NETWORK RESEARCH GROUP OF MEDICINAL PLANT COMPOUNDS FOR MALARIA TREATMENT FROM ETHNOPHARMACOLOGY IN THE AMAZON AND ACRE STATES

Principal Investigator (PI): Lin Chau Ming

School of Agronomic Sciences at Botucatu / São Paulo State University (UNESP)

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Figure 1. Elixir: medicinal formulas used to treat many diaseases, Pastoral da Saúde. Barcelos AM, Tomchinsky B. 2014

Malaria remains one of the major neglected diseases worldwide, infecting more than three million people annually and causing the death of a million of them. Malaria results from the interaction of the protozoan parasite Plasmodium, its host, the humans, and its vector, Anopheles mosquitoes. Where it occurs, it causes of delay in human development. In the world, the Sub-Saharan Africa is the most affected area, while, in the Americas, the Amazon region is the main endemic area and accounts for 99% of the transmission in the country. Unfortunately the parasite has shown resistance to most of the available drugs and it is urgent the research of new effective compounds to combat it. The Research Network studies are based on the knowledge of traditional communities from the Amazon region to find medicinal plants used for the treatment of malaria and its associated ills. Based on these indications, the most promising plants are studied and have their biochemical activities tested in laboratories for the identification of active phytochemical compounds. The research groups start from ethnobotanical studies in the communities, involved with the collection and identification of plants, the extraction of chemical compounds and realization of tests, such as:

- antiplasmodial activity *in vitro* with *P. falciparum*;
- schizont blood tests in mice with *P. berghei*;
- tests for acute toxicity *in vivo*; *in vitro* cytotoxicity assays;
- activity and toxicity of antimalarial substances obtained from plants;
- chromatographic screening, isolation and identification and structure elucidation of the isolated compounds;
- extraction and fractionation of pure substances;
- reaction tests with metalloporphyrin; and
- analysis by HPLC-UV and HPLC-MS/MS.

There are 55 traditional communities involved in this project distributed in eight municipalities around of the Purus and Negro rivers and their tributaries in the states of Acre and Amazonas: São Gabriel da Cachoeira (AM), Santa Isabel do Rio Negro (AM), Barcelos (AM), Novo Airão (AM) and Xapurí (AC), Lábrea (AM), Boca do Acre River (AM) and Pauini (AM). These communities are distributed in indigenous lands (IT), conservation units (FLONA and RESEX), settlements, private lands, lands of the Union, and some of them are characterized by the presence of indians from different ethnicity, gatherers, farmers, caboclos and ribeirinhos and there is also one religious community. The "Network research group of medicinal plant compounds for malaria treatment from ethnopharmacology in the Amazon and Acre States" was approved with the Call MCT / CNPq in 09/2009 - PRONEX - Malaria Network, process 555669/2009-2 with funding from FAPESP and CNPq from the end of 2009.

SUMMARY OF RESULTS TO DATE AND PERSPECTIVES

The ethnobotanical studies have been completed and from the 150 plant species listed for the specific treatment of malaria in visited communities, 30 are new and have never been published before, which shows the importance of this research. Twenty of these plants were selected for the laboratory tests, which should be completed by the end of 2015. For the agronomic tests, the same twenty plants were selected to propagation, fertilization, management and harvesting tests. All these steps are fundamental to know what are the most interesting species for the development of new drugs.

Figure 2. Searching for the indicated plants. Barcelos AM, Tomchinsky B. 2014

MAIN PUBLICATIONS

Resgate etnofarmacológico das plantas medicinais utilizadas para o tratamento da malária, nas calhas do rio Negro e Purus. Patrícia Scarparo Pereira da Costa. UFAM/FCA. 2013.

Etnobotânica de plantas antimaláricas em comunidades indígenas da região do Alto rio Negro, Amazonas, Brasil. Tese: Unesp/FCA. Carol Weber Kffuri. 2014.

Etnobotânica de plantas antimaláricas em Barcelos, Amazonas. Dissertação: Unesp/FCA. Bernardo Tomchinsky. 2014.

Tomchinsky B, Ming LC, Hidalgo AF, Carvalho I, Kffuri CW. 2013. Impactos da legislação na pesquisa etnobotânica no Brasil, com ênfase na região amazônica. *Amazôn, rev. Antropol. Online*. **5 (3)**: Especial: 734-761.

FrausinI G, Lima RBS, Hidalgo AF, Maas P, Pohlit AM. 2014. Plants of the Annonaceae traditionally used as antimalarials: a review. *Rev. Bras. Frutic.* **36**: no.spe1 Jaboticabal.

Lin Chau Ming

Faculdade de Ciências Agronômicas
Universidade Estadual Paulista (Unesp)
Rua José Barbosa de Barros, 1780
CEP 18610-307 – Botucatu, SP – Brasil

+55-14-3880-7100
linming@fca.unesp.br