

First Exploration of the *Mesobuthus Cyprius* Venom

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1. Introduction

Mesobuthus Cyprius, one of the two endemic scorpions in Cyprus, belongs in the family of Buthidae which is geographically distributed worldwide and is the largest of the scorpion families.

Even though *Mesobuthus Cyprius* was discovered in 2000 using molecular phylogenetics there are no other published data regarding the peptide and protein composition, the toxicity, or any other activity of the venom.

The main objective

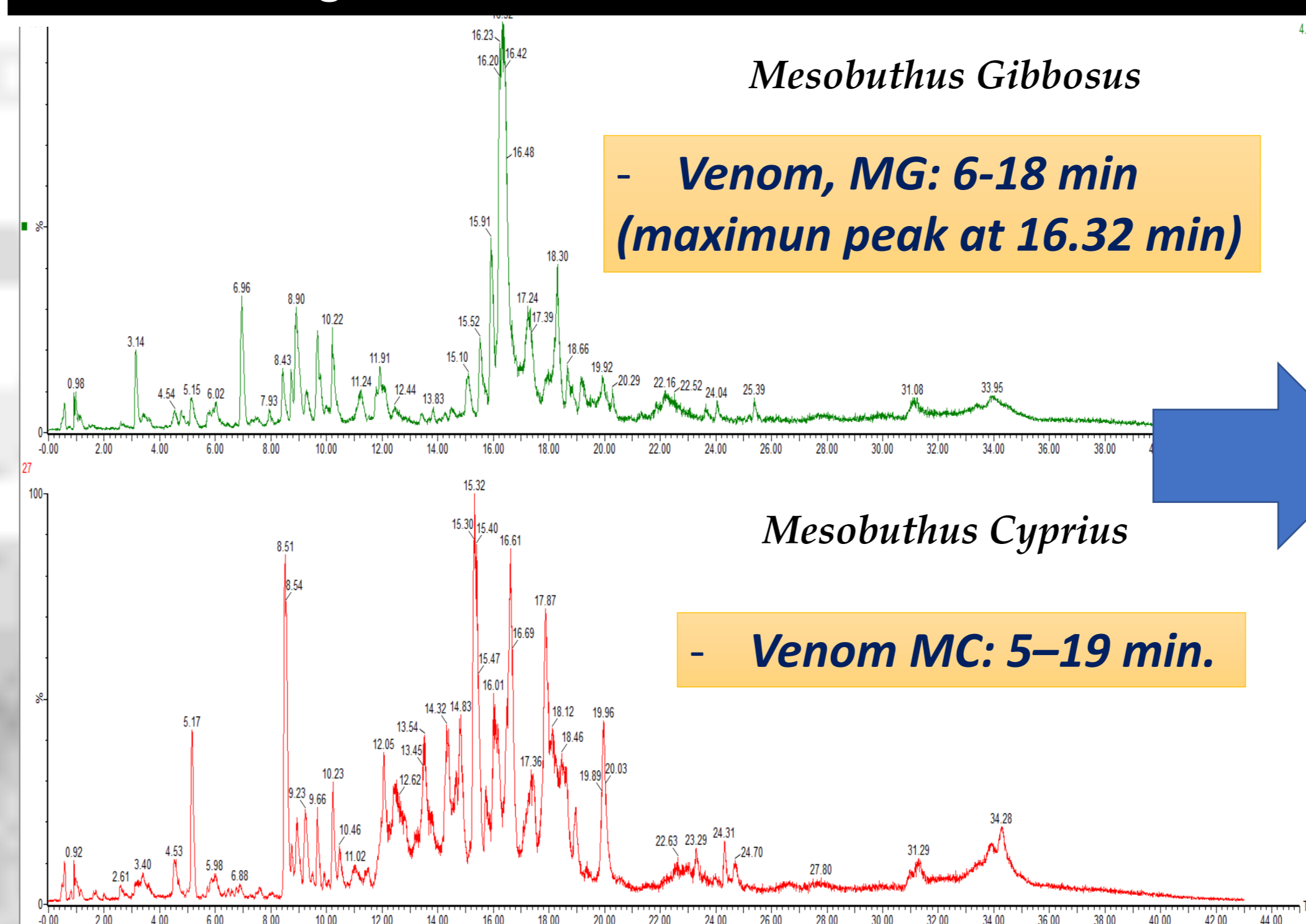
The identification the proteins in the *Mesobuthus Cyprius* Venom.

