Vol 15. No. 10 October 2012

Rs. 20/-

ISSN 0972 - 8287

SCIENCE INDIA

THE NATIONAL SCIENCE MAGAZINE

Published by
Swadeshi Science Movement

Interpretation of an Integrated Framework for the Contents of Rig Veda, Puranas and Science

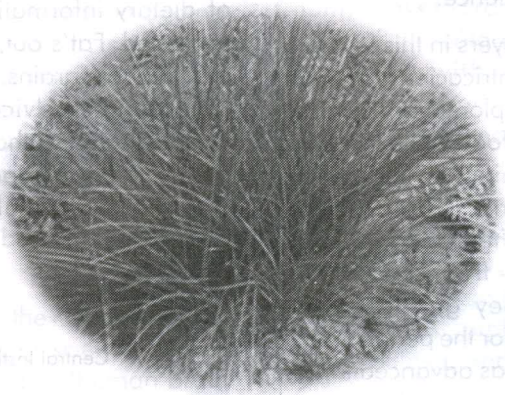
Saffron – A Golden Spice Nutritional and Medicinal Wonder

Ramesh Kumar, N. Ahmed and Shiv Lal

Saffron (*Crocus sativus* L.), one of the world's oldest and expensive spice is a bulbous perennial plant of the family Iridaceae, valued for its golden-coloured, pungent stigmas commonly known as "Golden Spice". The name saffron comes from the Arabic word 'Za'faran', which means yellow. The plants are bulbous, perennial with globular corms, having 8 to 15 leaves, one to three flowers of purple colour with perianth segments of 3.5-5 cm and style branches of 2.5-3.8 cm length. It is a sterile triploid form, flowers have tri-lobed stigma. The plant's purple flowers fail to produce viable seeds; reproduction depends on corms, underground bulb-like starch-storing organs. Saffron is multiplied by division into 5 to 8 "corm lets" that yield new plants. Corms are small brown globules up to 4.5 cm in diameter and are covered by fibers.

Saffron in full bloom

The saffron is produced by drying the stigmas and part of the styles of the lilac-purple autumn flowers. It has a bitter taste and a penetrating aromatic odor. Saffron, also called "Kesar' has been used as a seasoning of foods, fragrance, dye, and medicine for more than 3,000 years. Saffron is native to South West Asia and major saffron growing countries are Iran, Spain and India, among them Iran occupying the maximum area of 43,408 hectares with a total production of 174 tons, and productivity 3.98 kg/ha, contributing about 85% of world's saffron production. Though, India occupies the second largest area of 3,785 ha, the production is only 9.4 tons with an average productivity of 2.50 kg/ha. Spain, with 600 ha of land is the third largest producer with the world highest productivity of 7.84 kg/ha.



Saffron in vegetative stage

Vol-15, No.10 Oct. 2012

Saffron is mostly used in the preparation of food and drinks. Medicinally, saffron is used to treat a wide range of ailments including stomach upsets, bubonic plague, and smallpox, as an anticancer and anti-aging agent etc. It contains crocin, picocrocin and safranal, which are very important ingredients for both medicinal and aesthetic purposes. Owing to the very high crocin content and rich aroma, the Kashmiri saffron is famous worldwide and fetches a fine price over the saffron available from Spain or Iran. It is a legendry crop of Jammu and Kashmir produced on well drained Karewa soils of Kashmir, where ideal climatic conditions are available for vegetative growth and flower production. It grows at an elevation of 1500-2000 m msl. Photoperiod and temperature have a considerable influence on the flowering of saffron. An optimum period of 11 hours light and about 18-20°C temperature during flowering is desirable. Unusually low temperature coupled with high humidity during flowering season affects flowering.

Nutritional composition

The stigmas of the saffron flower contains carbohydrates, proteins, vitamins, minerals, and pigments including crocin, anthocianin, carotene, lycopene, flavonoids and other chemical compounds. The saffron stigma has a distinct and unique colour, flavour and aroma and particular chemical compounds responsible for each of these properties. Saffron's golden yellow-orange colour is primarily the result of α-crocin. The principal element giving "bitter" flavour is the glycoside picrocrocin. The main aroma factor in saffron is safranal. Saffron contains more than 150 volatile and aroma-yielding compounds. It also has many non-volatile active components, many of which are carotenoids, including zeaxanthin, lycopene and various α and β-carotenes.

