Ox Bile SAP

Science-based bile flow (choleretic) support

Bile is a fluid excreted by hepatocytes to aid digestion. Bile performs several vital functions such as excretion of lipid soluble toxins, emulsification of dietary fats to aid in their absorption, cholesterol metabolism, excretion of immunoglobulin A and inflammatory cytokines to initiate an immune response, facilitation of enterohepatic circulation including the transport of hormones and pheromones. Bile acids are responsible for lipid digestion and absorption in the small intestine. They are acidic steroids which form micelles in aqueous solutions, and facilitate lipid absorption and transport, as well as transport of calcium and fat soluble vitamins. They also act as antimicrobial agents, protecting the small intestine from bacterial overgrowth.

Traditional Chinese Medicine has been using animal bile for treatment of various disorders for over 3000 years. Particularly, ox bile has been used in the treatment of jaundice and to aid in the removal of intestinal parasites and to treat hemorrhoids topically. Recent research has shed new light on therapeutic applications of bile acids and sources of enriched bile acids.

Ox Bile SAP is a formulation containing ox bile with high cholic acid content, that can help increase bile flow.

ACTIVE INGREDIENTS

Each vegetable capsule contains:

Ox bile (from *Bos Taurus;* cholic acid 45%) . . . . . 500 mg

Other ingredients: Vegetable magnesium stearate, silicon dioxide, vegetable carbohydrate gum, and purified water.

Contains no: Gluten, soy, corn, wheat, eggs, dairy, yeast, citrus, preservatives, artificial colours and flavours, starch or sugar.

This product is non-GMO.

Ox Bile SAP contains 90 capsules per bottle.

DIRECTIONS FOR USE

Adults: Take 1 capsule daily or as directed by your health care practitioner. Take a few hours before or after taking other medications.

INDICATIONS

Ox Bile SAP is used in traditional medicine to help increase bile flow (choleretic), and can:

- Help manage gallbladder insufficiency.
- Be useful post gallbladder surgery/removal.
- Improve the digestive sensitivity to fats.
- Be effective for patients with short-bowel syndrome.

CAUTIONS AND WARNINGS

Consult a health care practitioner for use beyond 4 weeks.

Contraindications: Do not use if you are pregnant or breastfeeding. For adult subpopulation only. Do not use if you suffer from gastric reflux or if you have gastrointestinal lesions/ulcers. Do not use if you have liver, gastrointestinal tract or gallbladder disorders and/or bowel obstruction. Do not use if you have gallstones or bile duct obstruction.

Do not use if seal is broken. Keep out of reach of children.

PURITY, CLEANLINESS, AND STABILITY

All ingredients listed for each **Ox Bile SAP** lot number have been tested by an ISO 17025 accredited third-party laboratory for identity, potency, and purity.

Scientific Advisory Panel (SAP): adding nutraceutical research to achieve optimum health

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351, Rue Joseph-Carrier, Vaudreuil-Dorion, Quebec, J7V 5V5
T 1 866 510 3123 • F 1 866 510 3130 • nfh.ca

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BILE AND BILE ACIDS

Bile is a fluid excreted by hepatocytes to aid digestion. Bile is produced in the liver, then transported to the gall bladder, where it is concentrated and stored, till it is transported to the intestinal lumen.[1] The gallbladder contracts upon stimulation by cholecystokinin (CCK) and bile is pushed into the cystic duct which opens into the common bile duct. From here, bile enters the duodenal lumen.[2] Water makes up about 95% of bile composition and solubilizes approximately 70% bile salts, 22% phospholipids, 4% cholesterol, 3% proteins, 0.3% bilirubin, and carries steroids, enzymes, amino acids, vitamins as well as heavy metals, drugs, environmental toxins and xenobiotics [1,5] Bile performs a number of functions such as excretion of lipid soluble toxins, emulsification of dietary fats to aid in their absorption, cholesterol metabolism, excretion of immunoglobulin A and inflammatory cytokines to initiate an immune response, facilitate enterohepatic circulation including the transport of hormones and pheromones.[1,2] Bile acids are responsible for lipid digestion and absorption in the small intestine. Approximately 5% of these bile acids are excreted, the rest are reabsorbed and transported back to the liver through enterohepatic circulation.[2] Bile acids are acidic steroids with distinct biological and physicochemical characteristics, which allows them to form micelles in aqueous solutions, thus facilitation lipid absorption and transport, as well as transport of calcium and fat soluble vitamins. They also act as antimicrobial agents, protecting the small intestine from bacterial overgrowth.[3]

