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SAFFRON, SPICE SUPREME

**FARMING
HORIZONS**

Turmeric *Curcuma domestica*, family Zingiberaceae added as an essential spice to almost all Sri Lankan dishes for colour and flavour, and also relied upon as a hair remover by oriental women throughout the ages, is sometimes mistaken as saffron is singularly *Crocus sativa*, a plant belonging to the family Iridaceae. Meadow saffron or autumn *Crocus* (*Colchicum autumnale*, family Liliaceae and safflower or dyer's saffron (*Carthamus tinctorius*, family Compositae) and indeed turmeric are occasionally used substitutes for saffron but are neither related to it nor come close a matching its esteem as a spice. Saffron is a short statured, perennial herb with a spherical underground corm and six or more radially arranged, characteristically narrow and elongated leaves. The redolent, bluish violet flowers are borne singly and their pistils (female parts) bear elongated, pale yellow, exerted, filiform (whiplike) styles divided at the top into tripartite stigmas. The unmitigated red or orange coloured tripartite stigmas along with styles after drying are used as spice in many parts of the world. The cultivated saffron is an autotriploid ($2n = 3x = 24$) plant with 3 sets of 8 basic chromosomes each. The autotriploidy causes very irregular meiotic divisions at gamete forming stages and no seeds are produced. Therefore, saffron is raised entirely by planting corms. *Crocus sativus* widely cultivated in Europe is often confused with two crocus species; *C. napolitanus* and *C. albiflorus*.

Saffron has been cultivated in Persia and Kashmir for long, and had been probably introduced to China during the Mongol occupation under Gengis Khan. The crocus plant is thought to have been indigenous to Iran where it is cultivated extensively. In antiquity saffron had been mainly cultivated in South East Asia Minor in the Mediterranean region. The name saffron had probably been derived from "azafran", the Arabic term for the plant that had later been introduced into Spain by Muslims who cultivated it there around the year 961.

Thereafter, the spice seems to have spread widely through the agency of the seafaring Vikings who had taken cardamoms and saffron to the east to embellish their meat and fish fare as well as Christmas cakes. It is a necessary ingredient to garnish the poignant *Paella* rice preparations of the Spanish.

Saffron had been introduced even to England from Tripoli and was cultivated at a place still known as Saffron Valden in Essex. Only the name reminiscently remains as the cultivation of the crop became

too expensive due to the inhibitive labour costs needed for its harvesting and post harvest processing. Saffron is now being cultivated in Spain, Turkey, Sicily, Switzerland, France, Greece, Austria, Iran, China, India (Kashmir) and Pakistan (Baluchistan) and on the lower slopes of the Apennine mountains in Italy. More than half the world's saffron produce comes from the La Mancha region of central Spain where saffron thrives in conditions of severe winters, torrid summers and acidic soils. The region also became famous when Miguel de Cervantes (1547 - 1616) made it the fictitious home of his windmill jousting, nonconformist knight; Don Quixote, and his shrewd sidekick, Sancho Panza.

The red-yellow pigment of saffron, crocin is a carotenoid present in the stigmas. Crocin is also known as 'gardenin', found in some gardenias from which a pigment called 'wongky' is obtained. Crocin is very soluble in water, a property of great value in the food industry where crocin is widely used as a constituent in cheese, puddings, confectionery and a host of various food preparations. Picrocrocin and safranal are two out of seven such metabolites isolated from saffron. Like everything else, saffron has been used as an aphrodisiac, but no one has been able to get up enough evidence to show its effectiveness.

Saffron oil obtained from the stigmas is the most expensive of all saffron products. Testament to the kingly position of saffron in culinary art is provided by many early writings and its cultivation probably dates back to the ancient Hebrew and Greek cultures. Chinese, Iranians, Kashmiris, Spaniards and Arabs have always mixed it with their rice preparations. Gourmets would not even look at "biryani" (baryani in Pakistan) unless it is liberally laced with saffron. The bright yellow colour of local "buriyani" probably comes from turmeric used as a substitute.

It is just as well, because the best quality saffron costs as much as \$ 1000 a kilogram and would never get below \$ 700 even if there were an inordinate glut in Spain. Saffron dealers swear their precious produce would keep for a hundred years without losing in the least, its many potent properties. One might take such claims with a pinch of salt, but the fact remains that saffron is well known to keep extremely well preserved for long periods in air tight containers; therefore, any glut is easily taken care of.

In India, saffron planting starts in August - September; In Russia it is in June - July, and in Baluchistan the highest yields have been obtained

from Mid-July planting. The corms are planted in well prepared raised seed beds. When the soil is light textured and well drained, the corms are planted in flat beds. In both methods a spacing of 5 cm between rows and 15 cm between rows is best. The beds are fertilized with about 15 - 20 tonnes of farmyard manure per hectare during the last ploughing.

The enchantingly bright coloured *Crocus* flowers emerge in the spring in common with everywhere else where saffron is grown. By late Autumn with the first snows, the most precious crop in the world is ready for picking. An annual rainfall of about 35-45 cm is just about right for saffron; heavy rains at flowering or frost can spoil everything. The crocus plant produces a new crop of corms every year while the old corms decay. About 5 tonnes of seed corms are required to plant a hectare and in fitting soils the corms multiply to about 6 tonnes in three years and double the initial weight in about 10 years. The growth of the crocus plants reaches its highest by the third year after planting and after six years the corms are dug up as seed for planting elsewhere, leaving the land crocus free for about five years.

The average saffron yield in India is comparatively low - about 160 kg of fresh flowers from a hectare turning out about 3-5 kg of dried saffron. However, in some countries, where the crop is well managed, the average saffron yield can be as high as 12.5 kg from a hectare. Still higher saffron yields have been obtained under research conditions in Central Otago, New Zealand where yields of 24.3 kg/ha have been estimated on the basis of experiments. These yields could be twice as high as the yields obtained in traditional saffron growing countries in Europe. Nevertheless, the high labour costs could limit the economical production of saffron in New Zealand.

The flowers remain in bloom only in the morning half of the day making early picking necessary. For highest yields picking every other day has been found to be the best. Bending almost up to the ground level and picking flowers is back-breaking work as 130000 - 150000 flowers are required to make a kilogram of the spice. The task calls for some skill and it is indeed laborious. Picking is only the beginning of the ritual as the slender styles and stigmas have to be carefully dried in the subdued autumnal sun.

(Facts compiled from an AGRIS literature search and from various sources by K. G. W. Abeytunge, Extension & Training Division, Dept. of Agriculture).