Chemical composition of saffron

Component	Mass (%)
Carbohydrates	12.0–15.0
Water	9.0–14.0
Polypeptides	11.0–13.0
Cellulose	4.0–7.0
Lipids	3.0–8.0
Minerals	1.0–1.5
Miscellaneous non-nitrogenous	40.0

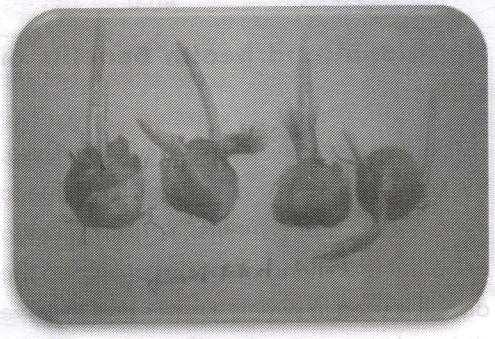
Nutritional and health benefits of saffron

Saffron is widely used as a culinary spice. It is also used in herbal supplements due to its varied health benefits. Saffron gives a beautiful touch and a special aroma to the dish. It is used in sweets, curries and to serve dishes decorated with saffron. On account of its coloring and aromatic properties, saffron is used mostly as a food additive in culinary, bakery and confectionery preparation. It is used in several exotic dishes, particularly in Spanish rice and French fish preparations. It is also used for colouring butter, cheese, pudding and pastry. Saffron possesses many chemical compounds that are known to have disease preventing and health promoting properties. Saffron is also rich in vitamins including vitamin A, folic acid, riboflavin, niacin and vitamin C, all of which are essential in providing good health. Saffron is used for preparing sweets in many Indian, Pakistani and Central Asian countries. It is

also used as a colour and flavoring base in preparing ice-cream, cakes and drinks.

Nutritional facts of saffron

- It is cholesterol free
- Low in sodium content
- Free from sugar
- Rich in iron
- Rich in manganese
- Rich in magnesium
- High in potassium
- High in vitamin B_6
- Very high in vitamin C



Sprouted corms of saffron

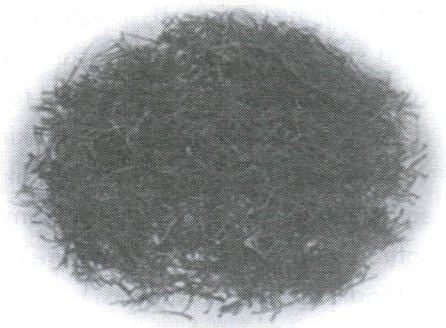
Saffron is a good source of minerals like copper, potassium, calcium, manganese, selenium and zinc. Potassium is an important component of cell and body fluids that help in controlling heart rate and blood pressure. On the other hand, manganese and copper are used as co-antioxidant enzyme superoxide dismutase by the body.

Medicinal benefits

The medicinal properties ascribed to saffron are wide-ranging:

- Saffron has traditionally been considered as an anodyne, a respiratory decongestant, antispasmodic, anti inflammatory, diaphoretic, expectorant, sedative and as a tonic for the heart and the nervous system.
- In combination with other herbs, saffron is also considerable as a good remedy for insomnia, coughing, indigestion and even baldness. It helps to protect eyes from being damaged by harmful UV rays and eye diseases like macular degeneration.
- It is very much effective in lowering the blood cholesterol level and also used to increase blood circulation and relieve stomach and kidney stones.
- It contains carotenoids, which helps in increasing the oxygen diffusivity in the plasma, improving pulmonary oxygenation and also helps to curb skin tumors and improve arthritis.
- The different active components in saffron bring about a positive effect on people with neurodegenerative disorders, memory impairment and soreness and inflammation of the tongue.
- It has anti-cancer properties and is believed to be effective in treating mild and moderate depression.
- The active components that are part of saffron have therapeutic application in many traditional medications as anti-spasmodic, carminative, diaphoretic, antioxidant and anticonvulsant. Saffron also contains several antioxidants such as zeaxanthin and lycopene, which act as a protectant from oxidant induced stress, infections and acts of immune modulators.

