Impact Factor: 9.9 ISSN-L: 2544-980X

Antidiabetic Effect of Curcumin

Boltaev Mizrob Mavlonovich [1]

Annotation: Curcumin is a bioactive molecule present in the rhizome of the Curcuma longa plant, also known as turmeric. Curcumin, as a member of the curcuminoids, is a natural non-flavonoid phenol. Curcumin has various pharmacological and biological effects that have been described by in vitro and in vivo studies, and include antioxidant, cardioprotective, anti-inflammatory, antimicrobial, nephroprotective, antitumor, hepatoprotective, immunomodulatory, hypoglycemic and antirheumatic effects.

Key words: Curcumin, Curcuma longa, hypoglycemic, type 2 diabetes mellitus.

Introduction. Type 2 diabetes mellitus (T2DM) is a collection of metabolic diseases that have reached pandemic proportions worldwide. The multifactorial nature of the pathology makes patient management extremely difficult, including lifelong drug therapy and lifestyle modification. It is well known that type 2 diabetes is a preventable disease, so reducing the incidence of new cases of type 2 diabetes may be a key strategy to reduce the global impact of diabetes. Currently, more and more data are emerging on the effectiveness of using medicinal plant supplements for the prevention and treatment of type 2 diabetes. Among these medicinal plants, curcumin is of growing interest in the scientific community [1,2,3].

Curcumin is a bioactive molecule present in the rhizome of the Curcuma longa plant, also known as turmeric. Curcumin, as a member of the curcuminoids, is a natural non-flavonoid phenol. Curcuminoids are a combination of curcumin, chemically diferuloylmethane (1,7-bis[4-hydroxy-3-methoxyphenyl]hepta-1,6-diene-3,5-dione) with two of its components, demethoxy-curcumin (4-hydroxycinnamoyl- [4-hydroxy-3-methoxycinnamoyl]methane) and bis-demethoxycurcumin (bis-[4-hydroxycinnamoyl]methane) [8]. Curcumin has various pharmacological and biological effects that have been described by in vitro and in vivo studies, and include antioxidant, cardioprotective, anti-inflammatory, antimicrobial, nephroprotective, antitumor, hepatoprotective, immunomodulatory, hypoglycemic and antirheumatic effects. In animal models, curcumin extract delays the development of diabetes, improves β-cell function, prevents β-cell death, and reduces insulin resistance [1]. The turmeric plant, widely used in cooking as a spice (also present in curry powder) and in the scientific community, is known as Curcuma longa. This plant species is characterized by orange tuberous rhizomes and is widely cultivated in Southeast Asia, where it has been used since ancient times as a natural remedy for various pathological conditions. The particular characteristics that have attracted the attention of scientists to curcumin as a nutraceutical are the following: antioxidant and anti-inflammatory activity, as well as the safety of its pharmacological profile [4,5,6]. Moreover, various mechanisms of action by which this plant overcomes multiple sclerosis have been presented. According to research, turmeric and its bioactive component curcumin, due to its anti-inflammatory and antioxidant properties, have anti-diabetic effects by increasing insulin release, anti-hyperlipidemic effects by increasing fatty acid absorption, anti-obesity effects by reducing lipogenesis and anti-hypertensive effects by increasing nitric oxide. According to several in vivo, in vitro and human studies, it can be concluded that turmeric or curcumin has important value as an adjunctive therapy in multiple sclerosis [7].

Curcuma longa, a rooted plant in the ginger family, has become the first choice for alternative medicine due to its anti-inflammatory, antioxidant and digestive properties. Its main ingredient,

[1] Assistant at the Department of Pharmacology, Bukhara State Medical Institute

curcumin, is also a natural active oxygen scavenger and active nitrogen provider, and has been proven to be effective in treating pain caused by arthritis and OA [12]. The main mechanism may be related to the protection of IL-1B-induced apoptotic chondrocytes, improvement of early degenerative changes of articular cartilage, inhibition of the production of cytoplasmic phospholipase A2 (cPLA2), cyclooxygenase 2 (COX-2), 5-lipoxygenase (5-LOX) etc. [12,13]. Recent clinical studies have also shown that curcumin can improve many indicators of OA. A recent meta-analysis showed that curcumin can effectively treat patients with OA, improve The Western Ontario and McMaster Universities (WOMAC) score and visual analog scale (VAS) score, and its side effects are not higher than that of ibuprofen, but only five randomized controlled trials (RCTs) were included, which severely limited its applicability of evidence [14]. Another meta-analysis found that curcumin and frankincense formula can relieve symptoms while reducing safety risks. It may be supplementary evidence for the treatment of knee OA, but the quality of the included RCTs is limited, and the number is too small to make it impossible for definite clinical practice recommendations [15]. With the gradual increase in RCTs [16–20] and the accumulation of evidence, there is an urgent need to update the systematic review and meta-analysis. Therefore, this article will conduct a systematic review and meta-analysis on the efficacy and safety of curcumin intervention in OA based on the latest updated evidence.

