

Short Communication

CYTOTOXICITY OF *BYRSONIMA DUCKEANA* W. R. ANDERSON (MALPIGHIACEAE) ON COLON CANCER CELLS

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ABSTRACT

Objective: The objective of this study was the cytotoxicity evaluation of the leaves extract and fractions of *Byrsonima duckeana* W. R. Anderson.

Methods: The toxicity on *Artemia salina*, haemolytic potential and cytotoxicity activities against two different cell lines a U937 cell line human, and HT29 tumor colon cell line of the leaves extract and fractions of *Byrsonima duckeana* W. R. Anderson were evaluated.

Results: There was no IC₅₀ the *Artemia salina* assay. The chloroform and ethyl acetate fractions showed haemolytic activity. The results were satisfactory at the most polar fractions, with cytotoxicity to the HT29 cell line.

Conclusion: The study provides preliminary evidence of cytotoxicity of the most polar fractions at the HT29 cell line, which can indicate a potential source to offer substances with cytotoxic activity.

Keywords: Medicinal Plant, Alternative Medicine, Cytotoxicity, Cancer Cells.

Plants and herbs have been used to benefit human health since humans inhabited the earth [1]. Natural products are considered a strategy to block the development of cancer in humans. Many of the drugs used in cancer treatment are derived from natural products [2].

In this context, the *Byrsonima* genus has attracted the interest of researchers, and we found studies in the literature focusing on its action against microorganisms, including several species of bacteria, enteric bacteria, mycobacteria, protozoa and fungi, most of which report positive results. Other biological activities, such as immunostimulatory, anti-inflammatory, anti-hemorrhagic, antihyperglycaemic, antihyperlipidemic, antiulcer, antidiarrheal and antioxidant activities, were also investigated in different species [3].

We did not find any data in the literature regarding the pharmacological properties of *Byrsonima duckeana* W. R. Anderson. However, based on preliminary pharmacological results, we decide to investigate the possible cytotoxic effect of an ethanol extract and its fractions of *Byrsonima duckeana* leaves against the U937 cell line human, and HT29 tumor colon cell line. We also evaluate its haemolytic potential and toxicity on *Artemia salina* nauplii.

Plant material was collected at the Adolpho Ducke Forest Reserve, Manaus, Amazonas, Brazil, and taxonomically identified by the Herbarium of the National Institute of Amazonia Research (INPA) by Alberto Vicentini and W. R. Anderson, in the context of the Flora da Reserva Ducke project. A voucher specimen was deposited under number 179696.

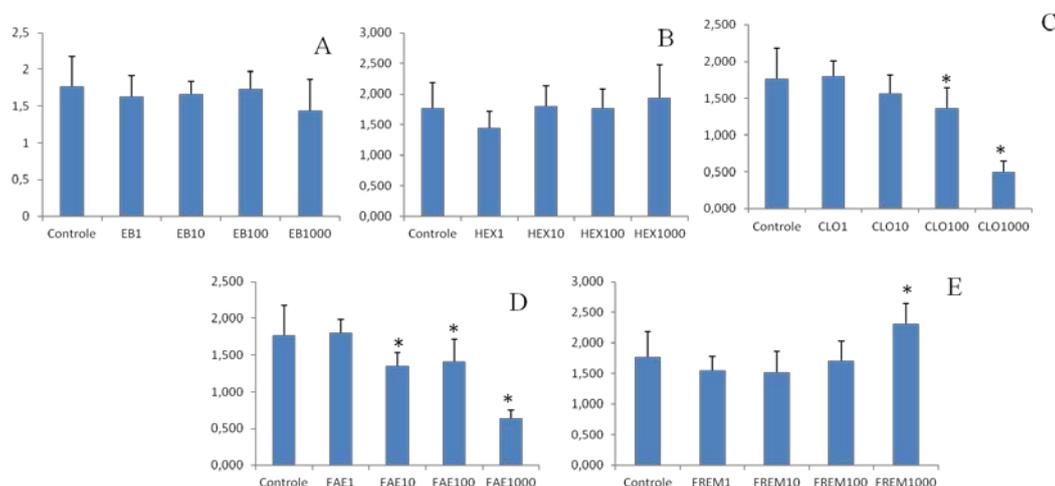


Fig. 1: Cytotoxicity effect of the extract and fractions of *B. duckeana* on the HT29 cell line: A- Crude extract of *B. duckeana*, B- Hexane fraction, C- Chloroform fraction, D- Ethyl acetate fraction, E- Remaining fraction

Leaf samples of *B. duckeana* were dried at 40 °C in a convection oven. The leaves were crushed and submitted to extraction in a Soxhlet apparatus modified [4]. The material was exhaustively extracted with ethanol, yielding the crude extract (EB), which was partitioned using solvents of increasing polarity, giving rise to the hexane (HEX), chloroform (CLO), ethyl acetate (FAE) and remaining (FREM) fractions which were used in the biological tests.

