Inhibition of Helicobacter pylori And Antitumoral Activity By Seeds From Persea americana Mill. (Avocado)

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Persea americana Mill., known as avocado, a native of tropical America (Mexico), is now widely cultivated throughout the tropics and subtropics of the world. Their leaves and pulp have been used as anti-inflammatory, to reduce glycemic and cholesterol levels and antiulcer¹. But little is known about the avocado seed, which is discarded, although studies have shown phenolic compounds with antimicrobial activity². In Brazil, there are reports of popular use of P. Americana seeds as antulcer, but with no scientific evidence. Currently, Helicobacter pylori is recognized as the causal agent of chronic gastritis and gastric and duodenal ulcers. The establishment of H. pylori is due to virulence factors, among them the production of urease, which isolates stomach acidity³. In this context, our aim was to evaluate the anti-H. pylori urease inhibition and antitumor activity of the hydroalcoholic extract (SCE) of seeds from Persea americana Mill. and its hexane (SHP) and ethyl acetate (SEAP) fractions. The crude extract was obtained by turbolysis with 70% alcohol and fractionated with hexane and ethyl acetate. Anti-H. pylori activity was evaluated against H. pylori ATCC 43504 and 43629 by determination of the Minimal Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC). The morphological analysis of H. pylori was performed using a scanning electron microscope (SEM)⁴. Urease inhibition was determined by the production of ammonia metabolized by urease. The cytotoxicity in human gastric adenocarcinoma cells (ATCC CRL - 1739) was performed by MTT test at 3.125-100 µg/mL. The assays were performed in triplicate and results were expressed as percent of inhibition. The results for SEAP and SHP in H. pylori ATCC 43504 showed MIC and MBC of 128 µg/mL, and for ATCC 43629, SEAP showed MIC of 256 µg/mL and no MBC, while SHP presented MIC of 256 and MBC of 1024 µg/mL. SCE did not present MIC or MBC at tested concentrations. There were no significant results of urease inhibition. In the antitumor activity against adenocarcinoma cells, SEAP presented IC₅₀ of 55.43 ± 6.20 µg/mL, SHP obtained IC₅₀ of 11.80 ± 1.75 µg/m and the antitumor standard, cisplatin, showed IC₅₀ of 7.70 ± 1.51 µg/mL. Fractions showed to be efficient on the gastric antitumor activity. SCE only inhibited 18.23% ± 6.88 of cells at 100 µg/mL. SEM showed that the H. pylori treated with SHP present cells in the process of converting from bacillary to coccoid (inactive) form, with appearance of blebs, septations and spherical forms, similar to those found in the literature⁵. These changes correspond to cell wall damage and interaction on PBPs (penicillin binding proteins) that act on the formation of peptidoglycan, more specifically PBP1 (66-kDa) in coccoid and PBPs 3 (60-kDa) and 2 (63- kDa) in the bacillary form. The treatment with SEAP predominated filamentous forms, being possible that it acts in PBP2, essential for the cellular division, being a possible therapeutic target exerted by the SEAP in the treatment against H. pylori. These results showed that seeds from P. americana Mill. can become an alternative for treatment of gastric diseases caused by H. pylori as well as antitumor.

Acknowledgments: Laboratório de Ultraestrutura Celular (LUCCAR)/UFES, CAPES, FAPES.

References: