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Effect of Saffron Extracts on Reproductive Function

Abstract

Saffron (*Crocus sativus L.*), a historically valued medicinal plant, has garnered modern scientific interest due to its diverse bioactive compounds and therapeutic potential. Rich in crocin, crocetin, picrocrocin, and safranal, saffron exhibits antioxidant, anti-inflammatory, antidepressant, and neuroprotective effects. Recent clinical studies have demonstrated its effectiveness in improving symptoms of premenstrual syndrome (PMS), premenstrual dysphoric disorder (PMDD), menopausal discomfort, and female sexual dysfunction. Standardized extracts like Affron® have been shown to enhance mood, reduce anxiety and depression, and improve sleep and hormonal symptoms in women, with minimal side effects. Despite its safety at therapeutic doses, dosage control remains essential to avoid toxicity. This review synthesizes the pharmacological properties and clinical evidence supporting saffron's role in women's health, underscoring its potential as a safe, non-hormonal, plant-based treatment for various gynecological and psychological conditions.

Keywords: *bioactive compounds, saffron extract, reproductive system, female sexual dysfunction, therapeutic potential*

Introduction

Saffron (*Crocus sativus L.*) has long captivated researchers and practitioners for its unique chemical profile, therapeutic versatility and historical prominence across cultures. In recent years, growing scientific attention has focused on its health-promoting properties, particularly in the context of women's reproductive and emotional well-being. Supported by clinical studies and regulatory evaluations, saffron emerges as a promising natural intervention with both traditional and modern medical significance.

Saffron and its Benefits for Health

The history of using the perennial, stemless herbaceous plant from the iris family—saffron crocus (Crocus sativus)—goes back over 3,000 years and spans several continents (Hasheminasab et al, 2024). From Persia, saffron spread to India and China, and only in the 8th–9th centuries, following the Arab-Muslim conquests, did its cultivation begin in Spain and North Africa. Due to to the Crusades of the 11th–13th centuries, it later appeared in France.

Research

For centuries, saffron production has been considered one of the most labor-intensive processes—almost entirely reliant on manual labor. Saffron (Crocus sativus L.) is an extremely delicate crop that requires strict adherence to specific conditions for successful growth. It is sterile due to its polyploidy and can only reproduce vegetatively through daughter corms. Moreover, saffron blooms only three weeks per year—in October. The flowers are harvested exclusively by hand; after about a day of drying in a low-light, dry place at a specific temperature, the stigmas are also removed manually and then dried.

The quality of saffron depends on this processing technique, which must comply with international quality standards—ISO 3632-1:2011 and ISO 3632-2:2011 [14, 15]. As a result, 1,000 Crocus sativus L. flowers yield about 25 grams of stigmas, and after drying, only 5 grams of saffron are obtained (Aucante, 2000).

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Saffron contains around 150 volatile and non-volatile compounds. The main biologically active components of saffron are crocin, crocetin, picrocrocin (which are carotenoids and apocarotenoids derived from zeaxanthin), and safranal (a terpene with an aldehyde functional group) (El Midaoui et al, 2022).

The quality of saffron is associated with its low moisture content, distinctive aroma (due to safranal), reddish-orange color (from crocin and crocetin), and bitter taste (from picrocrocin) (El Midaoui et al, 2022). Because of its vibrant color and high cost, saffron is often referred to as "red gold" and the "golden spice" (Siddiqui et al, 2022).

It is worth noting that crocin, when taken orally, does not enter the bloodstream; instead, it is converted into crocetin in the intestine or excreted unchanged in the feces. Therefore, nanotechnology-based approaches are being developed to improve the stability and bioavailability of crocin. Additionally, the concentration and ratio of saffron's biologically active compounds vary depending on the country of origin, making its effects difficult to interpret in clinical studies (EFSA, 2021).

The water-based extract Affron® is a natural ingredient derived from Spanish saffron (*Crocus sativus L.*), which is considered the highest quality saffron in the world. It is standardized to contain specific amounts of crocin, picrocrocin, and safranal (the total content of crocin and safranal typically ranges from 3.5% to 3.9%).

In early 2021, the European Food Safety Authority (EFSA) panel on Nutrition, Novel Foods and Food Allergens (NDA) concluded that Affron® has health benefits. An interventional study showed that taking 28 mg/day for 4 weeks improved mood in adults (EFSA, 2021).

Saffron has been used for therapeutic purposes since ancient times, including references in the Ebers Papyrus (1550 BCE), Avicenna's Canon of Medicine (11th century), and Indian Ayurvedic literature (Siddiqui et al, 2022). For instance, Avicenna described its use in treating inflammatory and respiratory conditions, as well as its effect on sexual activity (aphrodisiac properties). Many of these effects are now supported by scientific evidence.