List of references:

1. Pivari, F., Mingione, A., Brasacchio, C., & Soldati, L. (2019). Curcumin and Type 2 Diabetes Mellitus: Prevention and Treatment. Nutrients, 11(8), 1837. https://doi.org/10.3390/nu11081837
2. Boltaev, M. (2023). CURCUMA LONGANI XALQ VA AN'ANAVIY TABIBIDA AHAMIYATI. Центральноазиатский журнал образования и инноваций, 2(6 Part 4), 42-46.
3. Болтаев, М. М. (2023). ЗНАЧЕНИЕ КУРКУМЫ В НАРОДНОЙ И ТРАДИЦИОННОЙ МЕДИЦИНЕ. European Journal of Interdisciplinary Research and Development, 16, 367-372.
4. Mavlonovich, B. M. (2023). Phytochemical Features of Turmeric in Folk and Traditional Medicine. American Journal of Pediatric Medicine and Health Sciences (2993-2149), 1(9), 519–523. Retrieved from http://grnjournal.us/index.php/AJPMHS/article/view/1680
5. Болтаев, М. М. (2023). Фитохимические Особенности Куркумы В Народной И Традиционной Медицине. Research Journal of Trauma and Disability Studies, 2(11), 399-405.
6. Kunnumakkara, A. B., Bordoloi, D., Padmavathi, G., Monisha, J., Roy, N. K., Prasad, S., & Aggarwal, B. B. (2017). Curcumin, the golden nutraceutical: multitargeting for multiple chronic diseases. British journal of pharmacology, 174(11), 1325–1348. https://doi.org/10.1111/bph.13621
7. Vafaeipour, Z., Razavi, B. M., & Hosseinzadeh, H. (2022). Effects of turmeric (Curcuma longa) and its constituent (curcumin) on the metabolic syndrome: An updated review. Journal of integrative medicine, 20(3), 193–203. https://doi.org/10.1016/j.joim.2022.02.008
8. Мелибоева, Ш. Ш., Болтаев, М. М., & Шарипова, Э. М. (2021). Сравнительная Эффективность Препарата «Нодинорм» При Комплексном Лечении Фиброзно-Кистозной Мастопатии. Central Asian Journal of Medical and Natural Science, 114-119.
9. Мелибоева, Ш. Ш. К., Мусаева, Д. М., Шарипова, Э. М., & Болтаев, М. М. (2020). Ботаническая характеристика лекарственного растения «broccoli», фармакологические свойства и химический состав лекарственного растительного сырья «brassica oleracea». Вестник науки и образования, (24-1 (102)), 98-102.
10. Sh, M. S. (2022). Comparative analysis of common fennel regenerants according to the main morpho-biological features based on I. European Journal of Life Security and Stability (2660-9630), 15, 299-303.
11. Болтаев, М. М., & Мелибоева, Ш. Ш. к., Джалилов, ФС, Юлдашева, ДХ, Джалилова, ФС, & Самадов, БШ (2022). ПРИМЕНЕНИЕ БРОККОЛИ И ПРОРОСТКОВ БРОККОЛИ В

ПРОФИЛАКТИКЕ И ЛЕЧЕНИИ РАЗЛИЧНЫХ ЗАБОЛЕВАНИЙ. Журнал химии товаров и народной медицины, 1(4), 242-254.

