

Treatment of experimental vaginal candidiasis with ethanolic extract of propolis in goat

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Abstract

Candida albicans is a natural opportunistic flora on the skin and mucous membranes, growth in good conditions and causes clinical symptoms of candidiasis. Prophylactic and therapeutic administration of some antifungal agents has been caused drug resistance, so nowadays there is a need to introduce newer drugs for the treatment of candidiasis. In this study, 12 heads of 8 months old goats with a weight of 20 kg were used. After induction of vaginal candidiasis with *Candida albicans* (PTCC: 5027), animals were randomly divided into four groups: treated with ethanolic extract of propolis, treated with nystatin ointment, treated with glycerin and non-treated group. In this study, mucosal injuries occurred within 5 days. Ethanol extract of propolis during 5 days and nystatin within 7 days resolved the clinical signs of vaginal candidiasis. Mucosal injuries created in non-treated and glycerin-treated groups worsened over time by up to 3 weeks later. In the histopathological examination, the anti-inflammatory effects, the repair of sweat glands, sebaceous and hair follicles, and the removal of abscess from the dermis, in the treatment groups with ethanolic extract of propolis and nystatin, were significantly different from that of the non-treated and glycerin-treated groups. The results of this study showed that the ethanolic extract of propolis can repair vaginal candidiasis lesions in a shorter period compared to nystatin in goat.

Keywords: *Candida albicans*, Vaginal candidiasis, Ethanolic extract of propolis, Goat

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References

- Agüero, M.; Svetaz, L.; Sánchez, M.; Luna, L.; Lima, B. and López, M.L. (2011). Argentinean Andean propolis associated with the medicinal plant *Larrea nitida* Cav. (Zygophyllaceae). HPLC–MS and GC–MS characterization and antifungal activity. *Food and Chemical Toxicology*, 49 (5): 1970-1978.
- Ahangari, A.; Ownagh, A.; Tehrani, A. and Tukmechi, A. (2011). The effect of Ethanol Extract of Propolis (EEP) on the experimentally induced *Candida* keratitis in rabbits. *Tehran University Medical Journal*, 69 (1): 22-28.
- Alencar, S.; Oldoni, T.; Castro, M.L.; Cabral, I.S.; Costa-Neto, C.M.; Cury, J.A. et al. (2007). Chemical composition and biological activity of a new type of Brazilian propolis: Red propolis. *Journal of Ethnopharmacology*, 113 (2): 278-283.
- Andrade, A.; Finger, D.; Machado, C.S.; Schmidt, E.M.; Costa, P.M.; Nunes Alves, A.P.N. et al. (2011). In vivo antitumoural activity and composition of an oil extract of Brazilian propolis. *Food Chemistry*, 126 (11): 1239-1245.
- Bancroft, J.D. and Stevens, A. (1995). *Theory AND Practice of Histological Techniques*. 4th ed. New York, Churchill-Livingstone, P: 396.
- Cardenas-freytag, L.; Steele, C.; Wormley, F.L.; Cheng, E.; Clements, J.D.; and Fidel, P.L. (2002). Partial protection against experimental vaginal candidiasis after mucosal vaccination with heat-killed *Candida albicans* and the mucosal adjuvant LT (R192G). *Medical Mycology*, 40 (3): 291-299.
- Castaldo, S. and Capasso, F. (2002). Propolis, an old remedy used in modern medicine. *Fitoterapia* 73 (1): 1-6.
- Diamond, R.D.; Clark, R.A. and Haudenschild, C.C. (1980). Damage to *Candida albicans* hyphae and pseudohyphae by the myeloperoxidase system and oxidative products of neutrophil metabolism in vitro. *The Journal of Clinical Investigation*, 66 (5): 908-917.
- Eslami Milaneh, K.; Tehrani, A.; Najjarnejad, V.; Ownagh, A. and Pourjabali, M. (2018). Histopathology of propolis ethanolic extract (EEP) effects on inflammatory reactions in experimental cutaneous candidiasis in goats. *Medical Journal of Tabriz University of Medical Sciences and Health Services*, 40 (3): 16-25.
- Fidel, P.L.; Cutright, J. and Steele, C. (2000). Effects of Reproductive Hormones on Experimental Vaginal Candidiasis. *Infection and Immunity*, 68 (2): 651-657.
- Fidel, P.L. and Sobel, J.D. (1998). Protective immunity in experimental candida vaginitis. *Research in Immunology*, 149 (4-5): 361-373.
- Jubb, K.V.F.; Kennedy, P.C. and Palmer, N. (2016). *Pathology of domestic animals*. 6th ed. United States of America, Elsevier Saunders, P: 647.
- Kalogeropoulos, N.; Konteles, S.; Troullidou, E.; Mourtzinos, I. and Karathanos, V.T. (2009). Chemical composition, antioxidant activity and antimicrobial properties of propolis extracts from Greece and Cyprus. *Food Chemistry*, 116 (9): 452-461.
- Khosravi, A.; Shokri, H. and Yahyarayat, R. (2005). *Veterinary mycology*. 1st ed. Tehran, Jahaddaneshgahi Press, P: 36. (In Persian)
- Liberio, S.; Pereira, A.; Varghese, S.; Thomas-George, B.; Kandathil-Thajuraj, P.; Baby, D. et al. (2011). Antimicrobial activity against oral pathogens and immunomodulatory effects and toxicity of geopropolis produced by the stingless bee *Meliponafasciculata* Smith. *BMC Complementary and Alternative Medicine*, 108 (11): 1472.
- Mauricio, J. and Bankova, V. (2011). Propolis: Is there a potential for the development of new drugs? *Journal of Ethnopharmacology*, 133 (10): 253-260.
- McGavine, D.M. and Zackary, J.F. (2012). *Pathologic Basis of Veterinary Disease*. 5th ed. United States of America, Elsevier Mosby. Pp: 335-336.
- Mohammadzadeh, S.; Shariatpanahi, M.; Hamedi, M.; Ahmadkhaniha, R.; Samadi, N. and NasserOstad, S. (2007). Chemical composition, oral toxicity and antimicrobial activity of Iranian Propolis. *Food Chemistry*, 103: 1097-1103.
- Nash, E.E.; Peters, B.M.; Lilly, E.A.; Noverr, M.C. and Fidel, P.L. (2016). A Murine Model of *Candida glabrata* Vaginitis Shows No Evidence of an Inflammatory Immunopathogenic Response. *PLoS ONE* 11 (1): 1-14.

