



O'zbekiston Respublikasi Oliy ta'lim, fan va innovatsiyalar vazirligi

Toshkent kimyo-texnologiya instituti

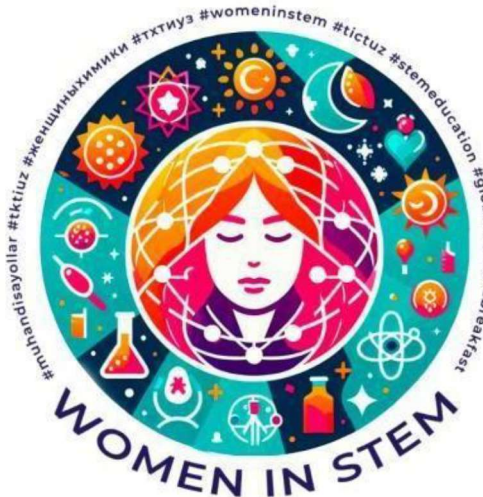
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Integral Universiteti (Hindiston)

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"WOMEN IN STEM"

**XALQARO FORUM
ILMIY ISHLAR TO'PLAMI
BOOK OF PROCEEDINGS**

TOSHKENT, 2026-yil, 14-17-FEVRAL



“Women in STEM-2026” ilmiy haftaligi “Innovator ayollar: Ko‘plab ovoz — bitta kelajak” xalqaro ilmiy forumi materiallari. Maqolalar to‘plami. –Toshkent, TKTI, 2026, 572 b. <https://doi.org/10.5281/zenodo.18826650>

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To‘plam materiallaridan mutaxassis, o‘qituvchi, tadqiqotchi hamda magistratura va bakalavriyat talabari foydalanishi mumkin.

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This collection consists of materials of the international scientific forum “Women-Innovators: Many voices — one future”, organized by the Tashkent Institute of Chemical Technology on February 14-17, 2026, within the framework of scientific week “Women in STEM-2026” and celebration of United Nations “February 11 - International Day of Women and Girls in Science”.

The Book of proceedings can be used by specialists, teachers, researchers, as well as master's and bachelor's degree students.

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MUCUNA PRURIENS CHEMICAL CONSTITUENTS AS POTENT MALE ANTI-INFERTILITY AGENT

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Abstract

The inability of a couple to conceive even after a year of frequent unprotected sexual activity is commonly referred to as infertility. The decline in male reproductive efficacy is increasingly attributed to molecular imbalances within the hypothalamic-pituitary-gonadal (HPG) axis and the accumulation of oxidative stressors. While synthetic interventions are available current chemical research is pivoting toward natural product scaffolds for their multi target functionality. Among these *Mucuna pruriens* stands out due to its high concentration of L-DOPA (L-3,4-dihydroxyphenylalanine), a non-protein amino acid that serves as a critical biochemical precursor to dopamine. This abstract examines the chemical mechanisms by which *M. pruriens* constituents mitigate infertility by modulating steroidogenesis and neutralizing reactive oxygen species (ROS).

The therapeutic efficacy of *Mucuna pruriens* is primarily driven by the structural bioavailability of its L-Dopa content. Chemically L-Dopa crosses the blood brain barrier and undergoes decarboxylation to dopamine which inhibits the release of prolactin, a peptide hormone that in excess, suppresses testosterone biosynthesis. By maintaining the chemical homeostasis of dopamine *Mucuna* extracts facilitate the upregulation of Luteinizing Hormone (LH) and Follicle Stimulating Hormone (FSH). Furthermore, phytochemical screening of *Mucuna* seeds reveals a complex matrix of alkaloids polyphenols and tocopherols. These molecules possess high electron donating potential allowing them to scavenge hydroxyl and superoxide radicals within the seminal environment thereby protecting the integrity of the sperm's polyunsaturated fatty acid (PUFA) membranes from lipid peroxidation.

To ensure clinical reproducibility analytical standardization of these extracts is paramount. Advanced techniques such as Reverse-Phase High-Performance Liquid Chromatography (RP-HPLC) are utilized to quantify L-Dopa levels often using a mobile phase of dilute phosphoric acid or methanol to achieve sharp peak resolution. Additionally Liquid Chromatography-Mass Spectrometry (LC-MS/MS) is employed to map the broader "chemical fingerprint" of the seed, identifying secondary metabolites that may act synergistically with L-Dopa to enhance its stability. In conclusion, the integration of *Mucuna pruriens* into fertility treatments represents a sophisticated application of bio-organic chemistry where specific plant derived molecular structures are leveraged to restore systemic hormonal balance and protect cellular DNA.

KEYWORDS: *Mucuna pruriens*, Phytochemicals, male infertility.

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