Anti-Inflammatory, Pain-Relieving & Antispasmodic Actions of Mullaca (Physalis angulata)

Mullaca also exhibits notable anti-inflammatory effects. Several research groups report that mullaca can modulate the immune system to produce less pro-inflammatory immune cells while encouraging the production of more anti-inflammatory immune cells (TNF-α, IL-1β, IL-6, IL-8, and others). Mullaca can also down regulate inflammatory genes (COX-2, iNOS) and inhibits a key factor that regulates inflammation (NF-κB). Mullaca and some of its chemicals (physalin B, D, and F) show steroid-like anti-inflammatory effects without the side effects of corticosteroids in human and animal research. Researchers also report that mullaca decreases the activity of cyclooxygenase (COX) and lipoxygenase (LOX) enzymes, which are involved in prostaglandin and leukotriene synthesis—key mediators of inflammation. Animal studies indicate mullaca can be beneficial for various types of inflammation, from arthritis (including osteoarthritis), and inflammatory bowel diseases, to asthma (and lung inflammation in COVID infection), and inflamed skin conditions like dermatitis and psoriasis when taken internally or used topically. Some of the same chemicals responsible for mullaca's anti-inflammatory actions have also shown effective pain-relieving effects in animal research. In addition, many types of cancer promote inflammation to promote tumor growth. Reducing inflammation and pain will further increase mullaca's anti-cancer benefits.

Published Research:

Zhang, Y., et al. "Anti-Inflammatory withanolides from *Physalis angulata* Var. villosa Bonati." *Chem. Biodivers.* 2025 May; 22(5): e202402778.

Kulshreshtha, S., et al. "Selected Indian medicinal plants exhibit anti-inflammatory activity by modulating pro-inflammatory cytokines *in vitro* and in carrageenan-induced rat paw edema." *Chem. Biodivers*. 2025 Jul: e03382.

Wiraswati, H., et al. "Antioxidant, antiinflammation, and antifibrotic activity of Ciplukan (*Physalis angulata* L). extract." *J. Inflamm. Res.* 2024 Sep; 17: 6297-6306.

Cai, Y., et al. "Physalin H ameliorates LPS-induced acute lung injury via KEAP1/NRF2 axis." *Int. Immunopharmacol.* 2024 Apr; 131:111789.

Tan, Y., et al. "Withanolides from *Physalin angulata* and their inhibitory effects on nitric oxide production. *Chem. Biodivers.* 2023 Apr; 20(4): e202300195.

Lu, R., et al. "Physalin A alleviates intervertebral disc degeneration via anti-inflammatory and anti-fibrotic effects." *J. Orthop. Translat*. 2023 Jan; 39: 74-87.

Zhong, R., et al. “Physalin B ameliorates inflammatory responses in lipopolysaccharide-induced acute lung injury mice by inhibiting NF-κB and NLRP3 via the activation of the PI3K/Akt pathway.” *J. Ethnopharmacol*. 2022 Feb; 284: 114777.
Ifora, I., et al. “Antinociceptive effect of ethanol extract of *Physalis angulata*.” *Intl. J. Pharma. Biomed. Sci.* 2022; 2(11): 494-498.
Lu, R., et al. et al. “Physalin A inhibits MAPK and NF-κB signal transduction through integrin αVβ3 and exerts chondroprotective effect.” *Front. Pharmacol.* 2021 Dec; 12: 761922.
Arruda, J., et al. “Physalin pool from *Physalis angulata* L. leaves and physalin D inhibit P2X7 receptor function *in vitro* and acute lung injury *in vivo*.” *Biomed. Pharmacother.* 2021 Oct; 142: 112006.
Wang, L., et al. “Anti-inflammatory effects of three withanolides isolated from *Physalis angulata* L. in LPS-activated RAW 264.7 cells through blocking NF-κB signaling pathway.” *J. Ethnopharmacol.* 2021 Aug; 276: 114186.
Wang, L., et al. “Anti-inflammatory action of physalin A by blocking the activation of NF-κB signaling pathway.” *J. Ethnopharmacol.* 2021 Mar; 267: 113490.
Qiu, L., et al. “Physalin B inhibits PDGF-BB-induced VSMC proliferation, migration and phenotypic transformation by activating the Nrf2 pathway.” *Food Funct.* 2021 Nov; 12(21): 10950-10966.
Marahatha, R., et al. “Pharmacologic activities of phytosteroids in inflammatory diseases: Mechanism of action and therapeutic potentials.” *Phytother. Res.* 2021 Sep; 35(9): 5103-5124.
do Espírito Santo, R., et al. “Physalis angulata concentrated ethanolic extract suppresses nociception and inflammation by modulating cytokines and prostanoids pathways.” *Nat. Prod. Res*. 2021 Nov; 35(22): 4675-4679.
Timotius, K., et al. “Potential anti-inflammation of *Physalis angulata* L.” *Intl. Herb. Med.* 2021; 9(5): 50-58.
Tuan Anh, H., et al. “Bioactive compounds from *Physalis angulata* and their anti-inflammatory and cytotoxic activities.” *J. Asian Nat. Prod. Res.* 2021; 23: 809–817.
Lin, Y., et al. “Physalin A attenuates inflammation through down-regulating c-Jun NH2 kinase phosphorylation/Activator Protein 1 activation and up-regulating the antioxidant activity.” *Toxicol. Appl. Pharmacol.* 2020 Sep; 402: 115115.
Zhang, Q., et al. “Anti-colitic effects of Physalin B on dextran sodium sulfate-induced BALB/c mice by suppressing multiple inflammatory signaling pathways.” *J. Ethnopharmacol.* 2020 Sep; 259: 112956.
Abdul-Nasir-Deen, A., et al. “Anti-inflammatory and wound healing properties of methanol leaf extract of *Physalis angulata* L.” *S. Afr. J. Bot.* 2020; 133: 124–131.
Rivera, D., et al. “A screening of plants used in Colombian traditional medicine revealed the anti-inflammatory potential of *Physalis angulata* calyces.” *Saudi J. Biol. Sci.* 2019 Nov; 26(7): 1758-1766.

