



> Dr Lilian Ceballos,
pharmacologue,
Pradelles-Cabardès

Utilisation thérapeutique de la propolis

dans les affections gastro-intestinales

BIBLIOGRAPHIE

- [1] Shang H et al. 2020. Effect of Propolis supplementation on C-reactive protein levels and other inflammatory factors: A systematic review and meta-analysis of randomized controlled trials. *Journal of King Saud University - Computer and Information Sciences*, 32(2): 1694-1701.
- [2] Zuhendri F et al. 2022. Recent update on the anti-inflammatory activities of propolis." *Molecules*, 27(23): 8473.
- [3] El-Seedi HR et al. 2022. Honey bee products: Preclinical and clinical studies of their anti-inflammatory and immunomodulatory properties." *Frontiers in Nutrition*, 8: 761267.
- [4] Medjeber O et al. 2018. Ex vivo immunomodulatory effect of ethanolic extract of propolis during Celiac Disease: Involvement of nitric oxide pathway." *Inflammopharmacology*, 26: 1469-1481.
- [5] Ruiz-Hurtado PA et al. 2021 Evaluation of the gastroprotective effects of Chihuahua propolis on indomethacin-induced gastric ulcers in mouse." *Biomedicine & Pharmacotherapy*, 137: 111345.
- [6] Al Ibraheemi AA & Shamoun S. 2016. Incidence and risk factors of oral mucositis in patients with breast cancer who receiving chemotherapy in Al-Bashir hospital. *Int. J. Hematol. Oncol. Stem Cell Res.*, 10 (4): 217-223.
- [7] Mallick S et al. 2016. Radiation induced oral mucositis: a review of current literature on prevention and management. *Eur. Arch. Otorhinolaryngol.*, 273(9): 2285-2293.
- [8] Stokman MA et al. 2006. Preventive intervention possibilities in radiotherapy- and chemotherapy-induced oral mucositis: results of meta-analyses. *J. Dent. Res.*, 85(5): 690-700.
- [9] Eslami, H et al. 2016. Efficacy of Hypozalix spray and propolis mouthwash for prevention of chemotherapy-induced oral mucositis in leukemic patients: a double-blind randomized clinical trial. *J. Dent. Res. Dent. Clin. Dent. Prospects*, 10 (4): 226-233.
- [10] Bolouri, A.J. 2015. Preventing and therapeutic effect of propolis in radiotherapy induced mucositis of head and neck cancers: a triple-blind, randomized, placebo-controlled trial. *Iran. J. Cancer Prev.*, 8(15): 4019.
- [11] Yildiz, O.G et al. 2008. Protective effects of caffeic acid phenethyl ester on radiation induced lung injury in rats. *Clin. Invest. Med.*, 31(15), 242-247.
- [12] Ghassemi L et al. 2010. The effect of ethanolic extract of propolis on radiation induced mucositis in rats. *Saudi Med. J.*, 31(6), 622-626.
- [13] Dastan F et al. 2020. Efficacy and safety of propolis mouthwash in management of radiotherapy induced oral mucositis; a randomized, double blind clinical trial. *Rep. Pract. Oncol. Radiother.*, 25(6): 969-973.
- [14] Nakai R & Ueno T. 2021. Effects of oral moisturizing gel containing propolis following head and neck radiotherapy: randomized controlled pilot trial. *BDJ Open*, 7(1): 1-7.
- [15] Hunt RH et al. 2015. The stomach in health and disease. *Gut*, 64 (10) : 1650-1668.
- [16] Da Silva LM et al. 2018. Propolis and its potential to treat gastrointestinal disorders. *Evid. Based Complement. Alternat. Med.* 2018.
- [17] Shapla UM et al. 2018. Propolis: the future therapy against helicobacter pylori-mediated gastrointestinal diseases. *J. Appl. Biomed.*, 16(2): 81-99.
- [18] El-Ghazaly MA et al. 2011. Anti-ulcerogenic effect of aqueous propolis extract and the influence of radiation exposure. *Int. J. Radiat. Biol.*, 87(10): 1045-1051.
- [19] Carol D et al. 2017. GC-MS characterization and antiulcer properties of the triterpenoid fraction from Propolis of the north west region of Cameroon. *J. Sci. Res. Rep.*, 15(4): 1-18. <https://doi.org/10.9734/jsrr/2017/35377>.
- [20] Costa P et al. 2018. Artepillin C, drupanin, aromadendrin-4'-O-methyl-ether and kaempferide from Brazilian green propolis promote gastroprotective action by diversified mode of action. *J. Ethnopharmacol.*, 15(226): 82-89.
