety, efficacy and tolerability of a combination micronutrient and polyherbal preparation (GoutFighter TM) for gout: a single-arm open-label pilot study. J Complement Integr Med 2020;18:113-21. View abstract.  
Zegota Z, Gozdzik J, Glogowska-Szelag J. Prospective, multicenter evaluation of a polyherbal supplement alongside standard-of-care treatment for mild knee osteoarthritis. Adv Orthop. 2021;2021:5589597. View abstract.  
Anon. Devil's claw root: ulcers and gastrointestinal bleeding. Prescrire Int 2013;22:296. View abstract.  
Carvalho RR, Donadel CD, Cortez AF, Valviesse VR, Vianna PF, Correa BB. J Bras Nefrol. 2017 Mar;39:79-81. View abstract.  
More M, Gruenwald J, Pohl U, Uebelhack R. A Rosa canina - Urtica dioica - Harpagophytum procumbens/zeyheri combination significantly reduces gonarthritis symptoms in a randomized, placebo-controlled double-blind study. Planta Med. 2017 Dec;83:1384-91. View abstract.  
Mahomed IM, Ojewole JAO. Oxytocin-like effect of Harpagophytum procumbens [Pedaliacae] secondary root aqueous extract on rat isolated uterus. Afr J Trad CAM 2006;3:82-89.   
Cuspidi C, Sala C, Tadic M, et al. Systemic hypertension induced by Harpagophytum procumbens (devil's claw): a case report. J Clin Hypertens (Greenwich) 2015;17:908-10. View abstract.  
Conrozier T, Mathieu P, Bonjean M, et al. A complex of three natural anti-inflammatory agents provides relief of osteoarthritis pain. Altern Ther Health Med. 2014;20 Suppl 1:32-7.View abstract.  
 Chrubasik S, Sporer F, and Wink M. [Harpagoside content of different powdered dry extracts from Harpagophytum procumbens]. Forsch Komplmentarmed 1996;3:6-11.  
 Chrubasik S, Schmidt A, Junck H, and et al. [Effectiveness and economy of Harpagophytum extract in the treatment of acute low back pain - first results of a therapeutic cohort study]. Forsch Komplementarmed 1997;4:332-336.  
Chrubasik S, Model A, Black A, and et al. A randomized double-blind pilot study comparing Doloteffin and Vioxx in the treatment of low back pain. Rheumatology 2003;42:141-148.  
 Biller, A. Ergebnisse sweier randomisieter kontrollierter. Phyto-pharmaka 2002;7:86-88.  
 Schendel, U. Arthritis treatment: Study with Devil Claw extract [in German]. Der Kassenarzt 2001;29/30:2-5.  
 Usbeck, C. Teufelskralle: Devil claw: Treatment for chronic pain [in German]. Arzneimittel-Forum 2000;3:23-25.  
 Rutten, S. and Schafer, I. Einsatz der afrikanischen Teufelskralle [Allya] bei Erkrankungen des Stutz unde Bewegungsapparates. Ergebnisse einer Anwendungscbeobachtung Acta Biol 2000;2:5-20.  
 Pinget, M. and Lecomte, A. The effect of Harpagophytum Arkocaps in degenerative rheumatism [in German]. Naturheilpraxis 1997;50:267-269.  
 Ribbat JM and Schakau D. Behandluing chronisch aktivierter Schmerzen am Bewegungsapparat. NaturaMed 2001;16:23-30.  
 Loew D, Schuster O, and M llerfeld J. Stabilit t und biopharmazeutische Qualit t. Voraussetzung f r Bioverf gbarkeit von Harpagophytum procumbens. In: Loew D and Rietbrock N. Phytopharmaka II. Forschung und klinische Anwendung. Darmstadt: Forschung und klinische Anwendung;1996.  
 Tunmann P and Bauersfeld HJ. ber weitere Inhaltsstoffe der Wurzel von Harpagophytum procumbens DC. Arch Pharm (Weinheim) 1975;308:655-657.  
 Ficarra P, Ficarra R, Tommasini A, and et al. [HPLC analysis of a drug in traditional medicine: Harpagophytum procumbens DC. I]. Boll Chim Farm 1986;125:250-253.  
