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Research Paper

Role of *Za'frān* in the Prevention and Control of NCDs: A Review

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ABSTRACT

Background: Saffron, a natural substance, has been traditionally used for centuries to address a range of disorders. It is obtained from the dried stigmas of the Crocus sativus plant, belonging to the Iridaceae family.
Objective: To explore the role of saffron in preventing and managing non-communicable diseases (NCDs).
Methods: By exploring Unani classical books, NCBI articles, PubMed, Google Scholar, etc.
Results: The results illustrated the role of *Za'frān* as *Dāfi'-i-Tashannuj* (anti-spasmodic), *Dāfi'-i-Maraḍ-i-Alzhā'imar* (anti-alzheimer), *Dāfi'-i-Afsurdagī* (anti-depressant), *Dāfi'-i-Siman Mufriṭ* (anti-obesity), hypoglycemic and *Dāfi'-i-Maraḍ Dhayābīṭus* (anti-diabetic) effects, besides other functions.
Conclusion: This study suggests that saffron, due to its diverse medicinal benefits, could play a significant role in the prevention and management of non-communicable diseases.

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1. INTRODUCTION

Synonyms: In Hindi, it is known as Kesar; in Sanskrit, as Avarakta, Saurab, Mangalya, Agnishikha, Kumkuma, Mangal, and Kusrunam; in English, as Saffron; in Arabic and Persian, as Za'farān and Zarpan; in Bengali, as Jafran; in Bombay, as Safran and Kessar; in Marathi, as Kecara; in Gujarati, as Keshar; in Telugu, as Kunkuma-purva and Kunkumma-purru; in Tamil and Malayalam, as Kunkumappu; in Kannada and Konkani, as Kunkuma-kesara; and in French and German, as Safran.[1]

Nature and distribution: Saffron, derived from the dried stigmas of the Crocus sativus plant (Iridaceae family), is a significant medicinal and culinary product. It ranks among the oldest known spices, with a history tracing back to ancient times. The earliest known representation of saffron, dated between 1600 BC and 1700 BC, was found on a fresco in the Palace of Minos in Crete, depicting individuals harvesting saffron. Regarding its origin, Vavilov suggests that saffron likely originated in the Middle East, although some scholars argue that it may have come from Central Asia or the islands

of Southwest Greece. From these areas, saffron spread to regions such as India, China, and the Middle East. Arab traders further dispersed saffron throughout the Mediterranean, including Morocco, where it was likely introduced by the 9th century. Today, the Taliouine region in Morocco is a key producer of saffron bulbs and stigmas. In recent years, saffron cultivation has expanded to new areas in the country, including El Haouz, Oulmes, Boulmane, Chefchaouen, and Midelt. As of 2015, saffron plantations in Morocco covered around 1,600 hectares, yielding an average of 3.5 tons, placing Morocco as the fourth-largest saffron producer globally. In India, saffron is primarily grown in the Pampore district of Kashmir (Jammu & Kashmir). Cultivation methods vary depending on the region's climatic and soil conditions, as well as local agricultural practices. Saffron requires moderate water levels, between 400 and 600 mm annually. Due to its high market value, saffron holds significant economic importance, offering a strong return on investment due to its premium price[2].

Non-Communicable Diseases (NCDs)

Chronic diseases, also known as non-communicable diseases (NCDs), are characterized by their long duration and slow progression. Most NCDs are non-infectious and result from a combination of genetic, physiological, behavioral, and environmental factors[3]. In recent years, conditions like cardiovascular diseases (CVD), diabetes, chronic obstructive pulmonary diseases (COPD), and cancers have become a global health crisis, particularly affecting developing countries, where nearly half of the affected population dies prematurely, before the age of 70. The World Health Organization (WHO) estimates that the global burden of NCDs will increase by 17% over the next decade, with a 27% rise in the African region alone. NCDs now contribute to nearly half of all deaths in Asia, accounting for 47% of the global disease burden[4].

Phytochemistry and constituents of Saffron

There are three bio-active components of *Za'frān* - Crocin and Crocetin ($C_{20}H_{24}O_4$), Picrocrocin ($C_{16}H_{26}O_7$) and Safranal ($C_{10}H_{14}O$). *Za'frān* is highly aromatic, which is mainly due to Safranal.

Effect of *Za'frān* on Cardio-vascular diseases (CVDs)

Za'frān acts as a tonic for heart and brain i.e. it is having neurotonic and cardiotonic properties.[6,11,12,14] Initial evidence indicates that crocetin may aid in improving atherosclerosis by enhancing plasma oxygen diffusion and reducing cholesterol and triglyceride levels. Additionally, crocetin's ability to bind with albumin could further boost oxygen diffusion, contributing to the improvement of atherosclerosis. The stigma of saffron has also demonstrated a significant inhibitory effect on blood coagulation, which is attributed to the presence of a platelet aggregation inhibitor that contains adenosine.[7] A clinical trial conducted by the Department of Medicine and the Indigenous Drug Research Center demonstrated the beneficial effects of saffron on cardiovascular diseases. The study included 20 participants, of whom 10 had existing heart conditions. According to findings published in the Indian Journal of Medical Sciences, all participants experienced health improvements, with those suffering from cardiovascular diseases showing more significant progress. Additionally, saffron has been identified as a rich source of riboflavin. Thanks to the presence of crocetin, saffron may help lower blood cholesterol levels and reduce the severity of atherosclerosis, thereby decreasing the likelihood of heart attacks. This could explain why Spain, where saffron is widely consumed, has a relatively low incidence of cardiovascular diseases. Moreover, the crocetin in saffron has been shown to enhance the effectiveness of antibiotics. Two compounds derived from safranal are believed to boost the antibacterial and antiviral activities within the body.8 Saffron also aids in alleviating *khafqān* (palpitations).[6]