- [21] Costa P et al. 2020. Role of the antioxidant properties in the gastroprotective and gastric healing activity promoted by Brazilian green propolis and the healing efficacy of Artepillin C. *Inflammopharmacology*, 28(4), 1009-1025.
- [22] Achadiyani A et al. 2020. Propolis of Trigona spp. protects mucosa from aspirin-induced gastric mucosal damage in rats. *Althea Med. J.*, 7(1): 11-15. <https://doi.org/10.15850/amj.v7n1.1677>.
- [23] Boeing T et al. 2021. The gastroprotective effect of red propolis extract from northeastern Brazil and the role of its isolated compounds. *J. Ethnopharmacol.* 267 (October), 2020. <https://doi.org/10.1016/j.jep.2020.113623>.
- [24] Baltas N et al. 2016. Effect of propolis in gastric disorders : inhibition studies on the growth of helicobacter pylori and production of its urease. *J. Enzyme Inhib. Med. Chem.*, 31: 46-50.
- [25] Nostro A et al. 2006. Effects of combining extracts (from propolis or Zingiber officinale) with clarithromycin on Helicobacter pylori. *Phytother. Res.*, 20(3): 187-190.
- [26] Romero M et al. 2019. Propolis polyphenolic compounds affect the viability and structure of helicobacter pylori in vitro. *Rev. Bras.* 29(3) : 325-332.
- [27] Ruiz-Hurtado, P.A. 2021. Propolis and Its Gastroprotective Effects on NSAID-Induced Gastric Ulcer Disease: A Systematic Review. *Nutrients*, 13: 3169. <https://doi.org/10.3390/nu13093169>
- [28] Soleimani D et al. 2021. A systematic review of preclinical studies on the efficacy of propolis for the treatment of inflammatory bowel disease. *Phytother. Res.*, 35(2): 701-710.
- [29] Abraham C & Cho JH. 2009. Inflammatory bowel disease. *N. Engl. J. Med.*, 361: 2066-2078.
- [30] Al Hariri M 2019. Immune's - boosting agent: immunomodulation potentials of propolis. *J. Fam. Community Med.*, 26 (1): 57-60.
- [31] Franchin, M et al. 2016. Neovestitol, an isoflavonoid isolated from Brazilian red propolis, reduces acute and chronic inflammation: involvement of nitric oxide and IL-6. *Sci. Rep.*, 6: 1-12.
- [32] Xue M et al. 2019. Propolis modulates the gut microbiota and improves the intestinal mucosal barrier function in diabetic rats. *Biomed. Pharmacother.* 118: 109393.
- [33] Cho MS et al. 2014. Caffeic acid phenethyl ester promotes anti-inflammatory effects by inhibiting MAPK and NF-κB signaling in activated HMC-1 human mast cells. *Pharm. Biol.*, 52(7): 926-932.
- [34] Tambuwala MM et al. 2018. Caffeic acid phenethyl ester (CAPE) reverses fibrosis caused by chronic colon inflammation in murine model of colitis. *Pathol. Res. Pract.*, 214(11): 1909-1911.
- [35] Miryan M et al. 2020. Does propolis affect the quality of life and complications in subjects with irritable bowel syndrome (diagnosed with Rome IV criteria)? A study protocol of the randomized, double-blinded, placebo-controlled clinical trial. *Trials*, 21(1): 1-10.
- [36] Zulkiflee N et al. 2022. Propolis: Its Role and Efficacy in Human Health and Diseases. *Molecules*, 27: 6120.
- [37] Xue M et al. 2019. Propolis modulates the gut microbiota and improves the intestinal mucosal barrier function in diabetic rats. *Biomed Pharmacother.* 118:109393.
- [38] Mariano, L.N.B et al. 2018. Brazilian green propolis hydroalcoholic extract reduces colon damages caused by dextran sulfate



- sodium-induced colitis in mice. *Inflammopharmacology*, 26(5): 1283-1292.
- [39] Wang K et al. 2018. Propolis from different geographic origins decreases intestinal inflammation and *Bacteroides* spp. populations in a model of DSS-induced colitis. *Mol. Nutr. Food Res.*, 62(17): 1-11.
- [40] Atta AH et al. 2019. Phytochemical studies and anti-ulcerative colitis effect of *Moringa oleifera* seeds and Egyptian propolis methanol extracts in a rat model. *Asian Pac. J. Trop. Biomed.*, 9(3): 98-108.