 Tunmann P and Lux R. Zur Kenntnis der Inhaltsstoffe aus der Wurzel von Harpagophytum procumbens DC. DAZ 1962;102:1274-1275.  
 Kikuchi T. New iridoid glucosides from Harpagophytum procumbens. Chem Pharm Bull 1983;31:2296-2301.  
 Chrubasik S, Zimpfer C, Schutt U, and et al. Effectiveness of Harpagophytum procumbens in treatment of acute low back pain. Phytomedicine 1996;3:1-10.  
 Chrubasik S, Sporer F, Wink M, and et al. Zum wirkstoffgehalt in arzneimitteln aus harpagophytum procumbens. Forsch Komplement rmed 1996;3:57-63.  
 Chrubasik S, Sporer F, and Wink M. [Content of active substance in tea preparations from Harpagophytum procumbens]. Forsch Komplementarmed 1996;3:116-119.  
 Langmead L, Dawson C, Hawkins C, and et al. Antioxidant effects of herbal therapies used by patients with inflammatory bowel disease: an in vitro study. Aliment Pharmacol Ther 2002;16:197-205.  
 Bhattacharya A and Bhattacharya SK. Anti-oxidative activity of Harpagophytum procumbens. Br J Phytother 1998;72:68-71.  
 Schmelz H, Haemmerle HD, and Springorum HW. Analgetische Wirksamkeit eines Teufels-krallenwurzel-Extraktes bei verschiedenen chronisch-degenerativen Gelenkerkrankungen. In: Chrubasik S and Wink M. Rheumatherapie mit Phytopharmaka. Stuttgart: Hippokrates;1997.  
 Frerick H, Biller A, and Schmidt U. Stufenschema bei Coxarthrose. Der Kassenarzt 2001;5:41.  
 Schr ffer H. Salus Teufelskralle-Tabletten. Ein Fortschritt in der nichtsteroidalen antirheumatischen Therapie. Die Medizinische Publikation 1980;1:1-8.  
 Pinget M and Lecompte A. Etude des effets de I'harpagophytum en rhumatologie d g n rative. 37 Le magazine 1990;:1-10.  
 Lecomte A and Costa JP. Harpagophytum dans l'arthrose: Etude en double insu contre placebo. Le Magazine 1992;15:27-30.  
 Guyader M. Les plantes antirhumatismales. Etude historique et pharmacologique, et etude clinique du nebulisat d'Harpagohytum procumbens DC chez 50 patients arthrosiques suivis en service hospitalier [Dissertation]. Universite Pierre et Marie Curie, 1984.  
 Belaiche P. Etude clinique de 630 cas d'artrose traites par le nebulisat aqueux d'Harpagophytum procumbens (Radix). Phytotherapy 1982;1:22-28.  
 Chrubasik S, Fiebich B, Black A, and et al. Treating low back pain with an extract of Harpagophytum procumbens that inhibits cytokine release. Eur J Anaesthesiol 2002;19:209.  
 Chrubasik S and Eisenberg E. Treatment of rheumatic pain with Kampo medicine in Europe. The Pain Clinic 1999;11:171.  
 Jadot G and Lecomte A. Activite anti-inflammatoire d'Harpagophytum procumbens DC. Lyon Mediteranee Med Sud-Est 1992;28:833-835.  
 Fontaine, J., Elchami, A. A., Vanhaelen, M., and Vanhaelen-Fastre, R. [Biological analysis of Harpagophytum procumbens D.C. II. Pharmacological analysis of the effects of harpagoside, harpagide and harpagogenine on the isolated guinea-pig ileum (author's transl)]. J Pharm Belg. 1981;36:321-324. View abstract.  
 Eichler, O. and Koch, C. [Antiphlogistic, analgesic and spasmolytic effect of harpagoside, a glycoside from the root of Harpagophytum procumbens DC]. Arzneimittelforschung. 1970;20:107-109. View abstract.  
 Occhiuto, F., Circosta, C., Ragusa, S., Ficarra, P., and Costa, De Pasquale. A drug used in traditional medicine: Harpagophytum procumbens DC. IV. Effects on some isolated muscle preparations. J Ethnopharmacol. 1985;13:201-208. View abstract.  