OX BILE

Traditional Chinese Medicine has been using animal bile for treatment of various disorders for over 3000 years. Particularly, ox bile has been used in the treatment of jaundice and to aid in the removal of intestinal parasites and to treat hemorrhoids topically.[4] The astringent properties of bile acids made the use of ox bile favorable for treating other topical ailments such as carbuncle, furuncle scabs and skin sores.[4] The use of ox bile can be attributed to the similarity of ox bile to human bile acid composition, to the extent where ox bile has been used to assess bile tolerance of different probiotic strains at concentration of 0.3% w/v.[5] Various combination therapies used ox bile in conjunction with specific herbs to treat febrile infantile convulsions, improve male libido and vision improvement.[4] In the last 100 years, ox bile components have been used in western medicine in the treatment of steatorrhea resulting from bile acid deficiency resulting from ileectomy performed in Crohn's disease patients.[4]

BILE ACID SUPPLEMENTATION

About 70% of solubilized bile contents are bile acids,[5] of which cholic acid is the most prominent. Cholic acid has been used as a standard to control the quality of ox bile powder.[6] Studies looking at individual bile acids have found therapeutic effects beyond digestion, such as increased proliferation and induced apoptosis of colon cancer cell lines by deoxycholic acid, or increased growth of esophageal mucosa due to taurodeoxycholic acid.[7] Supplementation with taurodeoxycholic acid in mice improved intestinal integrity by decreasing crypt cell proliferation and villus height, and providing protection from injury-induced intestinal apoptosis.[7] More recently, the bile acid chenodeoxycholic acid was found to increase brown adipose tissue activity and whole body energy expenditure in 12 female subjects who were administered 15mg/kg body weight of chenodeoxycholic acid daily. [8] Administration of 10-15mg/kg of cholic acid daily significantly improved urine bile acid metabolite scores, height and weight percentiles and histological improvement in liver biopsies of 70 patients with bile acid synthesis disorders.[9] Cholic acid administration has also proved to be beneficial in hereditary bile acid synthesis disorders, single enzyme defects and patients with Zellweger spectrum disorder with liver disease.[10] Supplementation of 13mg/kg to 6mg/kg long term in 15 patients suffering from hereditary bile acid synthesis disorders showed a reduction in excretion of atypical metabolites and total urinary bile acid excretion, with marked improvement in liver biopsies.[11] Recent studies have postulated further applications of cholic acid in the treatment of neurodegenerative diseases, where cholic acid may encumber amyloid fibrillation, stabilize peptides, reduce growth of insulin fibrils and reduce cytotoxicity.[12]

The heavy involvement of bile acids in fat digestion and absorption is a natural application of supplements containing cholic acid. Cholic acid supplementation has been shown to improve cholesterol absorption, thus showing potential as an important dietary aid for patients suffering from genetic bile acid disorders. Supplementation with 15mg/kg/day cholic acid for 20 days by 12 adults showed an enriched bile, higher cholesterol absorption via cholesterol solubilization in micelles.[13] Apart from the inherent benefits of cholesterol absorption, bile acid supplementation may improve absorption of fat soluble vitamins. When five patients with genetic bile acid deficiency were treated with glycocholic acid 15mg/kg, a marked improvement in fat soluble vitamins was observed.[14] Animal studies are being conducted to explore other potential benefits of bile acid supplementation, especially cholic acid. When mediated by fibroblast growth factor 21 (FGF 21), cholic acid supplementation improved glucose tolerance, gross energy efficiency, fasting glucose levels and reduced total body fat accumulation.[15] As a part of improvement in cholesterol absorption, cholic acid enriches luminal bile. Animal studies indicate that cholic acid may also improve intestinal epithelium proliferation in cases where the epithelium has undergone DNA damage.[16] Further studies will help tap into these potential therapeutic applications of bile acids.

Ox bile can also be an effective supplement for patients with short-bowel syndrome. A study investigated the effect of natural conjugated bile acid sourced from ox bile on fat absorption and diarrhea in patients with short bowel syndrome.[17] Researchers found that, with bile replacement therapy, there was an increase in fat absorption of approximately 40 g/ day, and that calcium absorption also improved, without any reported side effects. [17] Researchers concluded that conjugated bile acid replacement therapy should be part of the treatment for selected patients with short-bowel syndrome.[17]

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