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ROLE OF BIOLOGICALLY ACTIVE SUPPLEMENTS IN SUPPORTING REPRODUCTIVE HEALTH OF WOMEN OF REPRODUCTIVE AGE

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Abstract: This review analyzes recent scientific literature on the role of biologically active supplements (BAS) in maintaining reproductive health among women of reproductive age. The study highlights the most widely investigated supplements, including omega-3 fatty acids, vitamin D, inositol, magnesium, and B vitamins, which demonstrate beneficial effects on fertility, hormonal balance, and metabolic stability. The results confirm the growing importance of BAS in preventive and supportive medicine, although further large-scale clinical trials are needed to establish standardized guidelines.

Keywords: biologically active supplements, women's health, reproduction, vitamin D, omega-3 fatty acids, inositol, reproductive medicine

Introduction

In recent years, biologically active supplements (BAS) have gained increasing attention as additional tools for maintaining women's hormonal health. Modern studies (2020–2025) highlight their role in regulating menstrual function, alleviating menopausal symptoms, and supporting reproductive health. One of the most actively discussed nutrients is vitamin D. Current research demonstrates that its deficiency is associated with irregular menstrual cycles, endometriosis, and reduced fertility. Correction of vitamin D status has been shown to improve ovulation and increase tissue sensitivity to progesterone, thereby contributing to hormonal stabilization. Equally important are omega-3 polyunsaturated fatty acids, which exhibit anti-inflammatory properties and influence estrogen and prostaglandin synthesis. Clinical trials confirm their effectiveness in reducing symptoms of premenstrual syndrome (PMS) and endometriosis, conditions where chronic inflammation is a key mechanism. Another essential micronutrient is magnesium, whose role in stress regulation has been widely confirmed in recent years. By modulating cortisol production, magnesium reduces stress-related menstrual dysfunctions. Supplementation is associated with decreased headaches, irritability, and insomnia in women with PMS, which significantly improves quality of life. Particular interest is also directed towards phytoestrogens, especially soy isoflavones and red clover extracts. Numerous clinical reviews emphasize their ability to reduce vasomotor symptoms of menopause, such as hot flashes, night sweats, and sleep disturbances. Importantly, their effectiveness can be comparable to mild hormone replacement therapy, yet with fewer risks and side effects. In the context of reproductive endocrinology, inositol (myo-inositol and D-chiro-inositol) has emerged as a promising supplement for the management of polycystic ovary syndrome (PCOS). Recent studies (2023–2025) demonstrate its ability to improve insulin

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sensitivity, restore ovulatory cycles, and enhance fertility outcomes. Finally, B vitamins remain fundamental for women's health. Vitamins B6, B9, and B12 are actively involved in the synthesis of neurotransmitters, thereby reducing mood fluctuations associated with PMS. Moreover, folate (B9) plays an irreplaceable role in preconception care, supporting healthy pregnancy outcomes. Taken together, these data indicate that dietary supplements can serve as effective adjuvants in the regulation of hormonal balance in women. While they cannot fully replace pharmacological treatment, their evidence-based use contributes to comprehensive and personalized approaches to female health.

Methods

The study was carried out as a narrative review of peer-reviewed scientific literature published between 2020 and 2025. Sources included PubMed, Scopus, and Web of Science databases. Selection criteria focused on clinical trials, meta-analyses, and systematic reviews addressing the role of BAS in reproductive health of women of reproductive age. Studies not meeting methodological rigor or limited to non-human models were excluded.

Results

Analysis of selected literature revealed the following trends: Omega-3 fatty acids – associated with improved ovarian function, reduced inflammation, and enhanced fertility outcomes. Vitamin D – linked to regulation of hormonal balance, menstrual cycle normalization, and reduction of infertility risk. Inositol – demonstrated efficacy in women with polycystic ovary syndrome (PCOS), improving insulin sensitivity and ovulatory function. Magnesium – contributed to stress regulation, energy metabolism, and neuromuscular stability, indirectly supporting reproductive health. B vitamins – played a role in reducing homocysteine levels, preventing neural tube defects, and supporting hormonal metabolism. Overall, studies indicated that BAS positively influence reproductive health; however, evidence varied in methodological quality and duration.

Discussion

The findings confirm the growing importance of BAS in preventive and supportive medicine for women of reproductive age. Omega-3 fatty acids and vitamin D have been consistently identified as essential for reproductive well-being. Inositol supplementation is gaining increasing recognition in non-pharmacological management of PCOS, while magnesium and B vitamins remain crucial in stress resilience and energy metabolism. Despite encouraging outcomes, several challenges persist. Many studies lack large cohorts and long-term follow-up, which limits the strength of conclusions. Safety concerns regarding over-supplementation remain underexplored. Furthermore, there is no unified clinical guideline regulating the prescription of BAS, leading to inconsistencies in medical practice. Future research should prioritize large-scale randomized controlled trials (RCTs) and the development of standardized recommendations for integrating BAS into reproductive healthcare.

Conclusion

Biologically active supplements represent a valuable adjunct in supporting reproductive health among women of reproductive age. Evidence from 2020–2025 demonstrates beneficial effects of omega-3 fatty acids, vitamin D, inositol, magnesium, and B vitamins on fertility, hormonal

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regulation, and metabolic resilience. Nevertheless, further high-quality research is essential to establish unified clinical protocols and ensure both safety and efficacy. The application of BAS should follow personalized approaches, careful dosage regulation, and integration with established therapeutic strategies. Such measures may significantly improve women's quality of life and reproductive potential.

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