 Erdos, A., Fontaine, R., Friehe, H., Durand, R., and Poppinghaus, T. [Contribution to the pharmacology and toxicology of different extracts as well as the harpagosid from Harpagophytum procumbens DC]. Planta Med 1978;34:97-108. View abstract.  
 Brien, S., Lewith, G. T., and McGregor, G. Devil's Claw (Harpagophytum procumbens) as a treatment for osteoarthritis: a review of efficacy and safety. J Altern Complement Med 2006;12:981-993. View abstract.  
 Grant, L., McBean, D. E., Fyfe, L., and Warnock, A. M. A review of the biological and potential therapeutic actions of Harpagophytum procumbens. Phytother Res 2007;21:199-209. View abstract.  
 Ameye, L. G. and Chee, W. S. Osteoarthritis and nutrition. From nutraceuticals to functional foods: a systematic review of the scientific evidence. Arthritis Res Ther 2006;8:R127. View abstract.  
 Teut, M. and Warning, A. [Bone metastases in breast carcinoma]. Forsch Komplement.Med 2006;13:46-48. View abstract.  
 Kundu, J. K., Mossanda, K. S., Na, H. K., and Surh, Y. J. Inhibitory effects of the extracts of Sutherlandia frutescens (L.) R. Br. and Harpagophytum procumbens DC. on phorbol ester-induced COX-2 expression in mouse skin: AP-1 and CREB as potential upstream targets. Cancer Lett. 1-31-2005;218:21-31. View abstract.  
 Chrubasik, S. Addendum to the ESCOP monograph on Harpagophytum procumbens. Phytomedicine. 2004;11(7-8):691-695. View abstract.  
 Kaszkin, M., Beck, K. F., Koch, E., Erdelmeier, C., Kusch, S., Pfeilschifter, J., and Loew, D. Downregulation of iNOS expression in rat mesangial cells by special extracts of Harpagophytum procumbens derives from harpagoside-dependent and independent effects. Phytomedicine. 2004;11(7-8):585-595. View abstract.  
 Na, H. K., Mossanda, K. S., Lee, J. Y., and Surh, Y. J. Inhibition of phorbol ester-induced COX-2 expression by some edible African plants. Biofactors 2004;21(1-4):149-153. View abstract.  
 Chrubasik, S. [Devil's claw extract as an example of the effectiveness of herbal analgesics]. Orthopade 2004;33:804-808. View abstract.  
 Schulze-Tanzil, G., Hansen, C., and Shakibaei, M. [Effect of a Harpagophytum procumbens DC extract on matrix metalloproteinases in human chondrocytes in vitro]. Arzneimittelforschung. 2004;54:213-220. View abstract.  
 Chrubasik, S., Conradt, C., and Roufogalis, B. D. Effectiveness of Harpagophytum extracts and clinical efficacy. Phytother.Res. 2004;18:187-189. View abstract.  
 Boje, K., Lechtenberg, M., and Nahrstedt, A. New and known iridoid- and phenylethanoid glycosides from Harpagophytum procumbens and their in vitro inhibition of human leukocyte elastase. Planta Med 2003;69:820-825. View abstract.  
 Clarkson, C., Campbell, W. E., and Smith, P. In vitro antiplasmodial activity of abietane and totarane diterpenes isolated from Harpagophytum procumbens (devil's claw). Planta Med 2003;69:720-724. View abstract.  
 Betancor-Fernandez, A., Perez-Galvez, A., Sies, H., and Stahl, W. Screening pharmaceutical preparations containing extracts of turmeric rhizome, artichoke leaf, devil's claw root and garlic or salmon oil for antioxidant capacity. J Pharm Pharmacol 2003;55:981-986. View abstract.  
 Munkombwe, N. M. Acetylated phenolic glycosides from Harpagophytum procumbens. Phytochemistry 2003;62:1231-1234. View abstract.  