Clinical trials indicate that *Crocus sativus* improves sleep in postmenopausal women (Taavoni et al, 2017). Results from a double-blind, randomized, placebo-controlled trial involving 60 postmenopausal women who took either a placebo or 30 mg/day of saffron for 6 weeks demonstrated that saffron is a safe and effective remedy for reducing hot flashes and depressive symptoms in healthy postmenopausal women. It may serve as a non-hormonal alternative treatment for women experiencing hot flashes (Kashani et al, 2018).

In a 12-week double-blind, randomized, controlled trial conducted in Australia with parallel groups, 86 perimenopausal women experiencing menopausal symptoms received either a placebo or 14 mg of saffron extract (Affron®) twice daily. Outcome assessment included the Greene Climacteric Scale, the Positive and Negative Affect Schedule (PANAS), and the Short Form-36 Health Survey (SF-36).

The results showed that the use of saffron extract (Affron®) led to significantly greater improvements in mood and psychological symptoms compared to placebo. Specifically, there was a statistically significant reduction in the psychological score on the Greene Scale ($p = 0.032$), with anxiety levels reduced by 33% and depression scores decreased by 32% compared to baseline. The saffron extract was well tolerated, and no serious side effects were reported (Lopresti & Smith, 2021).

The improvement in psycho-emotional and neurovegetative symptoms is likely linked to the effects of crocin and safranal on the synaptic transmission of monoamine compounds, changes in the levels of neurotransmitters such as serotonin, dopamine, and noradrenaline, as well as increased levels of brain-derived neurotrophic factor (BDNF), the neuropeptide VGF, and the transcription factors CREB and P-CREB (Cerdá-Bernad et al, 2022).

In addition, the biologically active compounds in saffron exhibit anti-inflammatory, antiallergic, antidepressant, antihypertensive, antibacterial, nephroprotective, hepatoprotective, antigenotoxic, antiatherogenic, cardioprotective, and antidiabetic properties, which are especially important in managing women during the peri- and postmenopausal periods.

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The Role of Saffron in Female Reproductive Health

A study by Kashani et al. (2022) conducted in Iran explored the impact of saffron on female sexual dysfunction. The research included married women between the ages of 18 and 55 who were experiencing severe sexual difficulties. Participants received either 15 mg of *Crocus sativus* extract or a placebo, taken twice daily for six weeks. The primary outcome assessed was improvement in the Female Sexual Function Index (FSFI) score. Results showed a significant increase in FSFI scores among those in the saffron group compared to the placebo group, especially in the areas of sexual desire, lubrication, and satisfaction. These results indicate that saffron could be a safe and potentially effective treatment for female sexual dysfunction, though further well-designed studies are recommended to confirm these findings (Kashani et al, 2022).

The therapeutic potential of saffron in addressing gynecological conditions has been extensively examined. Notably, saffron has demonstrated effectiveness in alleviating symptoms associated with premenstrual syndrome (PMS) and premenstrual dysphoric disorder (PMDD). Its beneficial effects are attributed to multiple mechanisms of action, including anti-inflammatory, anti-nociceptive, anticonvulsant, and antidepressant properties (Maleki-Saghooni et al, 2018). Saffron's impact on PMS is largely due to its modulation of serotonin, a key neurotransmitter.

Hormonal fluctuations—particularly changes in testosterone and estradiol levels linked to elevated cortisol during the follicular phase—are significant contributors to PMS symptoms (Hosseinzadeh et al, 2008). A double-blind, placebo-controlled study involving 35 female college students with regular menstrual cycles and PMS symptoms found that brief exposure to the scent of saffron led to significant symptom improvement by reducing cortisol levels (Maleki-Saghooni et al, 2018).

Another randomized, double-blind clinical trial assessed the efficacy of 30 mg of saffron daily for PMS and PMDD. Approximately 70% of women of reproductive age in the saffron group reported a 50% reduction in PMS severity, as measured by a standardized questionnaire. Some mild and tolerable side effects, such as headaches and reduced appetite, were noted (Agha-Hosseini et al, 2008).

Additionally, a 2020 clinical trial involving 120 women diagnosed with PMDD confirmed that saffron effectively reduced depressive symptoms associated with the disorder, with minimal side effects (Rajabi et al, 2020).

Overall, saffron is generally considered safe when used within standard therapeutic doses. However, excessive intake can result in toxic effects, making it crucial to carefully monitor and regulate the dosage to ensure safety.

Conclusion

Saffron (*Crocus sativus L.*) represents a powerful natural remedy with centuries of traditional use now supported by modern scientific evidence. Its unique combination of bioactive compounds offers a range of therapeutic effects, particularly in the context of women's health. Clinical studies confirm saffron's potential to alleviate symptoms of PMS, PMDD, menopause, and female sexual dysfunction, with minimal adverse effects when used in appropriate doses. As research progresses, further high-quality clinical trials are essential to validate its broader applications and optimize dosing strategies for therapeutic use.