12. Болтаев, М. М., кизи Мелибоева, Ш. Ш., Джалилов, Ф. С., Юлдашева, Д. Х., Джалилова, Ф. С., & Самадов, Б. Ш. (2022). BROKKOLI VA BROKKOLI NIHOLLARIDAN TURLI KASALLIKLARNING OLDINI OLISH VA DAVOLASHDA FOYDALANISH. Журнал химии товаров и народной медицины, 1(4), 242-254.
13. Джалилов, Ф. С., Болтаев, М. М., & кизи Мелибоева, Ш. Ш. (2022). BROCCOLINING SHIFOBAXSH XUSUSIYATLARI. Журнал химии товаров и народной медицины, 1(3), 194-205.
14. Meliboeva, S., Boltayev, M., & Jalilov, F. (2022). The effect of broccoli sprouts on diabetes mellitus and the gastrointestinal tract. Science and innovation, 1(D5), 81-87.
15. Болтаев, М. М., Шарипова, Э. М., & Мелибоева, Ш. Ш. (2022). ПЕРВЫЕ ЛЕЧЕБНО-БОТАНИЧЕСКИЕ САДЫ НА ТЕРРИТОРИИ СОВРЕМЕННОГО УЗБЕКИСТАНА. IJTIMOIY FANLARDA INNOVASIYA ONLAYN ILMIY JURNALI, 96-100.
16. Boltaev, M. M., Sh, M. S., & Jalilov, F. S. (2023). PREPARATION AND DRYING OF BROCCOLI HERBS (BRASSICA OLERACEA L.). Електронне видання мережне Редакційна колегія: проф. Котвіцька АА, проф. Владимирова ІМ, проф. Георгіянц ВА, проф. Перехода ЛО, проф. Журавель ІО, проф. Колісник СВ, доц. Криськів ОС, проф. Власов СВ, ас. Смєлова НМ, ас. Григорів ГВ, 19.
17. Meliboeva, S. (2022). THE FIRST HEALING AND BOTANICAL GARDENS ON THE TERRITORY OF MODERN UZBEKISTAN. Science and innovation, 1(D4), 101-105.
18. Болтаев, М. М., Мелибоева, Ш. Ш. к., Джалилов, Ф. С., & Самадов, Б. Ш. (2023). ТЕХНОЛОГИЯ СУШКИ БРОККОЛИ (BRASSICA OLERACEA L.). Журнал химии товаров и народной медицины, 2(2), 182–196. https://doi.org/10.55475/jcgtm/vol2.iss2.2023.184
19. Meliboeva, S. (2023). ABU ALI IBN SINONING TIB QONUNLARIDA QAYD ETILGAN PLANTAGO MAJOR L. NING TIBBIY AHAMIYATI. Центральноазиатский журнал образования и инноваций, 2(6 Part 4), 37-41.
20. Мелибоева, Ш. (2023). МЕДИЦИНСКОЕ ЗНАЧЕНИЕ PLANTAGO MAJOR L. ИЗ КАНОНА АВИЦЕНЫ. Центральноазиатский журнал образования и инноваций, 2(6 Part 4), 53-58.
21. Sh, M. S., Boltaev, M. M., & Jalilov, F. S. (2023). CONTENT ANALYSIS OF ANTI-CANCER DRUGS FOR 2022. Електронне видання мережне Редакційна колегія: проф. Котвіцька АА, проф. Владимирова ІМ, проф. Георгіянц ВА, проф. Перехода ЛО, проф. Журавель ІО, проф. Колісник СВ, доц. Криськів ОС, проф. Власов СВ, ас. Смєлова НМ, ас. Григорів ГВ, 52.
22. Мелибоева, Ш. Ш., Болтаев, М. М., Жалилов, Ф. С., & Кодирова, Ш. С. (2022). ЗНАЧЕНИЕ БРОККОЛИ В НАРОДНОЙ МЕДИЦИНЕ. Издается по решению редакционно-издательского совета ФГБОУ ВО КГМУ Минздрава России, 144.
23. Mavlonovich, B. M. (2022). Pharmacological Properties of Stinky Ferula Gum and its Anti-Inflammatory Effects. American Journal of Social and Humanitarian Research, 3(2), 372-376.
24. Mavlonovich, B. M. (2022). ANTI-CANCER PROPERTIES OF CRUCIFEROUS VEGETABLES. Asian journal of pharmaceutical and biological research, 11(2).
25. Болтаев, М. М. (2023). ЗНАЧЕНИЕ КУРКУМЫ В НАРОДНОЙ И ТРАДИЦИОННОЙ МЕДИЦИНЕ. European Journal of Interdisciplinary Research and Development, 16, 367-372.
26. Boltaev, M. (2023). CURCUMA LONGANI XALQ VA AN'ANAVIY TABIBIDA AHAMIYATI. Центральноазиатский журнал образования и инноваций, 2(6 Part 4), 42-46.

27. Ш., М. Ш., М., Б. М., & М, Ш. Э. (2021). Выращивание «Brassica Oleracea» на территории Республики Узбекистан. Центральноазиатский журнал медицинских и естественных наук, 120-123. https://doi.org/10.47494/cajmns.vi0.361

28. Meliboyeva, S. S. Q., Boltayev, M. M., Sharipova, E. M., & Sharipova, R. G. (2021). Comparative efficiency of the preparation" Nodinorm" in complex treatment of fibrocystic mastopathy. ACADEMICIA: An International Multidisciplinary Research Journal, 11(10), 1591-1596.