- It is used to treat respiratory infections and disorders such as asthma and colds, scarlet fever, smallpox, hypoxia, blood disorders, paralysis, heart diseases, chronic, uterine, hemorrhage, dysmorrhea, amenorrhea and baby colic.
- It acts as an aphrodisiac, a general-use antidote against poisoning, a digestive stimulant, and a tonic for dysentery and measles. It is also used in treating atherosclerosis, stressful menstrual cycles, nasal polyps and stimulating the secretion of stomach acids.
- It prevents Alzheimer's disease and boosts immunity by aiding in the maturation of white blood cells. It eases irritability, depression, and mood swings and is used in the treatment of kidney, bladder and liver disorders.
- Saffron provides relief from joint pains. It has mild sedative properties and can be safely used to provide ample rest during influenza.
- This aromatic spice can speed up the healing of burns and cuts. It is popularly known as a stimulant, warm and dry in action, helping in urinary, digestive and uterine troubles.
- In Ayurveda, saffron is used to cure chronic diseases such as asthma and arthritis. A combination of saffron and ghee is used to treat diabetes.
- Saffron has been used in small whooping cough, stomach gas, consumption, quickens the brain, menopause, impotence, infertility, anemia, neuralgia, lumbago and diarrhea.



Dried saffron stigmas

Other benefits

Historically, saffron was particularly important as a dye plant. Saffron dye used in small quantities will impart a yellowish-orange colour, with increasing redness as more is applied to colour the cloth. In India, Tibet, and China, saffron has been used to produce the yellow red colour of robes for Hindu and Buddhist monks.

- Saffron is widely used in cosmetics - especially in fairness creams. It is an age-old belief that pregnant women consuming saffron give birth to 'fair' babies.
- It is used in making perfumes called 'Zaafran Attar', blended with saffron and sandal wood and also used in religious function as paste on fore heads as symbols of blessing and writing certain holy text.
- It is added to 'Kahwa' - the traditional Saffron tea drunk and to colour and flavour in 'Kashmiri Wazwan' by people in Kashmir.
- It is used as a flavoring agent in many food preparations, from rice dishes, such as biryani, to a variety of sweets.

- It is one of the ingredients in dehydrated food stuff, mixes, soups, masalas, ice cream and many other processed food products. Saffron is used in making various products like saffron cake, saffron pudding, saffron creme caramel, saffron jelly, saffron butter mixture and saffron beverage powders.
- It is also used in making saffron milk, saffron rice, saffron coffee bread, potato saffron omelet, saffron potato onion soup, cornish saffron cake etc.
- It enhances the taste of fishes and also gives golden yellow colour to butter and cheese and improves taste along with other health benefits.
- It is also used in making flavoured chewing tobacco called 'Zaafrani Zarda'.

medicinal and aesthetic purposes. Saffron is used to treat a wide range of ailments including stomach upsets, bubonic plague, and smallpox, as anticancer and anti-aging agent etc. It is considered as a tonic for the heart and the nervous system. Saffron has traditionally been considered as an anodyne, a respiratory decongestant, and antispasmodic, anti inflammatory, diaphoretic, expectorant and sedative. It is a good remedy for insomnia, coughing, indigestion and baldness. It helps to protect your eyes from being damaged by harmful UV rays and eye diseases like macular degeneration. It is very much effective in lowering the blood cholesterol level. The stigmas of the saffron flower also contains carbohydrates, proteins, vitamins, minerals, and pigments including anthocianin, carotene, lycopene, flavonoids and

View of Saffron Experimental farm at CITH, Srinagar

Summary

Saffron (*Crocus sativus* L.), one of the expensive spice of world is commonly known as "Golden Spice". It contains crocin, picocrocin and safranal, which are very important ingredients for culinary, minerals like copper, potassium, calcium, manganese, selenium and zinc.

Ramesh Kumar, N. Ahmed and Shiv Lal
Central Institute of Temperate Horticulture,
Old Air Field
Rangreth P.O. -190 007
Srinagar, J&K
E Mail: