



Cardiovascular Effects of Saffron: An Evidence-Based Review

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Received 15 January 2011; Accepted 28 March 2011

Abstract

Herbal medicine can be a valuable source of assistance for traditional medicine. There are a number of herbs that can be used in conjunction with modern medicine. Herbs can also be taken to aid recovery from serious diseases. Although one should never aim to treat diseases such as cardiovascular disease solely with herbal medicine, the value of herbs used in tandem with modern medicine cannot be ignored. Saffron has been reported to help lower cholesterol and keep cholesterol levels healthy. Animal studies have shown saffron to lower cholesterol by as much as 50%. Saffron has antioxidant properties; it is, therefore, helpful in maintaining healthy arteries and blood vessels. Saffron is also known to have anti-inflammatory properties, which are beneficial to cardiovascular health. The people of Mediterranean countries, where saffron use is common, have lower than normal incidence of heart diseases. From saffron's cholesterol lowering benefits to its anti-inflammatory properties, saffron may be one of the best supplements for cardiac health. This paper reviews the studies regarding the beneficial effects of saffron in cardiovascular health.

J Teh Univ Heart Ctr 2011;6(2):59-61

This paper should be cited as: Kamalipour M, Akhondzadeh S. Cardiovascular Effects of Saffron: An Evidence-Based Review. *J Teh Univ Heart Ctr* 2011;6(2):59-61.

Keywords: Anti-inflammatory agents, non-steroidal • Cardiovascular agents • Lipid regulating agents • *Crocus sativus*

Introduction

The role of alternative medicine in general and phytotherapy in various diseases in particular has been of extreme interest to various scientific and non-scientific communities throughout the world. Phytotherapy is broadly defined as the use of natural therapeutic agents derived from plants or crude herbal drugs. Herbal medicine has a long and respected history and holds a valuable place in the treatment of cardiovascular diseases as well as the vast majority of health problems. Utilizing the leaves, flowers, stems, berries, and roots of plants to both prevent and treat illness, herbal medicine not only helps to alleviate symptoms but also helps

to treat the underlying problem, as well as strengthen the overall functioning of a particular organ or body system.^{1,2}

Cardiovascular diseases are now considered a major cause of mortality not only in the developed world but also in the developing countries. In the age of genomics, nanotechnology, and proteomics, cardiovascular diseases continue to remain a major challenge to therapeutically manage; and the search for a viable evidence-based alternative continues.

Saffron (*Crocus sativus*) is a spice derived from the flower of the saffron crocus (*Crocus sativus*), a species of crocus in the family Iridaceae. The flower has three stigmas, which are the distal ends of the plant's carpels. Together with its style, the stalk connecting the stigmas to the rest of the plant,

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these components are often dried and used in cooking as a seasoning and coloring agent. Saffron, which has for decades been the world's most expensive spice by weight, is native to Iran; it was first cultivated in the Persian Empire.^{2,3} Saffron is characterized by a bitter taste and an iodoform- or hay-like fragrance; these are caused by the chemicals picrocrocin and safranal. It also contains a carotenoid dye, crocin, which gives food a rich golden-yellow hue. These traits make saffron a much-sought ingredient in many foods worldwide. Saffron also has medicinal applications.^{3,4}

Saffron tastes bitter and contributes a luminous yellow-orange coloring to foods. Because of the unusual taste and coloring it adds to foods, saffron is widely used in Persian, Arab, Central Asian, European, Indian, Moroccan, and Cornish cuisines. Confectionaries and liquors also often include saffron. Medicinally, saffron has a long history as part of traditional healing; modern medicine has also discovered saffron as having anticarcinogenic (cancer-suppressing), anti-mutagenic (mutation-preventing), immuno-modulating, and antioxidant-like properties. Saffron has also been used as a fabric dye, particularly in China and India, and in perfumery.^{1,2} Recent studies have shown the beneficial effects of saffron in depression, premenstrual syndrome (PMS), and Alzheimer's Disease.³⁻⁹

Saffron and Heart Disease Protection

Antioxidants in saffron tea can reduce the risk of cardiovascular diseases. The flavonoids, especially lycopene, found in saffron can provide added protection. A clinical trial at the Department of Medicine and Indigenous Drug Research Center showed positive effects of saffron on cardiovascular diseases.¹⁰ The study involved 20 participants, including 10 with heart diseases. According to the Indian Journal of Medical Sciences, all the participants showed improved health, but those with cardiovascular diseases showed more progress. In addition, saffron has been found to be the richest source of riboflavin.^{1,2} Due to the presence of crocetin, it indirectly helps to reduce cholesterol level in the blood and severity of atherosclerosis, thus reducing the chances of heart attacks. It may be one of the prime reasons that in Spain, where Saffron is consumed liberally, the incidence of cardiovascular diseases is quite low. The crocetin present in saffron is found to increase the yield of antibiotics.¹¹ Two compounds of safranal are supposed to increase antibacterial and antiviral physiological activity in the body.¹²

In 2005, Zheng et al. administered crocetin, the natural carotenoid antioxidant, to rabbits to determine its effect on the development of atherosclerosis. The authors randomly assigned New Zealand white rabbits to three different diets for eight weeks: a standard diet, a high lipid diet (HLD), or a high lipid + crocetin diet. The HLD group developed hypercholesterolemia and atherosclerosis, while the crocetin-supplemented group decreased the negative health

effects of a high lipid diet.¹³ The results did not show a significant difference in the plasma lipid levels (total, low density lipoprotein (LDL), and high density lipoprotein (HDL) cholesterol) between the HLD and crocetin groups but did show a significant decrease in the aorta cholesterol deposits, atheroma, foam cells, and atherosclerotic lesions in the crocetin-fed group. They suggested that nuclear factor kappa B (NF- κ B) activation in the aortas is suppressed by antioxidants such as crocetin which in turn decreases the vascular cell adhesion molecule-1 (VCAM-1) expression.¹³

A 2006 study by Sheng and colleagues looked at an alternative mechanism for crocin's atherosclerotic properties.¹⁴ Crocin inhibited an increase in serum triglycerides, total-, LDL-, cholesterol compared to the control group as seen before; however, the results also showed a significant increase in the fecal excretion of fat and cholesterol in the crocin group (100 mg/kg/day).¹⁴ Further studies determined that crocin inhibited pancreatic and gastric lipase activity, although a potential mechanism was not offered. Since pancreatic lipase is responsible for fat absorption by hydrolyzing fat, the inhibition of pancreatic lipase activity resulted in low lipid absorption. With a lack of potential pancreatic lipase inhibitors available, crocin shows promise as a drug for treating hyperlipidemia.¹⁴

In conclusion, saffron helps reduce the risk of heart diseases by strengthening the blood circulatory system. Rich in minerals like thiamin and riboflavin, saffron promotes a healthy heart and prevents different cardiac problems.

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