Yen, P., et al. “Withanolides from the whole plant of *Physalis angulata* and their anti-inflammatory activities.” *Vietnam J. Chem.* 2019; 57: 334–338.
Almeida Junior, L., et al. "Intestinal anti-inflammatory activity of Ground Cherry (*Physalis angulata* L.) standardized CO(2) phytopharmaceutical preparation." *World J. Gastroenterol*. 2017 Jun; 23(24): 4369-4380.
Yang, Y., et al. "Anti-inflammatory effects of physalin E from *Physalis angulata* on lipopolysaccharide-stimulated RAW 264.7 cells through inhibition of NF-κB pathway." *Immunopharmacol. Immunotoxicol.* 2017 Apr; 39(2): 74-79.
Sun, C., et al. "A novel withanolide with an unprecedented carbon skeleton from *Physalis angulata*." *Org. Biomol Chem.* 2017 Feb; 15(5): 1110-1114.
Sun, C., et al. "Unprecedented 22,26-seco physalins from *Physalis angulata* and their anti-inflammatory potential." *Org. Biomol. Chem*. 2017 Oct; 15(41): 8700-8704.
Sun, C., et al. "Physalins V-IX, 16,24-cyclo-13,14-seco withanolides from *Physalis angulata* and their antiproliferative and anti-inflammatory activities. *Sci. Rep.* 2017 Jun; 7(1): 4057.
Sun, C., et al. "A new phenol glycoside from *Physalis angulata*." *Nat. Prod. Res.* 2017 May; 31(9): 1059-1065.
Sun, C., et al. "Antiproliferative and anti-inflammatory withanolides from *Physalis angulata*." *J. Nat. Prod.* 2016 Jun; 79(6): 1586-97.
Sang-Ngern, M., et al. “Withanolides derived from *Physalis peruviana* (Poha) with potential anti-inflammatory activity.” *Bioorg. Med. Chem. Lett.* 2016 Jun; 26(12): 2755-2759.
Ukwubile, C., et al. “Analgesic and anti-inflammatory activity of *Physalis angulata* Linn (Solanaceae) leaf methanolic extract in Swiss albino mice.” *Int. Biol. Biomed. J.* 2016 Autumn; 2: 167–70.
Lima, S, et al, "Antinociceptive properties of physalins from *Physalis angulata*." *J. Nat. Prod.* 2014 Nov; 77(11): 2397-403.
Sun, L., et al. “Anti-inflammatory function of Withangulatin A by targeted inhibiting COX-2 expression via MAPK and NF-kappaB pathways.” *J. Cell. Biochem.* 2010 Feb; 109(3): 532-41.
Brustolim, D., et al. "Activity of physalin F in a collagen-induced arthritis model." *J. Nat. Prod*. 2010 Aug; 73(8): 1323-6.
Pinto, N., et al. "Topical anti-inflammatory potential of Physalin E from *Physalis angulata* on experimental dermatitis in mice." *Phytomedicine*. 2010 Aug; 17(10): 740-3.
Sun, L., et al. "Anti-inflammatory function of Withangulatin A by targeted inhibiting COX-2 expression via MAPK and NF-kappaB pathways." *J. Cell. Biochem.* 2010 Feb; 109(3): 532-41.
Bastos, G., et al. "*Physalis angulata* extract exerts anti-inflammatory effects in rats by inhibiting different pathways." *J. Ethnopharmacol*. 2008 Jul 23; 118(2): 246-51.
Bastos, G. N., et al. "Antinociceptive effect of the aqueous extract obtained from roots of *Physalis angulata* L. on mice." *J. Ethnopharmacol.* 2005 Jan; 103(2): 241-5.

Choi, E. M., et al. "Investigations of anti-inflammatory and antinociceptive activities of *Piper cubeba*, *Physalis angulata* and *Rosa hybrida*." *J. Ethnopharmacol.* 2003 Nov; 89(1): 171-5.
Cox, P. A. "Pharmacological activity of the Samoan ethnopharmacopoeia." *Econ. Bot.* 1989; 43(4): 487-97.

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