



Buchu

Updated: March 3, 2023.

OVERVIEW

Introduction

Buchu is an herbal product made from a group of aromatic herbs native to South Africa, the leaves of which were used in traditional Khoi-San medicine to treat a variety of conditions and are currently used as buchu tea and as dried extracts. Buchu preparations have not been linked to instances of serum enzyme elevations or clinically apparent liver injury with jaundice.

Background

Buchu (boe' shoe) is a group of aromatic small shrubs native to South Africa that were used in traditional medicine of the San and Khoikhoi people to treat wounds, stomach complaints, arthritis, and bladder and bowel ailments. Buchu refers specifically to two species in the genus *Agathosma* (meaning "good fragrance") that were used in San-Khoi traditional medicine: *Agathosma betulina* (round or short leaf buchu) and *Agathosma crenulata* (oval or long leaf buchu). Currently, the aromatic oils of these herbs are used in food preparation as flavoring and in manufacture of perfumes. Dried buchu leaves have been used for medicinal purposes in tonics and as tablets or powders to treat musculoskeletal pain, chronic arthritis, dyspepsia, edema, fever, the common cold, ulcers, irritable bowel syndrome, gout, prostatitis, prostatic hypertrophy, gout and sexually transmitted diseases. However, the efficacy of buchu has not been proven in prospective clinical trials for any of these conditions. More than 120 compounds have been identified in buchu including volatile oils, diosphenol, menthone, isomethone, limonene, and pulegone, which is a suspected hepatotoxin. The active ingredients responsible for the purported medicinal effects of buchu are unknown. Laboratory studies of buchu and isolated constituents in cell culture and animal models suggest that it has antimicrobial, antioxidant, antiinflammatory and diuretic properties. However, these properties have not been convincingly shown in human trials. Buchu is most frequently used in teas, the recommended regimen being one cup three times daily. Buchu is generally well tolerated without adverse events; minor side effects may include gastrointestinal upset and urinary tract irritation.

Hepatotoxicity

Buchu has not been subjected to prospective controlled trials of safety and efficacy but is widely described as being well tolerated and without significant side effects. A single case report of acute hepatitis in a patient taking both buchu and rooibos herbal tea has been published. The patient was also taking an unknown statin, and the contribution of buchu tea to the hepatic injury can only be said to be possible (Case 1). Thus, there is little evidence that buchu in low oral doses or as herbal tea causes clinically apparent liver injury in humans.

Likelihood score: D (possible, rare cause of clinically apparent liver injury).

Mechanism of Injury

Buchu contains many compounds including pulegone which causes liver injury in rodent models and induces cytotoxicity in cell culture systems. The concentration of pulegone is higher in leaves from *Agathosma crenulata* than in those of *Agathosma betulina*. Large oral doses have been found to deplete glutathione, which may be the mechanism of its toxic effects.

Outcome and Management

Hepatotoxicity from buchu must be quite rare if it occurs at all. In the presence of liver injury, stopping use of buchu promptly, even when used as an herbal tea, is warranted.

Drug Class: [Herbal and Dietary Supplements](#)

Other names: Boegoe, Bucco, Bookoo, Diosma.

CASE REPORT

Case 1. Acute hepatocellular jaundice attributed to herbal teas .(1)

A 52 year old man developed jaundice one month after starting buchu and rooibos herbal tea. He had no history of liver disease or alcohol abuse and no risk factors for viral hepatitis. He had a history of hyperlipidemia and chronic kidney disease due to IgA nephropathy. His medications included oral steroids and long term statin use. On presentation he was jaundiced, but physical examination was otherwise unremarkable. Laboratory testing showed a total bilirubin of 12.1 mg/dL, 8.3 mg/dL direct, with ALT of 2589 U/L, AST1438 U/L and alkaline phosphatase 359 U/L. The INR and platelet count were normal. Testing for hepatitis A, B, C and E as well as for EBV, CMV, HIV and VZV infection were negative, and ANA, SMA and AMA were not detected. An abdominal ultrasound showed a normal appearing liver and no ascites. A liver biopsy revealed mild portal inflammation, spotty necrosis and centrolobular cholestasis without evidence of biliary obstruction. The herbal teas were discontinued and he recovered promptly.

Key Points

Medication:	Buchu and Rooibos tea consumption
Pattern:	Hepatocellular [R ~ 22]
Severity:	3+ (jaundice, hospitalization)
Latency:	1 month
Recovery:	Improved 2 weeks after discharge
Other medications:	“Statin”, “Steroids”

Comment

This was the first and the only published report of clinically apparent liver injury attributed to buchu tea. The onset and course were typical of herbal-induced liver injury, but contaminants in the herbal teas or other unacknowledged herbal products are other possible explanations for the hepatitis. In addition, the history was compatible with statin-induced liver injury which on rare occasions arises years after initiation of treatment. It was not clear what statin was used and whether it was discontinued. Ten years after this report, it remained the only published case of clinically apparent liver injury possibly related to buchu.