Effect of *Za'frān* on Blood pressure

The results of the pooled analysis showed no significant decrease in systolic blood pressure; however, there was a notable reduction in diastolic blood pressure following saffron administration.[9] This was demonstrated in a study conducted by Pourmasoumi M, which provided clinical evidence on the effects of saffron (Crocus sativus L.) on cardiovascular risk factors through a systematic review and meta-analysis.

Effect of *Za'frān* on Neurological Diseases

A study named Effects of Crocus sativus and its constituents on nervous system has also proved role of *Za'frān* as *Dāfi'-i-Tashannuj* (anti-spasmodic), *Dāfi'-i-Maraḍ-i-Alzhā'imar* (anti-Alzheimer), *Dāfi'-i-Afsurdagī* (anti-depressant), anti-schizophrenia and anti-Parkinson effects.[10] In Traditional Chinese Medicine, saffron is utilized to treat melancholia, depression, shock, and menstrual disorders.[7]

Effect of *Za'frān* on the Urinary system:

It provides *Taqwiyyat-i-Gurda wa Mathāna* (strengthens the kidneys and bladder) and cleans it up. Intake of *Za'frān* along with honey helps to remove renal stones.[6,13]

Effect of *Za'frān* on Diabetes Mellitus:

In the aforementioned study by Pourmasoumi M on the effects of saffron on cardiovascular risk factors, it was demonstrated that the mean difference in fasting plasma glucose (FPG) showed a trend toward significant reduction following saffron administration.[9]

Effect of *Za'frān* on Arthritis:

Application of *Za'frān* and *Farfīyūn* as *Ḍimād* (paste) is highly beneficial in *Niqris* (Gout) and *Waja' al-Mafāṣil* (Arthritis).[6]

Other Effects of *Za'frān*:

Smaller doses of saffron stimulate gastric secretion, while larger doses promote uterine smooth muscle activity and demonstrate emmenagogue and abortifacient effects.[6] In addition to this it is having *Mufattih-i- Suddad Jigar wa 'Uruq*

(removes obstruction of liver and vessels) properties and is beneficial in '*Asr Tanaffus* (Shortness of breath).[12]

2. METHODOLOGY

Unani classical books were thoroughly explored, besides articles from NCBI, PubMed Google Scholar, etc.

3. RESULTS

The results illustrated the role of *Za'frān* as *Dāfi'-i-Tashannuj* (anti-spasmodic), *Dāfi'-i-Maraḍ-i-Alzhā'imar* (anti-Alzheimer), *Dāfi'-i-Afsurdagī* (anti-depressant), *Dāfi'-i-Siman Mufriṭ* (anti-obesity), hypoglycemic and *Dāfi'-i-Maraḍ Dhayābīṭus* (anti-diabetic effects) besides other functions.

4. DISCUSSION

Although a thorough literature survey was done to completely explore all the literature available on *Za'frān* still there were some limitations to this study which can be attributed to the availability of literature in other languages and the non-availability of translated literature. The Ebers Papyrus (circa 1550 BC) references saffron as a component in treatments for kidney issues. It was suggested to be added to meals as "a cheerful cardiac medicament," with a caution that excessive amounts could suppress appetite, while moderate consumption would enhance appetite and relieve headaches and hangovers. In contemporary times, saffron is utilized to treat catarrhal infections, melancholia, and liver enlargement, and serves as a nerve sedative, carminative, diaphoretic, and emmenagogue.

Recent studies have investigated saffron's potential cardio-protective, anti-hypertensive, anti-ischemic, hypo-lipidemic, anti-oxidant, and notably, anti-inflammatory properties. Many of these therapeutic effects are attributed to its various compounds, including picrocrocin, crocin, crocetin, and safranal.

5. CONCLUSION

This study concludes that *Za'frān* with a range of medicinal benefits will be highly beneficial in the prevention and control of non-communicable diseases. Long-term clinical trials involving each active component of saffron are necessary to support its recommendation as an alternative therapy for patients with non-communicable diseases.

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The best way to prepare saffron

According to FDA guidelines, saffron is classified as a natural food dressing and flavoring without restrictions in the food industry. To comply with the necessary standards, saffron must meet the following criteria:

1. The stigmas of saffron should be yellow, and the maximum amount of foreign organic compounds should be limited to 10%.
2. The moisture content and volatile compounds in dried saffron must not exceed 14%.
3. The total ash content and soluble ash should each be below 1%.

The best way to utilize saffron is by grinding it into a fine powder. To maximize its benefits, saffron stigmas should be added to hot water, which allows for a quick and delicate release of its flavors and color. Since heat helps release the essence and color of saffron, it is important to steep it in hot water while avoiding direct heat, as exposure to direct heat can reduce its beneficial properties.[5]

Dosage

1.75g to 3g. As per a quote, if one takes 9-13.5g of *Za'frān* then so much delightedness and happiness occurs that death may occur. Thus, one should not take beyond the mentioned dosage.[6,13]

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