 Gobel, H., Heinze, A., Ingwersen, M., Niederberger, U., and Gerber, D. [Effects of Harpagophytum procumbens LI 174 (devil's claw) on sensory, motor und vascular muscle reagibility in the treatment of unspecific back pain]. Schmerz. 2001;15:10-18. View abstract.  
 Laudahn, D. and Walper, A. Efficacy and tolerance of Harpagophytum extract LI 174 in patients with chronic non-radicular back pain. Phytother.Res. 2001;15:621-624. View abstract.  
 Loew, D., Mollerfeld, J., Schrodter, A., Puttkammer, S., and Kaszkin, M. Investigations on the pharmacokinetic properties of Harpagophytum extracts and their effects on eicosanoid biosynthesis in vitro and ex vivo. Clin.Pharmacol.Ther. 2001;69:356-364. View abstract.  
 Leblan, D., Chantre, P., and Fournie, B. Harpagophytum procumbens in the treatment of knee and hip osteoarthritis. Four-month results of a prospective, multicenter, double-blind trial versus diacerhein. Joint Bone Spine 2000;67:462-467. View abstract.  
 Baghdikian, B., Guiraud-Dauriac, H., Ollivier, E., N'Guyen, A., Dumenil, G., and Balansard, G. Formation of nitrogen-containing metabolites from the main iridoids of Harpagophytum procumbens and H. zeyheri by human intestinal bacteria. Planta Med 1999;65:164-166. View abstract.  
 Chrubasik, S., Junck, H., Breitschwerdt, H., Conradt, C., and Zappe, H. Effectiveness of Harpagophytum extract WS 1531 in the treatment of exacerbation of low back pain: a randomized, placebo-controlled, double- blind study. Eur.J Anaesthesiol. 1999;16:118-129. View abstract.  
 Gagnier, J. J., van Tulder, M., Berman, B., and Bombardier, C. Herbal medicine for low back pain. Cochrane.Database.Syst.Rev. 2006;:CD004504. View abstract.  
 Spelman, K., Burns, J., Nichols, D., Winters, N., Ottersberg, S., and Tenborg, M. Modulation of cytokine expression by traditional medicines: a review of herbal immunomodulators. Altern.Med.Rev. 2006;11:128-150. View abstract.  
 Ernst, E. and Chrubasik, S. Phyto-anti-inflammatories. A systematic review of randomized, placebo-controlled, double-blind trials. Rheum.Dis Clin North Am 2000;26:13-27, vii. View abstract.  
Romiti N, Tramonti G, Corti A, Chieli E. Effects of Devil's Claw (Harpagophytum procumbens) on the multidrug transporter ABCB1/P-glycoprotein. Phytomedicine 2009;16:1095-100. View abstract.  
Gagnier JJ, van Tulder MW, Berman B, Bombardier C. Herbal medicine for low back pain. A Cochrane review. Spine 2007;32:82-92. View abstract.  
Chrubasik S, Kunzel O, Thanner J, et al. A 1-year follow-up after a pilot study with Doloteffin for low back pain. Phytomedicine 2005;12:1-9. View abstract.  
Wegener T, Lupke NP. Treatment of patients with arthrosis of hip or knee with an aqueous extract of devil's claw (Harpagophytum procumbens DC). Phytother Res 2003;17:1165-72. View abstract.  
Hagiwara H, Seki T, Ariga T. The effect of pre-germinated brown rice intake on blood glucose and PAI-1 levels in streptozotocin-induced diabetic rats. Biosci Biotechnol Biochem 2004;68:444-7. View abstract.  
Unger M, Frank A. Simultaneous determination of the inhibitory potency of herbal extracts on the activity of six major cytochrome P450 enzymes using liquid chromatography/mass spectrometry and automated online extraction. Rapid Commun Mass Spectrom 2004;18:2273-81. View abstract.  
Jang MH, Lim S, Han SM, et al. Harpagophytum procumbens suppresses lipopolysaccharide-stimulated expressions of cyclooxygenase-2 and inducible nitric oxide synthase in fibroblast cell line L929. J Pharmacol Sci 2003;93:367-71. View abstract.  
Gagnier JJ, Chrubasik S, Manheimer E. Harpgophytum procumbens for osteoarthritis and low back pain: a systematic review. BMC Complement Altern Med 2004;4:13. View abstract.  