- [41] Shimizu, Y., Suzuki, T., 2019. Brazilian propolis extract reduces intestinal barrier defects and inflammation in a colitic mouse model. *Nutr. Res.*, 69: 30-41
- [42] Sangaraju R et al. 2019. Protective effect of galangin against dextran sulfate sodium (DSS)-induced ulcerative colitis in Balb/c mice. *Inflamm. Res.*, 68(8): 691-704.
- [43] Hwang S et al. 2020. Oral administration of Korean propolis extract ameliorates DSS-induced colitis in BALB/c mice. *Int J Med Sci*, 17(13):1984-1991.
- [44] Bai T et al. 2017. Comparison of the Rome IV and Rome III criteria for IBS diagnosis: A cross-sectional survey. *Journal of Gastroenterology and Hepatology*, 32(5): 1018-1025.
- [45] Miryan M. 2022. Effects of propolis supplementation on irritable bowel syndrome with constipation (IBS-C) and mixed (IBS-M) stool pattern: A randomized, double-blind clinical trial. *Food Sci Nutr.*, 10(6):1899-1907.
- [46] Qin, H.-Y. 2019). Quercetin attenuates visceral hypersensitivity and 5-Hydroxytryptamine availability in Postinflammatory irritable bowel syndrome rats: Role of Enterochromaffin cells in the Colon. *Journal of Medicinal Food*, 22(7): 663-671.
- [47] Medjebber O. 2018. Ex vivo immunomodulatory effect of ethanolic extract of propolis during Celiac Disease: involvement of nitric oxide pathway. *Inflammopharmacology*, 26(6):1469-1481.
- [48] Garzarella EU et al. 2022. Evaluating the effects of a standardized polyphenol mixture extracted from poplar-type propolis on healthy and diseased human gut microbiota. *Biomedicine & Pharmacotherapy*, 148: 112759.
- [49] Zafeiropoulou K et al. 2020. Alterations in intestinal microbiota of children with celiac disease at the time of diagnosis and on a gluten-free diet. *Gastroenterology*, 159: 2039-2051
- [50] Soleimani D et al. 2021. Protective effects of propolis on hepatic steatosis and fibrosis among patients with nonalcoholic fatty liver disease (NAFLD) evaluated by real-time two-dimensional shear wave elastography: A randomized clinical trial. *Phytother Res.*, 35(3):1669-1679.
- [51] Samadi, N et al. 2017. Effects of bee propolis supplementation on glycemic control, lipid profile and insulin resistance indices in patients with type 2 diabetes: A randomized, double-blind clinical trial. *Journal of Integrative Medicine*, 15(2): 124-134.
- [52] Mujica, V et al. 2017. The role of Propolis in oxidative stress and lipid metabolism: A randomized controlled trial. *Evidence-Based Complementary and Alternative Medicine*, 2017, 4272940.
- [53] Ichi I et al. 2009. The beneficial effect of propolis on fat accumulation and lipid metabolism in rats fed a high-fat diet. *Journal of Food Science*, 74(5): H127-H131.
- [54] Kismet K et al. 2017. Does propolis have any effect on non-alcoholic fatty liver disease? *Biomedicine & Pharmacotherapy*, 90: 863-871.
- [55] Koya-Miyata S et al. 2009. Propolis prevents diet-induced hyperlipidemia and mitigates weight gain in diet-induced obesity in mice. *Biological and Pharmaceutical Bulletin*, 32(12): 2022-2028.
- [56] Yu Y et al. 2011. Ethanolic extract of propolis promotes reverse cholesterol transport and the expression of ATP-binding cassette transporter A1 and G1 in mice. *Lipids*, 46(9), 805-811.
- [57] Hesami S et al. 2019. Administration of Iranian Propolis attenuates oxidative stress and blood glucose in type II diabetic patients: A randomized, double-blind, placebo-controlled, clinical trial. *Caspian Journal of Internal Medicine*, 10(1): 48-54.
- [58] Kismet K. 2017. Does propolis have any effect on non-alcoholic fatty liver disease? *Biomedicine & Pharmacotherapy*, 90: 863-871.
- [59] Luangmonkong, T. 2018. Targeting oxidative stress for the treatment of liver fibrosis. *Reviews of Physiology, Biochemistry and Pharmacology*, 175: 71-102.
- [60] Wang X et al. 2013. Antifibrotic activity of galangin, a novel function evaluated in animal liver fibrosis model. *Environmental Toxicology and Pharmacology*, 36(2): 288-295.
- [61] Su KY et al. 2014. Taiwanese green Propolis and Propolin G protect the liver from the pathogenesis of fibrosis via eliminating TGF- β -induced Smad2/3 phosphorylation. *Journal of Agricultural and Food Chemistry*, 62(14): 3192-3201.