References

1. Agha-Hosseini, M., Kashani, L., Aleyaseen, A., Ghoreishi, A., Rahmanpour, H. A. L. E. H., Zarrinara, A. R., & Akhondzadeh, S. (2008). Crocus sativus L.(saffron) in the treatment of premenstrual syndrome: a double-blind, randomised and placebo-controlled trial. *BJOG: An International Journal of Obstetrics & Gynaecology*, *115*(4), 515-519.
2. Aucante, P. (2000). Le safran-chroniques du potager. *Actes sud Ed.*

ISSN: 2707-1146
e-ISSN: 2709-4189

3. Cerdá-Bernad, D., Costa, L., Serra, A. T., Bronze, M. R., Valero-Cases, E., Pérez-Llamas, F., ... & Frutos, M. J. (2022). Saffron against neuro-cognitive disorders: an overview of its main bioactive compounds, their metabolic fate and potential mechanisms of neurological protection. *Nutrients*, *14*(24), 5368.
4. EFSA Panel on Nutrition, Novel foods and Food allergens (NDA), Turck, D., Castenmiller, J., De Henauw, S., Hirsch-Ernst, K. I., Kearney, J., ... & Siani, A. (2021). Affron® and increase in positive mood: Evaluation of a health claim pursuant to Article 13 (5) of Regulation (EC) No 1924/2006. *EFSA Journal*, *19*(7), e06660.
5. El Midaoui, A., Ghzaiel, I., Vervandier-Fasseur, D., Ksila, M., Zarrouk, A., Nury, T., ... & Lizard, G. (2022). Saffron (Crocus sativus L.): A source of nutrients for health and for the treatment of neuropsychiatric and age-related diseases. *Nutrients*, *14*(3), 597.
6. Hasheminasab, F. S., Azimi, M., & Raeiszadeh, M. (2024). Therapeutic effects of saffron (Crocus sativus L) on female reproductive system disorders: A systematic review. *Phytotherapy Research*, 38(6), 2832-2846.
7. Hosseinzadeh, H., Ziaee, T., & Sadeghi, A. (2008). The effect of saffron, Crocus sativus stigma, extract and its constituents, safranal and crocin on sexual behaviors in normal male rats. *Phytomedicine*, *15*(6-7), 491-495.
8. Kashani, L., Esalatmanesh, S., Eftekhari, F., Salimi, S., Foroughifar, T., Etesam, F., ... & Akhondzadeh, S. (2018). Efficacy of Crocus sativus (saffron) in treatment of major depressive disorder associated with post-menopausal hot flashes: a double-blind, randomized, placebo-controlled trial. *Archives of gynecology and obstetrics*, *297*, 717-724.
9. Kashani, L., Aslzadeh, S., Shokraee, K., Shamabadi, A., Najafabadi, B. T., Jafarinia, M., ... & Akhondzadeh, S. (2022). Crocus sativus (saffron) in the treatment of female sexual dysfunction: a three-center, double-blind, randomized, and placebo-controlled clinical trial. *Avicenna Journal of Phytomedicine*, *12*(3), 257.
10. Lopresti, A. L., & Smith, S. J. (2021). The effects of a saffron extract (affron®) on menopausal symptoms in women during perimenopause: A randomised, double-blind, placebo-controlled study. *Journal of menopausal medicine*, *27*(2), 66.
11. Maleki-Saghooni, N., Mirzaeii, K., Hosseinzadeh, H., Sadeghi, R., & Irani, M. (2018). A systematic review and meta-analysis of clinical trials on saffron (Crocus sativus) effectiveness and safety on erectile dysfunction and semen parameters. *Avicenna journal of phytomedicine*, *8*(3), 198.
12. Rajabi, F., Rahimi, M., Sharbafchizadeh, M. R., & Tarrahi, M. J. (2020). Saffron for the management of premenstrual dysphoric disorder: a randomized controlled trial. *Advanced Biomedical Research*, *9*(1), 60.
13. Siddiqui, S. A., Ali Redha, A., Snoeck, E. R., Singh, S., Simal-Gandara, J., Ibrahim, S. A., & Jafari, S. M. (2022). Anti-depressant properties of crocin molecules in saffron. *Molecules*, *27*(7), 2076.
14. Taavoni, S., Ekbatani, N. N., & Haghani, H. (2017). Effect of Tribulus terrestris, ginger, saffron, and Cinnamomum on menopausal symptoms: a randomised, placebo-controlled clinical trial. *Menopause Review/Przegląd Menopauzalny*, *16*(1), 19-22.

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