Moussard C, Alber D, Toubin MM, et al. A drug used in traditional medicine, harpagophytum procumbens: no evidence for NSAID-like effect on whole blood eicosanoid production in human. Prostaglandins Leukot Essent Fatty Acids. 1992;46:283-6.. View abstract.  
Whitehouse LW, Znamirowska M, Paul CJ. Devil's Claw (Harpagophytum procumbens): no evidence for anti-inflammatory activity in the treatment of arthritic disease. Can Med Assoc J 1983;129:249-51. View abstract.  
Fiebich BL, Heinrich M, Hiller KO, Kammerer N. Inhibition of TNF-alpha synthesis in LPS-stimulated primary human monocytes by Harpagophytum extract SteiHap 69. Phytomedicine 2001;8:28-30.. View abstract.  
Baghdikian B, Lanhers MC, Fleurentin J, et al. An analytical study, anti-inflammatory and analgesic effects of Harpagophytum procumbens and Harpagophytum zeyheri. Planta Med 1997;63:171-6. View abstract.  
Lanhers MC, Fleurentin J, Mortier F, et al. Anti-inflammatory and analgesic effects of an aqueous extract of Harpagophytum procumbens. Planta Med 1992;58:117-23 . View abstract.  
Grahame R, Robinson BV. Devils's claw (Harpagophytum procumbens): pharmacological and clinical studies. Ann Rheum Dis 1981;40:632. View abstract.  
Chrubasik S, Sporer F, Dillmann-Marschner R, et al. Physicochemical properties of harpagoside and its in vitro release from Harpagophytum procumbens extract tablets. Phytomedicine 2000;6:469-73. View abstract.  
Soulimani R, Younos C, Mortier F, Derrieu C. The role of stomachal digestion on the pharmacological activity of plant extracts, using as an example extracts of Harpagophytum procumbens. Can J Physiol Pharmacol 1994;72:1532-6. View abstract.  
Costa De Pasquale R, Busa G, et al. A drug used in traditional medicine: Harpagophytum procumbens DC. III. Effects on hyperkinetic ventricular arrhythmias by reperfusion. J Ethnopharmacol 1985;13:193-9 . View abstract.  
Circosta C, Occhiuto F, Ragusa S, et al. A drug used in traditional medicine: Harpagophytum procumbens DC. II. Cardiovascular activity. J Ethnopharmacol 1984;11:259-74. View abstract.  
Chrubasik S, Thanner J, Kunzel O, et al. Comparison of outcome measures during treatment with the proprietary Harpagophytum extract doloteffin in patients with pain in the lower back, knee or hip. Phytomedicine 2002;9:181-94. View abstract.  
Barak AJ, Beckenhauer HC, Tuma DJ. Betaine, ethanol, and the liver: a review. Alcohol 1996;13:395-8. View abstract.  
Chantre P, Cappelaere A, Leblan D, et al. Efficacy and tolerance or Harpagophytum procumbens versus diacerhein in treatment of osteoarthritis. Phytomedicine 2000;7:177-83. View abstract.  
Fetrow CW, Avila JR. Professional's Handbook of Complementary & Alternative Medicines. 1st ed. Springhouse, PA: Springhouse Corp., 1999.  
Krieger D, Krieger S, Jansen O, et al. Manganese and chronic hepatic encephalopathy. Lancet 1995;346:270-4. View abstract.  
Shaw D, Leon C, Kolev S, Murray V. Traditional remedies and food supplements: a 5-year toxicological study (1991-1995). Drug Saf 1997;17:342-56. View abstract.  
Brinker F. Herb Contraindications and Drug Interactions. 2nd ed. Sandy, OR: Eclectic Medical Publications, 1998.  
Wichtl MW. Herbal Drugs and Phytopharmaceuticals. Ed. N.M. Bisset. Stuttgart: Medpharm GmbH Scientific Publishers, 1994.  
Newall CA, Anderson LA, Philpson JD. Herbal Medicine: A Guide for Healthcare Professionals. London, UK: The Pharmaceutical Press, 1996.