

## Red yeast rice (*Monascus purpureus*)

Natural Standard Bottom Line Monograph, Copyright © 2006 ([www.naturalstandard.com](http://www.naturalstandard.com)).  
Commercial distribution prohibited. This monograph is intended for informational purposes only, and should not be interpreted as specific medical advice. You should consult with a qualified healthcare provider before making decisions about therapies and/or health conditions.



While some complementary and alternative techniques have been studied scientifically, high-quality data regarding safety, effectiveness, and mechanism of action are limited or controversial for most therapies. Whenever possible, it is recommended that practitioners be licensed by a recognized professional organization that adheres to clearly published standards. In addition, before starting a new technique or engaging a practitioner, it is recommended that patients speak with their primary healthcare provider(s). Potential benefits, risks (including financial costs), and alternatives should be carefully considered. The below monograph is designed to provide historical background and an overview of clinically-oriented research, and neither advocates for or against the use of a particular therapy.

### Related Terms:

- Angkak, beni-koju, Cholestin™, hong qu, hung-chu, *Monascus*, red koji, red leaven, red rice, red rice yeast, red yeast rice, Xue Zhi Kang, Zhi Tai.

### BACKGROUND

- Red yeast rice is the product of yeast (*Monascus purpureus*) grown on rice, and is served as a dietary staple in some Asian countries. It contains several compounds collectively known as Monacolins, substances known to inhibit cholesterol synthesis. One of these, "Monacolin K" is a potent inhibitor of HMG-CoA reductase, and is also known as Mevinolin or Lovastatin (Mevacor®, a drug produced by Merck & Co., Inc).
- Red yeast rice extract has been sold as a natural cholesterol-lowering agent in over the counter supplements, such as Cholestin™ (Pharmanex, Inc). However, there has been legal and industrial dispute as to whether red yeast rice is a drug or dietary supplement, involving this manufacturer, the U.S. Food and Drug Administration (FDA) and the pharmaceutical industry (particularly producers of HMG-CoA reductase inhibitor prescription drugs or "statins").
- The use of red yeast rice in China was first documented in the Tang Dynasty in 800 A.D. A detailed description of its manufacture is found in the ancient Chinese pharmacopoeia, Ben Cao Gang Mu-Dan Shi Bu Yi, published during the Ming Dynasty (1368-1644). In this text, red yeast rice is proposed to be a mild aid for gastric problems (indigestion, diarrhea), blood circulation and spleen and stomach health. Red yeast rice in a dried, powdered form is called Zhi Tai. When extracted with alcohol it is called Xue Zhi Kang.

### SCIENTIFIC EVIDENCE

<b>Uses</b> <i>These uses have been tested in humans or animals. Safety and effectiveness have not always been proven. Some of these conditions are potentially serious, and should be evaluated by a qualified healthcare provider.</i>	<b>Grade*</b>
<b><u>High cholesterol</u></b> Since the 1970s, human studies have reported that red yeast lowers blood	

Since the 1970s, human studies have reported that red yeast lowers blood levels of total cholesterol, low-density lipoprotein/LDL ("bad cholesterol"), and triglyceride levels.

Other products containing red yeast rice extract can still be purchased, mostly over the Internet. However, these products may not be standardized, and effects are not predictable. For lowering cholesterol, there is better evidence for using prescription drugs such as lovastatin.

*\*Key to grades: A: Strong scientific evidence for this use; B: Good scientific evidence for this use; C: Unclear scientific evidence for this use; D: Fair scientific evidence against this use (it may not work); F: Strong scientific evidence against this use (it likely does not work).*

---

## TRADITION/THEORY

*The below uses are based on tradition, scientific theories, or limited research. They often have not been thoroughly tested in humans, and safety and effectiveness have not always been proven. Some of these conditions are potentially serious, and should be evaluated by a qualified healthcare provider. There may be other proposed uses that are not listed below.*

- Anthrax, anti-inflammatory, atherosclerosis, blood circulation problems, bruised muscles, bruises, cancer, colic in children, cuts, diarrhea, dysentery (bloody diarrhea), hangover, high blood pressure, indigestion, postpartum problems, spleen problems, stomach problems, wounds.

---

## DOSING

*The below doses are based on scientific research, publications, traditional use, or expert opinion. Many herbs and supplements have not been thoroughly tested, and safety and effectiveness may not be proven. Brands may be made differently, with variable ingredients, even within the same brand. The below doses may not apply to all products. You should read product labels, and discuss doses with a qualified healthcare provider before starting therapy.*

### **Adults (18 years and older):**

- 1,200 milligrams of concentrated red yeast powder capsules have been taken two times per day by mouth with food.
- The average consumption of naturally occurring red yeast rice in Asia has been reported as 14-55 grams per day.

