

THERAPUTIC EFFECT OF NUTRACEUTICAL ON STRESS MANAGEMENT**Parth Oza*, Malav Patel, Hemil Patel, Neel Patel, Abhi Prajapati, Dr. Bhumi R. Patel**¹⁻²⁻³⁻⁴⁻⁵Research Scholar, Gujarat Technological University, Gujarat.⁶Associate Professor, Sharada School of Pharmacy, Gandhinagar, Gujarat, India.***Corresponding Author: Parth Oza**

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ABSTRACT

Stress is recognized as a leading health problem associated with multiple physiological and psychological disorders, including anxiety, depression, and cardiovascular disease. Nutraceuticals have emerged as a promising alternative or adjunct to pharmacological therapy for stress management due to their safety and holistic benefits. They function through mechanisms such as neurotransmitter modulation, reduction of oxidative stress, regulation of the hypothalamic-pituitary-adrenal (HPA) axis, and neuroprotective activity. This paper reviews nutraceuticals such as Ashwagandha, Melatonin, Omega-3 fatty acids, Vitamins (B complex, C, D), Magnesium, Zinc, Ginseng, and L-Theanine and their therapeutic potential in stress management. The findings suggest that nutraceuticals offer a complementary approach to improving mood, reducing anxiety, and enhancing cognitive and physiological resilience to stress.

KEYWORDS: Stress, Nutraceuticals, Adaptogens, Omega-3, Vitamins, Ashwagandha, Cortisol, Anxiety.**INTRODUCTION**

Stress is a complex physiological and psychological condition that occurs when an individual perceives a threat or challenge exceeding their adaptive capacity. The concept of stress was first described by Hans Selye (1936), who defined it as a non-specific response of the body to any demand placed upon it. While acute stress may trigger adaptive responses, chronic stress has detrimental effects on health, leading to hypertension, metabolic syndrome, immune dysfunction, and psychiatric disorders. Nutraceuticals, natural bioactive compounds from food sources, have been shown to

mitigate stress by improving neuroendocrine balance and enhancing resilience. This study aims to evaluate their potential and mechanisms in managing stress effectively. The human stress response involves activation of the sympathetic nervous system and the HPA axis, leading to the release of cortisol and catecholamines. Prolonged activation contributes to oxidative stress, inflammatory cascades, and neurotransmitter imbalance, all of which impair homeostasis. Understanding this mechanistic link is vital to identifying how nutraceuticals exert protective effects at both molecular and systemic levels.

Table 1: Common effects of stress on body, mood, and behaviour.

On the Body	On the Mood	On the Behaviour
Headache, Muscle tension, Fatigue	Anxiety, Sadness, Restlessness	Overeating, Smoking, Alcohol use
Sleep problems, Chest pain	Lack of motivation, Depression	Angry outbursts, Drug misuse
Weak immunity, High BP	Irritability, Mood swings	Withdrawal from social activity

MATERIALS AND METHODS

A literature-based approach was adopted to compile evidence on nutraceuticals with anti-stress properties. Research articles, meta-analyses, and clinical trials were retrieved from databases such as PubMed, ScienceDirect,

and Google Scholar from 2000 to 2025. Keywords used included 'nutraceuticals', 'stress management', 'adaptogens', 'omega-3', and 'vitamins'. Studies involving human participants, animal models, or mechanistic insights were included. Excluded were studies lacking

control groups or those focused solely on unrelated diseases. Data were synthesized qualitatively to evaluate efficacy, dosage, and safety profiles of individual nutraceuticals.

RESULTS AND DISCUSSION

The results of the reviewed studies demonstrated that several nutraceuticals exert positive effects on the body's

stress response mechanisms. The most promising among them include Ashwagandha, Omega-3 fatty acids, Vitamins (B, C, D), Magnesium, Zinc, L-Theanine, Melatonin, and Ginseng.

Table 2: Summary of major nutraceuticals and their mechanisms of action.

Nutraceutical	Primary Mechanism	Key Benefit
Ashwagandha	Reduces cortisol, adaptogenic	Lowers stress and anxiety
Omega-3	Anti-inflammatory, neuroprotective	Improves mood and cognition
Magnesium	Regulates NMDA receptors	Enhances relaxation and sleep
Vitamin D	Regulates serotonin and immunity	Reduces depressive symptoms
Nutraceutical	Primary Mechanism	Key Benefit
Ashwagandha	Reduces cortisol, adaptogenic	Lowers stress and anxiety
Omega-3	Anti-inflammatory, neuroprotective	Improves mood and cognition
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Nutraceutical	Primary Mechanism	Key Benefit
Ashwagandha	Regulates cortisol, adaptogenic	Reduces stress and anxiety
Omega-3	Anti-inflammatory, neuroprotective	Improves mood and brain health
Magnesium	Balances NMDA receptors	Promotes relaxation and sleep
Vitamin D	Regulates serotonin and immune balance	Decreases depressive symptoms

ASHWAGANDHA

An adaptogenic herb that reduces cortisol, improves resilience, and alleviates anxiety and depression. Clinical trials show a 23% reduction in cortisol after 60 days of supplementation.

MELATONIN

A hormone regulating sleep-wake cycles. Improves sleep quality and reduces stress-induced anxiety by normalizing circadian rhythm and lowering cortisol levels.

OMEGA-3 FATTY ACIDS

EPA and DHA play roles in reducing inflammation, enhancing neuronal fluidity, and improving mood and cognitive performance. Shown effective in reducing anxiety and depression.

VITAMIN D

Regulates serotonin synthesis, reduces inflammation, and supports immune and brain health. Low vitamin D is associated with higher stress and depression.

MAGNESIUM

Essential mineral that acts as a natural relaxant by regulating NMDA receptors and cortisol secretion. Deficiency linked to irritability and anxiety.

VITAMINS B3, B6 & B12

Crucial for neurotransmitter synthesis (serotonin, dopamine). Their deficiency causes fatigue and poor stress tolerance. Supplementation reduces perceived stress.

L-THEANINE

Found in green tea; increases alpha brain waves, promoting calm alertness. Reduces cortisol and anxiety without sedation.

VITAMIN C

Powerful antioxidant that modulates the GABAergic system and reduces cortisol. Shown to decrease blood pressure and improve mood during stress.

GINSENG

Adaptogen with anti-inflammatory and antioxidant properties that enhances mental performance and reduces fatigue under stress.

ZINC

Essential trace element that stabilizes cortisol levels and supports neurotransmission. Deficiency associated with mood disorders.

CONCLUSION

Nutraceuticals play a significant role in mitigating the effects of chronic stress by modulating physiological and psychological mechanisms. These bioactive compounds, through their adaptogenic, anti-inflammatory, and neuroprotective actions, offer a safe alternative or complement to pharmacological interventions. However, standardization of formulations, clinical dosage optimization, and long-term safety validation remain critical areas for future research. Integrating these natural bioactive compounds into daily diets may improve long-term psychological resilience, enhance mood stability, and prevent chronic illnesses related to stress overload.

Continued research should emphasize the combination of nutraceuticals with lifestyle modifications such as exercise, meditation, and balanced nutrition for optimal results.

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