- [62] Li, M. 2015. Caffeic acid phenethyl ester inhibits liver fibrosis in rats. *World Journal of Gastroenterology*, 21(13): 3893-3903.
- [63] Zhao, W. X. 2014. Caffeic acid phenethyl ester attenuates pro-inflammatory and fibrogenic phenotypes of LPS-stimulated hepatic stellate cells through the inhibition of NF- κ B signaling. *International Journal of Molecular Medicine*, 33(3): 687-694.
- [64] Nikbaf-Shandiz et al. 2022. Propolis supplementation in obese patients with non-alcoholic fatty liver disease: effects on glucose homeostasis, lipid profile, liver function, anthropometric indices and meta-inflammation. *Food Funct.*, 13, 11568-11578
- [65] Vukovic NL et al. 2018. Cytotoxic, proapoptotic and antioxidative potential of flavonoids isolated from propolis against colon (HCT-116) and breast (MDA-MB-231) cancer cell lines. *Food Res. Int.*, 106: 71-80.
- [66] Oršolic N. et al. 2022. Molecular and Cellular Mechanisms of Propolis and Its Polyphenolic Compounds against Cancer. *Int. J. Mol. Sci.*, 23: 10479.
- [67] Catchpole O et al. 2015. Antiproliferative activity of New Zealand propolis and phenolic compounds vs human colorectal adenocarcinoma cells. *Fitoterapia*, 106: 167-174.
- [68] Catchpole, O et al. 2018. Anti-gastrointestinal cancer activity of cyclodextrin-encapsulated propolis. *J. Funct. Foods*, 41: 1-8.
- [69] Chiu HF et al. 2020. Chemopreventive and chemotherapeutic effect of propolis and its constituents: a mini-review. *J. Cancer Prev.*, 25(2): 70-78.
- [70] Calhelha RC et al. 2014. Cytotoxicity of portuguese propolis: the proximity of the in vitro doses for tumor and normal cell lines. *Biomed. Res. Int.* 2014. lines. <https://doi.org/10.1155/2014/897361>.
- [71] Vukovic, N.L. 2018. Cytotoxic, proapoptotic and antioxidative potential of flavonoids isolated from propolis against colon (HCT-116) and breast (MDA-MB-231) cancer cell lines. *Food Res. Int.*, 106: 71-80.
- [72] Abutaha N. 2020. Apoptotic potential and chemical composition of jordanian propolis extract against different cancer cell lines. *J. Microbiol. Biotechnol.*, 30 (6): 893-902.
- [73] Alizadeh AM et al. 2015. Chemoprotection of MNNG-initiated gastric cancer in rats using Iranian propolis. *Arch. Iran. Med.*, 18(1): 18-23.
- [74] Catchpole O et al. 2015. Antiproliferative activity of New Zealand propolis and phenolic compounds vs human colorectal adenocarcinoma cells. *Fitoterapia*, 106: 167-174.
- [75] Gajek G et al. 2020. Antagonistic effects of CAPE (a component of Propolis) on the cytotoxicity and genotoxicity of irinotecan and SN38 in human gastrointestinal cancer cells in vitro. *Molecules*, 25: 685.
- [76] Valença I et al. 2013. Portuguese propolis disturbs glycolytic metabolism of human colorectal cancer in vitro. *BMC Complement. Altern. Med.*, 13: 184 (2013).
- [77] Kubina R et al. 2015. The ethanol extract of polish propolis exhibits anti-proliferative and/or pro-apoptotic effect on HCT 116 colon cancer and Me45 malignant melanoma cells in vitro conditions. *Adv. Clin. Exp. Med.*, 24(2): 203-212.
- [78] Doi K et al. 2017. Chemopreventive action by ethanol-extracted brazilian green propolis on post-initiation phase of inflammation-associated rat colon tumorigenesis. *In Vivo*, 31(2): 187: 197.
- [79] Elbaz NM et al. 2016. Chitosan-based nano- in-microparticle carriers for enhanced oral delivery and anticancer activity of propolis. *Int. J. Biol. Macromol.*, 92: 254-269.
- [80] Catchpole O et al. 2018. Anti-gastrointestinal cancer activity of cyclodextrin-encapsulated propolis. *J. Funct. Foods*, 41: 1-8.
- [81] Azarshinfam N et al. 2021. Evaluation of anticancer effects of propolis extract with or without combination with layered double hydroxide nanoparticles on Bcl-2 and Bax genes expression in HT-29 cell lines. *Gene Rep.*, 23: 101031.
- [82] Ceballos L. 2022. La propolis, de la prévention aux traitements associés. *Phytothérapie Européenne*, 128: 20-24.