### **Children (younger than 18 years):**

- There is not enough scientific evidence to recommend red yeast for children.

---

## SAFETY

*The U.S. Food and Drug Administration does not strictly regulate herbs and supplements. There is no guarantee of strength, purity or safety of products, and effects may vary. You should always read product labels. If you have a medical condition, or are taking other drugs, herbs, or supplements, you should speak with a qualified healthcare provider before starting a new therapy. Consult a healthcare provider immediately if you experience side effects.*

## Allergies

- There is one report of anaphylaxis (a severe allergic reaction) in a butcher who touched meat containing red yeast.

## Side Effects and Warnings

- There is limited evidence about the side effects of red yeast. Mild headache and abdominal discomfort can occur. Side effects may be similar to those for the prescription drug lovastatin (Mevacor®). Heartburn, gas, bloating, muscle pain or damage, dizziness, asthma, and kidney problems are possible. People with liver disease should not use red yeast products.
- In theory, red yeast may increase the risk of bleeding. Caution is advised in patients with bleeding disorders or taking drugs that may increase the risk of bleeding. Dosing adjustments may be necessary. A metabolite of *Monascus* called mycotoxin citrinin (CTN) in fermentation may be harmful.

## Pregnancy and Breastfeeding

- Prescription drugs with similar chemicals as red yeast cannot be used during pregnancy. Therefore, it is strongly recommended that pregnant or breast-feeding women not take red yeast.

---

## INTERACTIONS

*Most herbs and supplements have not been thoroughly tested for interactions with other herbs, supplements, drugs, or foods. The interactions listed below are based on reports in scientific publications, laboratory experiments, or traditional use. You should always read product labels. If you have a medical condition, or are taking other drugs, herbs, or supplements, you should speak with a qualified healthcare provider before starting a new therapy.*

## Interactions with Drugs

- There are not many studies of the interactions of red yeast rice extract with drugs. However, because red yeast rice extract contains the same chemicals as the prescription drug lovastatin, the interactions may be the same. Fibrate drugs or other cholesterol-lowering medication may cause additive effects or side effects when taken with red yeast. Alcohol and other drugs that may be toxic to the liver should be avoided with red yeast rice extract. Taking cyclosporine, ranitidine (Zantac®) and certain antibiotics with red yeast rice extract may increase the risk of muscle breakdown or kidney damage.
- Certain drugs may interfere with the way the body processes red yeast using the liver's "cytochrome P450" enzyme system. Inhibitors of cytochrome P450 may increase the chance of muscle and kidney damage if taken with red yeast.
- In theory, red yeast may increase the risk of bleeding when taken with drugs that increase the risk of bleeding. Some examples include aspirin, anticoagulants ("blood thinners") such as warfarin (Coumadin®) or heparin, anti-platelet drugs such as clopidogrel (Plavix®), and non-steroidal anti-inflammatory drugs such as ibuprofen (Motrin®, Advil®) or naproxen (Naprosyn®, Aleve®).
- Red yeast may produce gamma-aminobutyric acid (GABA), and therefore can have additive effects when taken with drugs that affect GABA such as neurontin

(Gabapentin®).

### Interactions with Herbs and Dietary Supplements

- Red yeast may interact with products that cause liver damage or are broken down in the liver. Grapefruit juice may increase the blood levels of red yeast. Milk thistle, St. John's wort, niacin and vitamin A may interact with red yeast rice extract. Coenzyme Q levels may be lowered by red yeast rice extract. Cholesterol-lowering herbs and supplements like guggul or fish oils may have increased effects when taken with red yeast
- Certain herbs and supplements may interfere with the way the body processes red yeast using the liver's "cytochrome P450" enzyme system. Inhibitors of cytochrome P450 may increase the chance of muscle and kidney damage if taken with red yeast.
- In theory, red yeast may increase the risk of bleeding when taken with herbs and supplements that are believed to increase the risk of bleeding. Multiple cases of bleeding have been reported with the use of *Ginkgo biloba*, and fewer cases with garlic and saw palmetto. Numerous other agents may theoretically increase the risk of bleeding, although this has not been proven in most cases.

### Interactions with Food

- Food may enhance the absorption of red yeast.

---

#### AUTHOR INFORMATION

- This information is based on a systematic review of scientific literature edited and peer-reviewed by contributors to the Natural Standard Research Collaboration ([www.naturalstandard.com](http://www.naturalstandard.com)).