PRODUCT INFORMATION

REPRESENTATIVE TRADE NAMES

Buchu – Generic

DRUG CLASS

Herbal and Dietary Supplements

CHEMICAL FORMULA AND STRUCTURE

DRUG	CAS REGISTRY NUMBER	MOLECULAR FORMULA	STRUCTURE
Buchu	92346-82-2	Herbal	Not Applicable

CITED REFERENCE

- Engels M, Wang C, Matoso A, Maidan E, Wands J. Tea not tincture: hepatotoxicity associated with rooibos herbal tea. *ACG Case Rep J*. 2013;1:58–60. PubMed PMID: 26157822.

ANNOTATED BIBLIOGRAPHY

References updated: 03 March 2023

Abbreviations: HDS, herbal and dietary supplements.

Zimmerman HJ. Unconventional drugs. Miscellaneous drugs and diagnostic chemicals. In, Zimmerman, HJ. *Hepatotoxicity: the adverse effects of drugs and other chemicals on the liver*. 2nd ed. Philadelphia: Lippincott, 1999: pp. 731-4.

(Expert review of hepatotoxicity published in 1999; several herbal medications are discussed, but not buchu).

Liu LU, Schiano TD. Hepatotoxicity of herbal medicines, vitamins and natural hepatotoxins. In, Kaplowitz N, DeLeve LD, eds. *Drug-induced liver disease*. 2nd ed. New York: Informa Healthcare USA, 2007, pp. 733-54.

(Review of hepatotoxicity of herbal and dietary supplements [HDS] published in 2007; no mention of buchu).

Simpson D. Buchu--South Africa's amazing herbal remedy. *Scott Med J*. 1998;43(6):189–91. PubMed PMID: 9924759.

(Description of buchu as an herb native to the Cape Province of South Africa which was a traditional medicine used by the San [Bushmen] and Khoikhoi [Hottentot] people who introduced the herb to early Dutch settlers, it being subsequently introduced into Europe and used to treat wounds, stomach ailments, arthritis and diseases of the bladder, the active ingredient being a volatile oil with a peppermint-like odor which has also been used as a flavoring and in perfumes).

Moolla A, Viljoen AM. 'Buchu' -*Agathosma betulina* and *Agathosma crenulata* (Rutaceae): a review. *J Ethnopharmacol*. 2008;119:413–9. PubMed PMID: 18725278.

(Extensive review of the history of development, chemical constituents, pharmacological activities, and data on clinical efficacy and safety of buchu in humans).

Jacobsson I, Jönsson AK, Gerdén B, Hägg S. Spontaneously reported adverse reactions in association with complementary and alternative medicine substances in Sweden. *Pharmacoepidemiol Drug Saf*. 2009;18:1039–47. PubMed PMID: 19650152.

