



## IN VITRO EVALUATION OF ANTIMUTAGENIC ACTIVITY AND PHYTOCHEMICAL STUDY OF *Baccharis trimera* (Less.) DC. ESSENTIAL OIL

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**Abstract:** Carqueja, *Baccharis trimera* (Less.) DC. (Asteraceae), is a native species widely used in folk medicine as anti-inflammatory and to treat digestive problems. This study evaluated the chemical composition and the antimutagenic activity of the essential oil of *Baccharis trimera* (EOBt) through the *in vitro* micronucleus assay (MN). Moreover, as the antioxidant activity is one important mechanism of antimutagenic action [1], the antioxidant effect of EOBt was assessed by 2,2-diphenyl-1-picrylhydrazil (DPPH) and Oxygen Radical Absorbance Capacity (ORAC) assays [2]. Aerial parts of *B. trimera* (cv. CPQBA 01) were collected in CPQBA experimental field in July/2012 and the EOBt was obtained by hydrodistillation (3 h). The chemical composition was determined by gas chromatography coupled to mass spectrometry (GC/MS) indicating bicyclogermacrene (15.19%), E-caryophyllene (13.70%), germacrene D (8.69 %),  $\beta$ -pinene (7.54%), globulol (7.52%),  $\beta$ -myrcene (6.56%) and  $\delta$ -cadinene (6.01%) as the major compounds of EOBt. In antimutagenic activity assay, CHO-K1 cells ( $2 \times 10^5$  cells/well) were treated with EOBt (25  $\mu\text{g/ml}$ ) and methylmetanesulfonate (MMS, 25  $\mu\text{g/mL}$ ) in three different schedules of treatment [simultaneous (EOBt + MMS, 4 h), pre (EOBt, 2 h + MMS, 2 h) and post (MMS 2 h + EOBt, 2 h) treatments]. Then, the cells were treated with cytochalasin B (3  $\mu\text{g/ml}$ , 20 h), sodium citrate 1% and methanol/acetic acid 3:1 for slides preparation. Replication Index (RI), Cytokinesis-Block Proliferation Index (CBPI) and MN frequency (%) in binucleate cells were calculated and the statistical analysis was performed by ANOVA, post test Duncan ( $p < 0.05$ ) [3]. All samples showed  $\text{RI} > 90\%$  and  $\text{CBPI} > 1.7$  (absence of cytotoxicity). Compared to untreated cells ( $1.07 \pm 0.30\%$ ), MMS increased MN frequency to  $5.77 \pm 0.14\%$  in simultaneous treatment and to  $5.11 \pm 0.13\%$  in pre and post-treatments. In the simultaneous treatment, EOBt decreased by 65.8% the frequency of MNs in relation to the positive control (MMS). In the post-treatment, there was a reduction of 54.5% in MN incidence while in pre-treatment with EOBt, the reduction was only 35.1%. The antioxidant evaluation showed  $18.76 \pm 0.53$  and  $2927.94 \pm 14.80 \mu\text{M}$  of Trolox equivalent antioxidant capacity/g of EOBt in DPPH and ORAC assays, respectively. These results suggest that EOBt does not show a preventive effect, but may be more efficient to reverse damage caused by genotoxic or mutagenic agents. Moreover, this antimutagenic activity could be partially attributed to an antioxidant effect. (FAPESP grant #2013/13196-0, CAPES).

### References

- [1] Bhattacharya, S. 2011. Natural Antimutagens: A Review. Research Journal of Medicinal Plant, 5: 116-126.
- [2] Neri-Numa, I.A., Carvalho-Silva, L.B., Ferreira, J.E.M., Machado, A.R.T., Malta, L.G., Ruiz, A.L.T.G., Carvalho, J.E., Pastore, G.M. 2014. Preliminary evaluation of antioxidant, antiproliferative and antimutagenic activities of pitomba (*Talisia esculenta*). LWT - Food Science and Technology, 59: 1233-1238.
- [3] Della Torre, A. 2013. Óleo essencial de *Baccharis trimera* (Less.) DC. Estudo fitoquímico e avaliação *in vitro* das atividades antiproliferativa e mutagênica. Dissertação de Mestrado, Programa de Pós-graduação em Biociências e Tecnologia de Produtos Bioativos, Universidade Estadual de Campinas, Campinas, SP.