## **Conference** presentation

## Multicenter project Brazil-Italy: physicochemical analysis of *Zincum metallicum* and lactose in dynamized mixtures

Carla Holandino<sup>a\*</sup>, Adriana Passos Oliveira<sup>a</sup>, Fortune Homsani<sup>a</sup>, Thaís Fernandes<sup>a</sup>, Michelle Rodrigues de Lima Zanetti<sup>a</sup>, Juliana Patrão Paiva<sup>a</sup>, Camila Monteiro Siqueira<sup>b</sup> Venicio Feo da Veiga<sup>c</sup>, Sheila Garcia<sup>a</sup>, Leticia Colli<sup>d</sup>, Alessandra Lifsitch Viçosa<sup>e</sup>, Luciana Macedo Brito<sup>f</sup>, André Linhares Rossi<sup>g</sup>, Paulo Henrique de Souza Picciani<sup>h</sup>, Silvana Marques Araújo<sup>i</sup>, Leoni Villano Bonamim<sup>j</sup>, Paolo Bellavite<sup>k</sup>

<sup>*a*</sup>Multidisciplinary Laboratory of Pharmaceutical Sciences and Laboratory of Research and Development of Integrative and Complementary Medicine, Department of Drugs and Medicines, Pharmacy college, UFRJ. Rio de Janeiro, Brazil (www.farmacia.ufrj.br).

\*Corresponding author: Carla Holandino, <u>cholandino@gmail.com</u>

<sup>b</sup>Federal Institute of Rio de Janeiro, Rio de Janeiro, Brazil

<sup>c</sup>Laboratory of Electron Microscopy, Institute of Microbiology Prof. Paulo de Góes (IMPPG), CCS, UFRJ, Rio de Janeiro, Brazil

<sup>d</sup>Pharmaceutical Technology Laboratory, Department of Drugs and Medicines, Pharmacy college, UFRJ. Rio de Janeiro, Brazil

eLaboratory of Experimental Pharmacothecnics- Farmaguinhos / Oswaldo Cruz Foundation -

Fiocruz (www.far.fiocruz.br), Rio de Janeiro, RJ, Brazil

<sup>f</sup>Federal Rural University, RURAL. Rio de Janeiro, Brazil

<sup>g</sup>Brazilian Center for Research in Physics (www.cbpf.br), Rio de Janeiro - RJ, Brazil

<sup>h</sup>Institute of Macromolecules Professor Eloisa Mano (www.ima.ufrj.br), Federal University of

Rio de Janeiro, Rio de Janeiro, RJ, Brazil

<sup>i</sup>Department of Basic Health Science, Laboratory of Parasitology, Universidade Estadual de Maringá, Paraná, Brazil

<sup>j</sup>Paulista University, São Paulo, Brazil

<sup>k</sup>University of Verona, Italy

## Abstract

**Background:** The use of sensitive techniques can be useful to increase the understanding of homeopathic systems behavior.



**Cite as:** Holandino C, Oliveira AP, Homsani F, Fernandes T, Zanetti MRL, Paiva JP, Siqueira CM, da Veiga VF, Garcia S, Colli L, Viçosa AL, Brito LM, Rossi AL, Picciani PHS, Araújo SM, Bonamim LV, Bellavite P. Proceedings of the XXX GIRI Meeting; 2016 Sep 09-11; Netherland. *Int J High Dilution Res.* 2016;15(4):41-42

**Aim:** To analyze physicochemical properties of *Zincum metallicum* and lactose mixtures prepared according to Brazilian Homeopathic Pharmacopeia.

**Methodology:** *Zincum metallicum* was prepared using lactose as vehicle, from 1 to 3 cH, and from 1 to 6dH. All samples including respective controls (dynamized lactose) were analyzed by Atomic Absorption Spectroscopy (AAS), X-ray Diffraction (XRD), Transmission Electron Microscopy (TEM) with X-Ray Energy Dispersive Spectroscopy (EDX), Scanning Electron Microscopy (SEM), and Differential Scanning Calorimetry (DSC).

**Results:** AAS analysis showed the dynamization process decreases zinc concentration in a proportional manner to the increase of homeopathic potencies. Quantities of 4ppm and 132 ppm of zinc were detected in 6dH and 3cH, respectively. XRD analysis showed crystalline form of lactose was not modified by dynamization. Amorphous lactose spheres were observed by TEM in all samples, with mean size ranging from 800 to 200 nm. EDX obtained in the TEM confirmed zinc presence throughout the amorphous matter and the absence of individualized zinc crystalline particles. These results are in accordance with XRD which showed absence of zinc diffraction peaks, in all lactose samples containing zinc suggesting this metal could be modified from crystalline to amorphous state, and consequently adsorbed into lactose molecules. SEM structural analysis of lactose and zinc (1cH) samples using *BSE* detector showed no zinc metal grains confirming XRD and TEM results. DSC analyses presented statistical significance differences (p<0.05) when fusion enthalpy values of zinc samples were compared.

**Conclusions:** This data shows the several ground cycles of zinc into lactose probably induced the amorphisation of the zinc crystalline particles, increasing the metal adsorption by lactose molecules.

Conflict of interest: None declared.

Keywords: physicochemical, homeopathy, Zincum metallicum, lactose

© International Journal of High Dilution Research. Not for commercial purposes.



**Cite as:** Holandino C, Oliveira AP, Homsani F, Fernandes T, Zanetti MRL, Paiva JP, Siqueira CM, da Veiga VF, Garcia S, Colli L, Viçosa AL, Brito LM, Rossi AL, Picciani PHS, Araújo SM, Bonamim LV, Bellavite P. Proceedings of the XXX GIRI Meeting; 2016 Sep 09-11; Netherland. *Int J High Dilution Res.* 2016;15(4):41-42