---

#### REFERENCES

*Natural Standard developed the above evidence-based information based on a thorough systematic review of the available scientific articles. For comprehensive information about alternative and complementary therapies on the professional level, go to [www.naturalstandard.com](http://www.naturalstandard.com). Selected references are listed below.*

1. Bonovich K, Colfer H, Petoskey MI, et al. A multi-center, self-controlled study of cholestin in subjects with elevated cholesterol. *Journal of Investigative Medicine* 1999;47(2):54A.
2. Heber D, Yip I, Ashley JM, et al. Cholesterol-lowering effects of a proprietary Chinese red-yeast-rice dietary supplement. *Am J Clin Nutr* 1999;69(2):231-236. [View Abstract](#)
3. Heber D, Lembertas A, Lu QY, et al. An analysis of nine proprietary Chinese red yeast rice dietary supplements: implications of variability in chemical profile and contents. *J Altern Complement Med* 2001;7(2):133-139. [View Abstract](#)
4. Li JJ, Hu SS, Fang CH, et al. Effects of xuezhikang, an extract of cholestin, on lipid profile and C-reactive protein: a short-term time course study in patients with stable angina. *Clin Chim Acta* 2005;352(1-2):217-224. [View Abstract](#)
5. Liu BH, Wu TS, Su MC, et al. Evaluation of citrinin occurrence and cytotoxicity in *Monascus* fermentation products. *J Agric Food Chem* 2005;53(1):170-175. [View Abstract](#)
6. Liu L, Zhao SP, Cheng YC, et al. Xuezhikang decreases serum lipoprotein(a) and C-reactive protein concentrations in patients with coronary heart disease. *Clin Chem* 2003;49(8):1347-1352. [View Abstract](#)
7. Man RY, Lynn EG, Cheung F, et al. Cholestin inhibits cholesterol synthesis and secretion in hepatic cells (HepG2). *Mol Cell Biochem* 2002;233(1-2):153-158. [View Abstract](#)

8. Prasad GV, Wong T, Meliton G, et al. Rhabdomyolysis due to red yeast rice (*Monascus purpureus*) in a renal transplant recipient. *Transplantation* 2002;74(8):1200-1201. [View Abstract](#)
9. Smith DJ, Olive KE. Chinese red rice-induced myopathy. *South Med J* 2003;96(12):1265-1267. [View Abstract](#)
10. SoRelle R. Appeals Court says Food and Drug Administration can regulate Cholestin. *Circulation* 2000;102(7):E9012-E9013. [View Abstract](#)
11. Wang J, Lu Z, Chi J, et al. Multicenter clinical trial of the serum lipid-lowering effects of a *Monascus purpureus* (red yeast) rice preparation from traditional Chinese medicine. *Current Therapeutic Research* 1997;58(12):964-978.
12. Wei W, Li C, Wang Y, et al. Hypolipidemic and anti-atherogenic effects of long-term Cholestin (*Monascus purpureus*-fermented rice, red yeast rice) in cholesterol fed rabbits. *J Nutr Biochem* 2003;14(6):314-318. [View Abstract](#)
13. Yang HT, Lin SH, Huang SY, et al. Acute administration of red yeast rice (*Monascus purpureus*) depletes tissue coenzyme Q(10) levels in ICR mice. *Br J Nutr* 2005;93(1):131-135. [View Abstract](#)
14. Zhao SP, Liu L, Cheng YC, et al. Effect of xuezhikang, a cholestin extract, on reflecting postprandial triglyceridemia after a high-fat meal in patients with coronary heart disease. *Atherosclerosis* 2003;168(2):375-380. [View Abstract](#)
15. Zhao SP, Liu L, Cheng YC, et al. Xuezhikang, an extract of cholestin, protects endothelial function through antiinflammatory and lipid-lowering mechanisms in patients with coronary heart disease. *Circulation* 2004;110(8):915-920. [View Abstract](#)



**Natural Standard Monograph** ([www.naturalstandard.com](http://www.naturalstandard.com))

Copyright © 2006 Natural Standard Inc. Commercial distribution or reproduction prohibited.

The information in this monograph is intended for informational purposes only, and is meant to help users better understand health concerns. Information is based on review of scientific research data, historical practice patterns, and clinical experience. This information should not be interpreted as specific medical advice. Users should consult with a qualified healthcare provider for specific questions regarding therapies, diagnosis and/or health conditions, prior to making therapeutic decisions.