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## Kombucha

### DESCRIPTION

Kombucha, also known as the Manchurian or Kargasok mushroom, is not a mushroom but a symbiotic mixture of bacteria, including *Acetobacter xylinum*, *Acetobacter ketogenum* and *Pichia fermentans*, and various yeasts. The yeasts are usually of the genera *Saccharomyces*, *Brettanomyces* and *Zygosaccharomyces*. Kombucha is used as a tea and is prepared by incubating it in sugared black or green tea. The tea is mildly effervescent and has a cider-like acid taste.

Anecdotes abound regarding kombucha's ability to treat a wide spectrum of disorders, including AIDS and baldness. A few years ago, a media stir was created when it was reported that a patient with far-advanced AIDS made a "miraculous" recovery after drinking Kombucha tea. What wasn't reported was that the patient had begun a new FDA-allowed experimental therapy at the same time.

Kombucha tea is prepared by the user, and it is possible for the home-brewed version to become contaminated with pathogenic bacteria or fungi.

### ACTIONS AND PHARMACOLOGY

#### ACTIONS

Kombucha has putative "cure-all" activity.

#### MECHANISM OF ACTION

Kombucha tea may have some antibiotic activity.

#### PHARMACOKINETICS

There are no reports on the pharmacokinetics of kombucha, and it is unlikely that any pharmacokinetic studies have been performed.

### INDICATIONS AND USAGE

Claims have been made that kombucha tea cures everything from AIDS to baldness, flatulence and cancer. There is no credible evidence that it is effective in preventing or treating any disorder, and its use has been associated with significant toxicity in some cases. Its use in immuno-compromised individuals is particularly inadvisable.

### RESEARCH SUMMARY

There is no credible research that supports the use of kombucha for any purpose. Its use has been associated with occasional allergic reactions, jaundice, nausea, vomiting, and head and neck pain. The Iowa Department of Public Health recommended against its use when two cases of severe unexplained illness (one of which ended in death) were reported in two individuals who had been consuming kombucha tea daily for two months. Two cases of symptomatic lead poisoning were reported in individuals who drank kombucha tea brewed in a ceramic pot. It was hypothesized that the tea elicited lead from the glaze pigment of the pot.

A recent case report noted that a 53-year-old Asian man with no significant past medical history presented in the emergency room with a 2-month history of progressive muscle weakness. A month prior to symptom manifestation he had begun consuming kombucha in milk. He was diagnosed with a myositis associated with pleural effusions, pericardial effusion and "mechanic's hands," characterized by darkened hyperkeratotic changes on the palmar aspect of the fingers as well as on the palms. Those examining and treating the man believed the probable cause to be the kombucha.

A recent review of clinical evidence concluded that kombucha's unsubstantiated benefits do not outweigh its documented risks. No efficacy for kombucha was found, yet multiple cases of kombucha toxicity were cited. The reviewer concluded: "The potential for harm seems considerable." The recommendation remains the same: be cautious about the use of kombucha for any purpose.

### CONTRAINDICATIONS, PRECAUTIONS, ADVERSE REACTIONS

#### CONTRAINDICATIONS

Kombucha is contraindicated in those who are hypersensitive to any component of the preparation.

#### PRECAUTIONS

Children, pregnant women, nursing mothers, the elderly and those with compromised immune systems should avoid the use of kombucha.

Kombucha may contain antibiotic substances and, theoretically, could cause antibiotic resistance.

Those who use kombucha should be extremely careful in its preparation in order to avoid contamination with pathogenic bacteria and or fungi. The tea should not be prepared or

stored in ceramic or lead containers, as lead can leach into the tea.

#### ADVERSE REACTIONS

Those who drink more than 4 ounces daily of kombucha tea frequently experience nausea, vomiting and headaches. There have been reports of allergic reactions, jaundice, and head and neck pain. There are reports of two women with unexplained metabolic acidosis following use of kombucha tea. One died. However, it was unclear whether the kombucha tea had any role in causing the metabolic acidosis. Another 115 people who made tea from the same batch of kombucha had no adverse reactions. There are a few reports of elevated serum liver tests and a report of lead poisoning from drinking kombucha tea prepared in a ceramic pot. A case of cutaneous anthrax associated with kombucha has been reported, possibly secondary to contamination of the tea during its preparation.

#### OVERDOSAGE

There are no reported cases of overdose with kombucha.

#### DOSAGE AND ADMINISTRATION

There is no typical dosage and no recommended dosage.

#### LITERATURE

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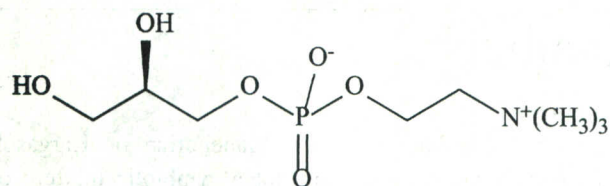
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## L-Alpha-Glycerolphosphorylcholine (Alpha-GPC)

#### DESCRIPTION

L-alpha-glycerolphosphorylcholine is a substance derived from soy lecithin. It is phosphatidylcholine without the two fatty acid chains contained within the phosphatidylcholine structure. Although it is popularly referred to as a phospholipid, it is not. It is a phospholipid-derived substance.

Alpha-GPC has the following structural formula:



L-alpha-glycerolphosphorylcholine

L-alpha-glycerolphosphorylcholine is either abbreviated as alpha-GPC or GPC. It is also known as choline alfoscerate; choline-glycerophosphate, and choline-hydroxide, (R)-2,3-dihydroxypropyl hydrogen phosphate, inner salt. Alpha-GPC is believed to be a delivery form of choline (see Choline).

#### ACTIONS AND PHARMACOLOGY

##### ACTIONS

Alpha-GPC is a putative cognition enhancer and a putative growth hormone secretagogue.

##### MECHANISM OF ACTION

The actions of supplemental alpha-GPC are speculative and, therefore, any proposed mechanism of action is likewise speculative. Alpha-GPC is a delivery form of choline, and choline can be metabolized to acetylcholine. Some with Alzheimer's disease may suffer from a cholinergic defect, and, theoretically, a delivery form of choline may positively affect some with cognition disorders in which there exists a cholinergic deficit. In a similar speculative vein, it is known that cholinergic potentiation may modulate the growth hormone (GH) response to the hypothalamic hormone GHRH or growth hormone releasing hormone. Again, if alpha-GPC is a significant precursor of acetylcholine, it may have a GH secretagogue effect.