A preliminary assessment of toxicity was conducted with the *Artemia salina* assay and evaluation haemolytic activity. Cell viability was then determined with the MTT assay - (3-[4,5-dimethylthiazol-2-yl]-2,5-diphenyltetrazolium bromide thiazolyl blue). The toxic potential of the crude extract and the fractions of *Byrsonima duckeana* was evaluated against *Artemia salina*, and was determined by counting the dead nauplii after 24 hours of incubation [5]. The ethyl acetate and remaining fractions were not verified. The haemolytic activity was measured using sterile paper discs impregnated with 1000 µg of the samples placed on blood agar plates (Newprov®). After incubation at 36°C for 24 hours, the hemolysis halo was verified and compared with the positive

control, a 10% Triton solution that is considered with 100% of activity [6]. After this preliminary evaluation of toxicity, a cytotoxicity assessment was performed with the MTT cell viability at 1, 10, 100 e 1000 µg/mL of each sample using U937 (human monocyte) HT29 (tumor colon) cell lines [7], all the results were compared by the ANOVA, considering values of $p \leq 0.05$ statistically significant.

There were no deaths of nauplii at the *Artemia salina* assay. Haemolytic activity was observed only at the chloroform and ethyl acetate fractions with about 65.6 % and 48.4% haemolysis, respectively. Fig. 1 and 2 show the cytotoxic effects of the samples on the HT29 and U937 cells, respectively. The chloroform and ethyl acetate fractions showed decreasing cell viability on HT29 line at 100 and 1000 µg/mL and 10 to 1000 µg/ml, respectively. The same fractions had hemolytic activity, which suggests that the more polar constituents of ethanol extract are more closely related to their toxicity. Interestingly, there was no toxicity to non-tumor cells, at the MTT assay, indicating some selectivity that may be important in further studies on the anticancer potential of this species.

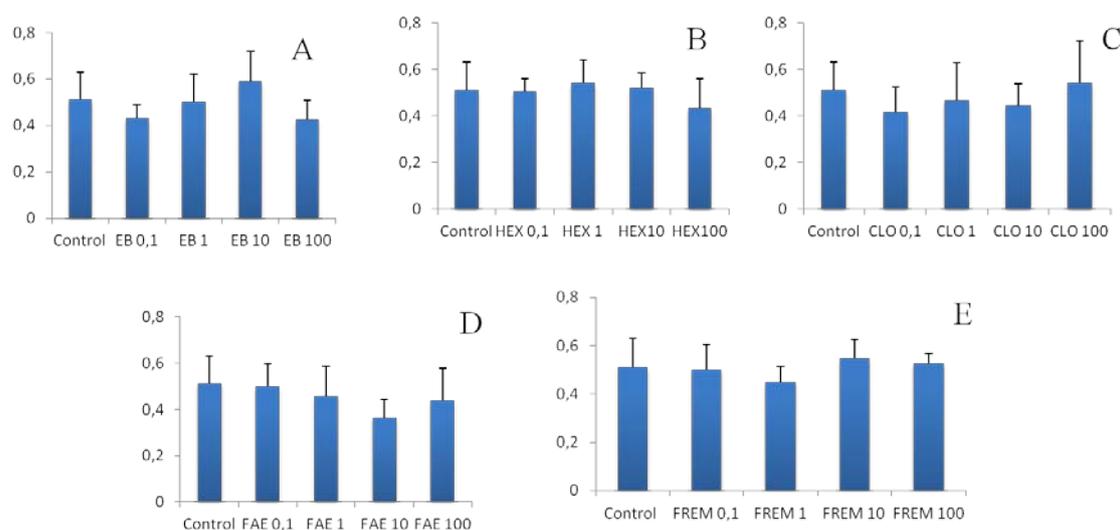


Fig. 2: Cytotoxicity effect of the extract and fractions of *B. duckeana* on U937 tumor colon cells. A- Crude extract, B- Hexane fraction, C- Chloroform fraction, D- Ethyl acetate fraction, E- Remaining fraction

CONFLICT OF INTERESTS

The authors declare that there is no conflict of interests.

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