- Ownagh, A. and Adibhesami, M. (2012). Treatment of vaginal candidiasis by ethanolic extract of propolis in rabbit. *Armaghane-danesh, Yasuj University of Medical Sciences*, 17(3): 233-242.
- Ownagh, A.; Tukmechi, A.; Adibhesam, M. and Ebrahimzadeh, S. (2010). Comparative study on the effect of ethanol extract of propolis collected from west Azarbaijan apiaries against dermatophytes and nondermatophytes fungi. *Urmia Medical Journal*, 21 (3): 206-214.
- Polaquini, S.; Svidzinski, T.; Kimmelmeier, C. and Gasparetto, A. (2006). Effect of aqueous extract from Neem (*Azadirachta indica* A. Juss) on hydrophobicity, biofilm formation and adhesion in composite resin by *Candida albicans*. *Archives of Oral Biology*, 51 (2): 482-490.
- Popova, M.; Trusheva, B.; Antonova, D.; Cutajar, S.; Mifsud, D.; ClaudeFarrugia, C. and et al. (2011). The specific chemical profile of Mediterranean propolis from Malta. *Food Chemistry*, 126 (5): 1431-1435.
- Pritt, B.; Gibson, L.E. and Comfere, N.I. (2014). Diagnosis of deep cutaneous fungal infections: correlation between skin tissue culture and histopathology. *Journal of The American Academy of Dermatology*, 71 (2): 293-301.
- Segal, E. and Frenkel, M. (2018). Experimental in vivo models of candidiasis. *Journal of Fungi*, 21 (4): 2-10.
- Shokri, H.; Khosravi, A. and Yalfani, R. (2011). Antifungal efficacy of propolis against fluconazole-resistant *Candida glabrata* isolates obtained from women with recurrent vulvovaginal candidiasis. *International Journal of Gynecology and Obstetrics*, 27 (3): 158-165.
- Storti-Filho, A.; Damke, E.; Carrara, M.A.; Batista, M.R.; Donatti, L.; Boer, C.G. et al. (2011). Effects of depomedroxyprogesterone acetate on the development and maintenance of *Candida albicans* in the vagina of oophorectomized Wistar rats (*Rattus norvegicus*). *Brazilian Journal of Pharmaceutical Sciences*, 47 (1): 167-174.
- Sullivan, D.; Moran, G.; Al-Mosaid, A.; Stokes, C.; Vaughan, C. and Coleman, D.C. (2004). Comparison of the epidemiology, drug resistance mechanisms, and virulence of *Candida dubliniensis* and *Candida albicans*. *FEMS Yeast Research*, 4 (4-5): 369-376.