



ANTI-INFLAMMATORY ACTIVITY OF COMPOUNDS FROM *Galphimia glauca* AND THEIR ROLE IN THE METABOLOMIC PROFILING

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Introduction. *Galphimia glauca* is used in Mexican traditional medicine for the treatment of central nervous system disorders, mainly as sedative and tranquilizer. A phytochemical study of the methanolic extract from *G. glauca*, conducted by our group (1), led to the isolation of seven new compounds from a family of nine galphimines A-I (nor-sercofriedelane). Also, we have been studying this plant under a biotechnological and metabolomic (2) approaches. A strong ethnopharmacological evidence related to this plant describes its use as anti-inflammatory herbal medicine. Recently, we report a second metabolomic study with this species, as well as, preliminary results of the strong anti-inflammatory activity (62.7-82.1 % inhibitions) of *G. glauca* methanolic extracts from seven collected in different locations of Mexico, using the tetradecanoylphorbol acetate-induced mouse ear inflammation model (TPA) (3).

The aim of this investigation is the bio-guided isolation of the anti-inflammatory compounds from the leaves extracts of *G. glauca*, and to determine its accumulation in the seven previously populations investigated through a metabolomic study conducted in 2012 by our group.

Methods. Plant material was collected in the summer of 2012 (August and October) from seven different locations in Mexico. The samples were then pulverized and kept at -20 °C until used for ¹H NMR, HPLC and TLC analysis, and biological assays. The anti-inflammatory activity will be determined by using the TPA mouse ear inflammation model and cell culture from PMA-treated THP-1 (THP1PMA) cells (4). For the metabolic study the methodology to be employed will be the same reported by Cardoso-Taketa *et al.*, 2008, using the ¹H NMR multivariate data analysis by Principal Component Analysis (PCA).

Results. Fresh aerial parts of plants were collected in seven localities: Dr. Mora, Guanajuato; Tepoztlán, Cuernavaca and Miacatlán, Morelos; Zapopan, Jalisco; Tuxtla Gutiérrez, Chiapas; and Jalpan de Serra, Querétaro. A total of 10 individuals were collected in each locality. Voucher specimens were authenticated by Rolando Ramirez and then deposited at the HUMO Herbarium, CEAMISH (Centro de Educación Ambiental e Investigación Sierra de Huautla). Sample collection

details are presented in Table 1. Organic extracts from each population were assayed by the TPA anti-inflammatory model, indicating that hexanic extract was the most active (90.2 %) compared to chloroform (87.2 %), ethyl acetate (89.1 %) and metanolic (79.3 %) extracts.

Table 1. General data for *Galphimia glauca* populations collected in 2012.

Population	Voucher	Locality	Date and time of collection	Position	Altitude (m)
GM	15189	Doctor Mora, Guanajuato	September 20 12.00-14.00	W101°19.22 N21° 0.8.74	2120
MT	15485	Tepoztlán, Morelos	December 12 12.00-14.00 h	W99° 06.97 N18° 59.35	1700
MC	15011	Cuernavaca Morelos	October 12 16.00-1700 h	W99° 13.48 N18° 58.91	2204
MM	15426	Miacatlán, Morelos	December 9 15.00-18.00 h	W99° 21.75 N18° 45.57	1004
GJ	15014	Zapopan, Jalisco	October 20	W103°19.95 N20° 40.67	1585
TC	15421	Tuxtla Gutiérrez, Chiapas	October 26	W93°05.95 N16° 49.52	559
QJ	15018	Jalpan de Serra, Querétaro	November 16	W99° 28.57 N21° 28.50	1548

Conclusions. The hexanic extract showed the strongest anti-inflammatory activity, and this extract will be fractionated for the bio-guide investigation.

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References.

- Cardoso-Taketa AT, Lozada-Lechuga J, Fragoso-Serrano M, Villarreal ML, Pereda-Miranda R. (2004) Isolation of nor-sercofriedelanes from the sedative extracts of *Galphimia glauca*. J. Nat. Prod. 67: 644-9.
- Cardoso-Taketa AT, Pereda-Miranda R, Choi YH, Verpoorte, Villarreal ML. (2008) Metabolic Profiling of the Mexican Anxiolytic and Sedative Plant *Galphimia glauca* Using Nuclear Magnetic Resonance Spectroscopy and Multivariate Data Analysis. Plant Med. 74: 1-7.
- Sharma A, Cardoso-Taketa A, Choi YH, Verpoorte R and Villarreal ML. A comparison on the metabolic profiling of the Mexican anxiolytic and sedative plant *Galphimia glauca* four years later. Journal of Ethnopharmacology. 2012, doi: 10.1016/j.jep.2012.03.033.
- Kohro T, Tanaka T, Murakami T, Wada Y, Aburatani H, Hamakubo T and Kodama T. (2004) A Comparison of Differences in the Expression Profiles of Phorbol 12-myristate 13-acetate Differentiated THP-1 Cells and Human Monocyte-derived Macrophage. Journal of Atherosclerosis and Thrombosis. 11,2:88-97.