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Metabolic profiling and DNA barcoding of the Mexican anxiolytic and sedative plant Galphimia glauca

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Palphimia glauca has a long traditional use, and continues to be used in Mexico as a natural tranquilizer for the treatment of central Jnervous system disorders as well as for other illnesses. The genus Galphimia contains 26 different species but identification of this particular species throughout Mexico is highly mistaken by local people and botanists from reputed universities. Aim of this study was to investigate it's metabolic profile, confirm it's ethno-botanical use and correct the mistaken identification of this species. Metabolic profiling was carried out by means of (1)H NMR spectroscopy and multivariate data analysis applied to crude extracts from wild plant specimens. HPLC analysis was performed to confirm and quantify the presence of galphimines. Two neuropharmacological in vivo assays on mice were employed to study anxiolytic (elevated plus maze test) and sedative (sodium pentobarbital-induced hypnosis model) activities in the extracts. Anti-inflammatory activity was determined by using the tetradecanoylphorbol acetateinduced mouse ear inflammation model (TPA). For DNA barcoding we employed matK, rpoC1 and rbcL DNA barcodes to indicate the different species. Furthermore to investigate the possible impact of the several different ecosystems where the seven populations were collected, thin layer chromatography was employed to create a partial chemical profile, which was then compared with the metabolic profiles obtained by (1)H-NMR and multivariate data analysis. The results confirm that only two out of seven populations showed anxiolytic and sedative effect. The galphimines are consistent good markers for CNS activity. Galloylquinic acid levels varied throughout the populations studied. As per our knowledge, this is the first study, which shows that these populations of Galphimia genus represent significant anti-inflammatory activity in all investigated populations that is not linked with galphimines. This study showed that the seven populations here analyzed contain at least three different species of the genus Galphimia, although each individual population is homogeneous. Interestingly our TLC analysis clearly showed that the active populations displayed a distinctively unique chemical profile. This work also showed that the use of DNA barcodes combined with chemical profile analysis is an excellent approach to solve the problems of quality control in the development of Galphimia-based medicines as well as for any breeding programs for this species.

Biography

Ashutosh Sharma has completed his PhD from State University of Morelos, Mexico and Postdoctoral studies from National Autonomus University of Mexico (UNAM). Currently, he is the Biotechnology Program Director and Full Time Research Professor at Instituto Tecnológico y de Estudios Superiores de Monterrey, Queretaro, Mexico, a world class university. He has published more than 16 papers in international reputed journals and is reviewer of several international journals as well. He is inventor of 1 patent, co-author of 1 book and co-author of 2 book chapter. He is the youngest high level Professor of the university. He has presented more than 30 scientific work in various countries like USA, Holland, Chile, Brazil, India, Canada, China and Mexico. He is member of various scientific organizations and comitees. He has organized and co-organized several international conferences in the field of biotechnology. He enjoys writing on scientific issues that have been published in national and local news papers in Mexico. He has participated as a speaker in more than 70 symposiums, conferences, scientific events, science fairs and scientific discussions. He is co-founder and scientific director of a Startup "Nucleus" that focuses on the development of Phytomedicine and nuraceuticals. He is national coordinator of Cancerquest project in Mexico and founder of CancerCom student group that works on the prevention and awareness on cancer. He has recieved various awards, national and international scholarships during his career. He has fellowship of the prestigious national research system of Mexico, where he also serve as acredited evaluator for revising scientific project funded by National science and technology foundation of Mexico. Currently, he directs thesis for 2 master student and 1 PhD student.

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