



## **PROFILING OF THE METABOLITES FOUND IN DROPLETS OF THE ORB-WEBS FROM THE SPIDER *Nephila clavipes* : UNDERSTANDING THE STRATEGY OF PREY CAPTURE**

**Franciele Grego Esteves, José Roberto Aparecido dos Santos-Pinto  
and Mario Sergio Palma**

*Center of Study of Social Insects, Department of Biology, Institute of Biociences of Rio Claro, São Paulo State University - UNESP, Rio Claro, SP, Brazil. francielegrego@gmail.com*

*Nephila clavipes* belongs to the group of orb-weaving spiders, which evolved the ability to synthesize adhesive threads for prey capture to enhance the efficiency of their chemical arsenal for catching, paralyzing and /or killing the preys. Such adhesives threads are found in the core circles of the orb-webs, coated by a viscous solution that covers the entire length of the as nodules (viscous droplets), which in turn contain many vesicles in suspension, entrapping solutions of proteins, peptides and many small-molecular mass compounds [1, 2]. These molecules may to play different roles, such as the capture of prey, predators' repellents and to possess antimicrobial characteristics. This suggests that web is not a simple tool for mechanical capture and entrapment of prey, but present active involvement of this complex structure, which seems to play an "active" strategic role in capturing preys [1, 3]. Thus, the aim of this study was to investigate the richness of the chemical profile of the small-molecular mass compounds found in the oil droplets of the spider web *N. clavipes*. According to the literature, some of those compounds possibly can play "an active role" in the insect-prey's capture strategy. An experimental approach was developed by using comprehensive two-dimensional gas chromatography coupled to a EI mass detector (GC×GC-MS); as a result 358 compounds were found in the viscous droplets, such as saturated/unsaturated, linear/branched hydrocarbons, saturated / unsaturated fatty esters, saturated / unsaturated fatty acids. Our results demonstrated that fatty acids were the components found in highest concentrations in the web; and they can act as surfactants, possibly assisting the process of destabilization of the cuticle of the insect-prey, when they are trapped by the web, allowing the diffusion of toxins into the body of the prey. The results provided a large number of qualitative and quantitative information on the composition of the chemical profile of metabolites, which constitutes the oily droplets of the web. Moreover results contribute to the chemical-ecological understanding of these compounds in insect-prey's capture by *N. clavipes* web; and finally the possible use of these compounds in applications in the selective insecticide development or even possible pharmacological applications.

[1] Nentwin, W. 1987. In: *Ecophysiology of spiders*. pp. 249-63. Springer-Verlag, Berlin.

[2] Salles, H.C., Volsi, E.C.F.R., Marques, M.R., Mendes, M.A., Palma, M.S. 2006. The Venomous Secrets of the Web Droplets from the Viscid Spiral of the Orb-Weaver Spider *Nephila clavipes* (Araneae, Tetragnatidae). *Chem. & Biod.* 3: 727-41.

[3] Sanggaard, K.W., Bechsgaard, J.S., Fang, X., Duan, J., Dyrland, T.F. 2014. Spider genomes provide insight into composition and evolution of venom and silk. *Nature Communications*. 3765.

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