- (778 spontaneous reports of adverse reactions to herbals to Swedish Registry, no cases were attributed to buchu).
- Stickel F, Kessebohm K, Weimann R, Seitz HK. Review of liver injury associated with dietary supplements. *Liver Int.* 2011;31:595–605. PubMed PMID: 21457433.
- (Review of current understanding of liver injury from herbals and dietary supplements focusing upon Herbalife and Hydroxycut products, green tea, usnic acid, noni juice, Chinese herbs, vitamin A and anabolic steroids; buchu is not discussed).
- Teschke R, Wolff A, Frenzel C, Schulze J, Eickhoff A. Herbal hepatotoxicity: a tabular compilation of reported cases. *Liver Int.* 2012;32:1543–56. PubMed PMID: 22928722.
- (A systematic compilation of all publications on the hepatotoxicity of specific herbals identified 185 publications on 60 different herbs, herbal drugs and supplements, but does not list or mention buchu).
- Engels M, Wang C, Matoso A, Maidan E, Wands J. Tea not tincture: hepatotoxicity associated with rooibos herbal tea. *ACG Case Rep J.* 2013;1:58–60. PubMed PMID: 26157822.
- (52 year old American man developed acute icteric hepatitis one month after starting a buchu and rooibos herbal tea [bilirubin 12.1 mg/dL, ALT 2589 U/L, Alk P 359 U/L, INR normal], resolving rapidly after stopping the teas on no therapy: Case 1).
- Bunchorntavakul C, Reddy KR. Review article: herbal and dietary supplement hepatotoxicity. *Aliment Pharmacol Ther.* 2013;37:3–17. PubMed PMID: 23121117.
- (Systematic review of literature on HDS associated liver injury does not mention buchu).
- Navarro VJ, Seeff LB. Liver injury induced by herbal complementary and alternative medicine. *Clin Liver Dis.* 2013;17:715–35. PubMed PMID: 24099027.
- (Review of the epidemiology, regulatory status, diagnosis, pathogenesis and causes of liver injury from herbal products with specific discussion of conjugated linoleic acid, ephedra, germander, green tea, usnic acid, flavocoxid, aloe vera, chaparral, greater celandine, black cohosh, comfrey, kava, skullcap, valerian, noni juice, pennyroyal and traditional herbal remedies).
- Navarro VJ, Barnhart H, Bonkovsky HL, Davern T, Fontana RJ, Grant L, Reddy KR, et al. Liver injury from herbals and dietary supplements in the U.S. Drug-Induced Liver Injury Network. *Hepatology.* 2014;60:1399–408. PubMed PMID: 25043597.
- (Among 839 cases of liver injury from drugs collected in the US between 2004 and 2013, 130 were due to HDS products, including 45 from body building agents [probably anabolic steroids] and 85 from diverse HDS products but no case was attributed specifically to buchu).
- Seeff LB, Bonkovsky HL, Navarro VJ, Wang G. Herbal products and the liver: a review of adverse effects and mechanisms. *Gastroenterology.* 2015;148:517–532.e3. PubMed PMID: 25500423.
- (Extensive review of herbal product associated liver injury does not discuss buchu specifically).
- Brown AC. Liver toxicity related to herbs and dietary supplements: Online table of case reports. Part 2 of 5 series. *Food Chem Toxicol.* 2017;107:472–501. PubMed PMID: 27402097.
- (Description of an online compendium of cases of liver toxicity attributed to HDS products, does not list or discuss buchu).
- Medina-Caliz I, Garcia-Cortes M, Gonzalez-Jimenez A, Cabello MR, Robles-Diaz M, Sanabria-Cabrera J, Sanjuan-Jimenez R, et al; Spanish DILI Registry. Herbal and dietary supplement-induced liver injuries in the Spanish DILI Registry. *Clin Gastroenterol Hepatol.* 2018;16:1495–1502. PubMed PMID: 29307848.

(Among 856 cases of hepatotoxicity enrolled in the Spanish DILI Registry between 1994 and 2016, 32 were attributed to herbal products, the most frequent cause being green tea [n=8] and Herbalife products [n=6], no mention of buchu).

Cohen SM, Eisenbrand G, Fukushima S, Gooderham NJ, Guengerich FP, Hecht SS, Rietjens IMCM, et al. FEMA GRAS assessment of natural flavor complexes: Mint, buchu, dill and caraway derived flavoring ingredients. *Food Chem Toxicol.* 2020;135:110870. PubMed PMID: 31604112.

(Formal analysis of the safety of buchu leaves extract used as a flavoring agent in food concluded that it should be generally regarded as safe [GRAS]).

Ballotin VR, Bigarella LG, Brandão ABM, Balbinot RA, Balbinot SS, Soldera J. Herb-induced liver injury: Systematic review and meta-analysis. *World J Clin Cases.* 2021;9:5490–5513. PubMed PMID: 34307603.

(Systematic review of the literature on HDS induced liver injury identified 446 references describing 936 cases due to 79 different herbal products, the most common being He Shou Wu [91], green tea [90] Herbalife products [64], kava kava [62] and greater celandine [48]; buchu is not discussed).

Bessone F, García-Cortés M, Medina-Caliz I, Hernandez N, Parana R, Mendizabal M, Schinoni MI, et al. Herbal and dietary supplements-induced liver injury in Latin America: experience from the LATINDILI Network. *Clin Gastroenterol Hepatol.* 2022;20:e548–e563. PubMed PMID: 33434654.

(Among 367 cases of hepatotoxicity enrolled in the Latin American Drug-Induced Liver Injury Network between 2011 and 2019, 29 [8%] were attributed to herbal products, the most frequent being green tea [n=7], Herbalife products [n=5] and garcinia [n=3]; buchu is not mentioned).

Brendler T, Abdel-Tawab M. Buchu (*Agathosma betulina* and *A. crenulata*): rightfully forgotten or underutilized? *Front Pharmacol.* 2022;13:813142. PubMed PMID: 35197854.

(Extensive review of the traditional use of buchu, its taxonomy, biology, introduction into Europe, scientific investigation, phytochemical composition, pharmacological activity, current uses, toxicity and marketing, concluding that recent studies have failed to confirm its purported beneficial effects; mentions that the toxicity found with studies of pulegone used concentrations well above those found in commercially available extracts).