The elucidation of the venom's proteins (a proteomic strategy, using multiresidue liquid chromatography tandem mass spectrometry (LC-PDA-MS and UPLC-TOF-MS) techniques)

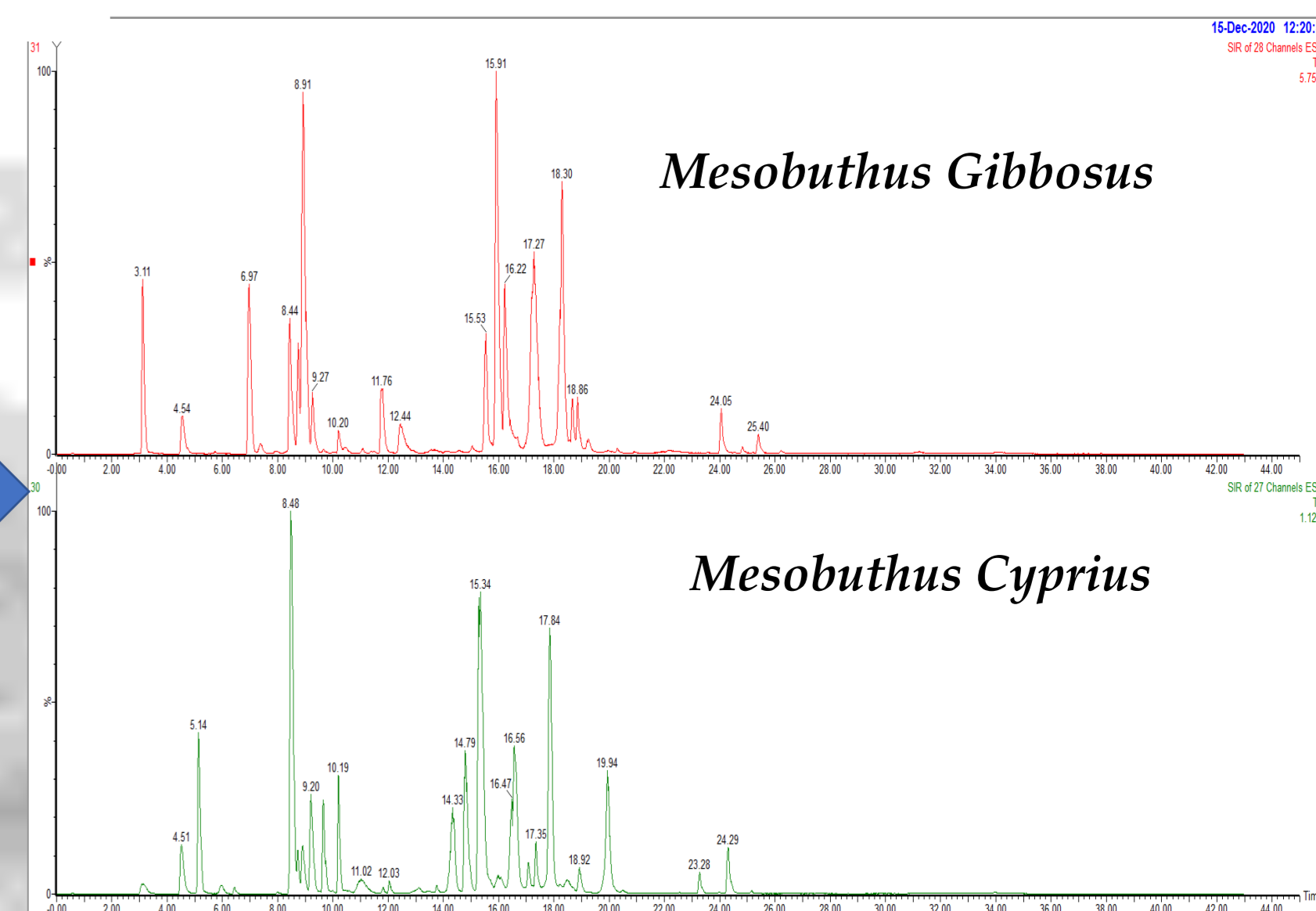
This is the first report revealing data and other information for the proteome of endemic scorpion species of Cyprus, the *Mesobuthus Cyprius* (MC).

- Comparison of the *Mesobuthus Cyprius* and *Mesobuthus Gissobus* (MG) venom (proteomic analysis)
- Study of the venoms with Nuclear Magnetic Resonance Spectroscopy (NMR) in solution identifying several differences.
- Ability of the venom to cause cell death in a number of cancer cell lines.

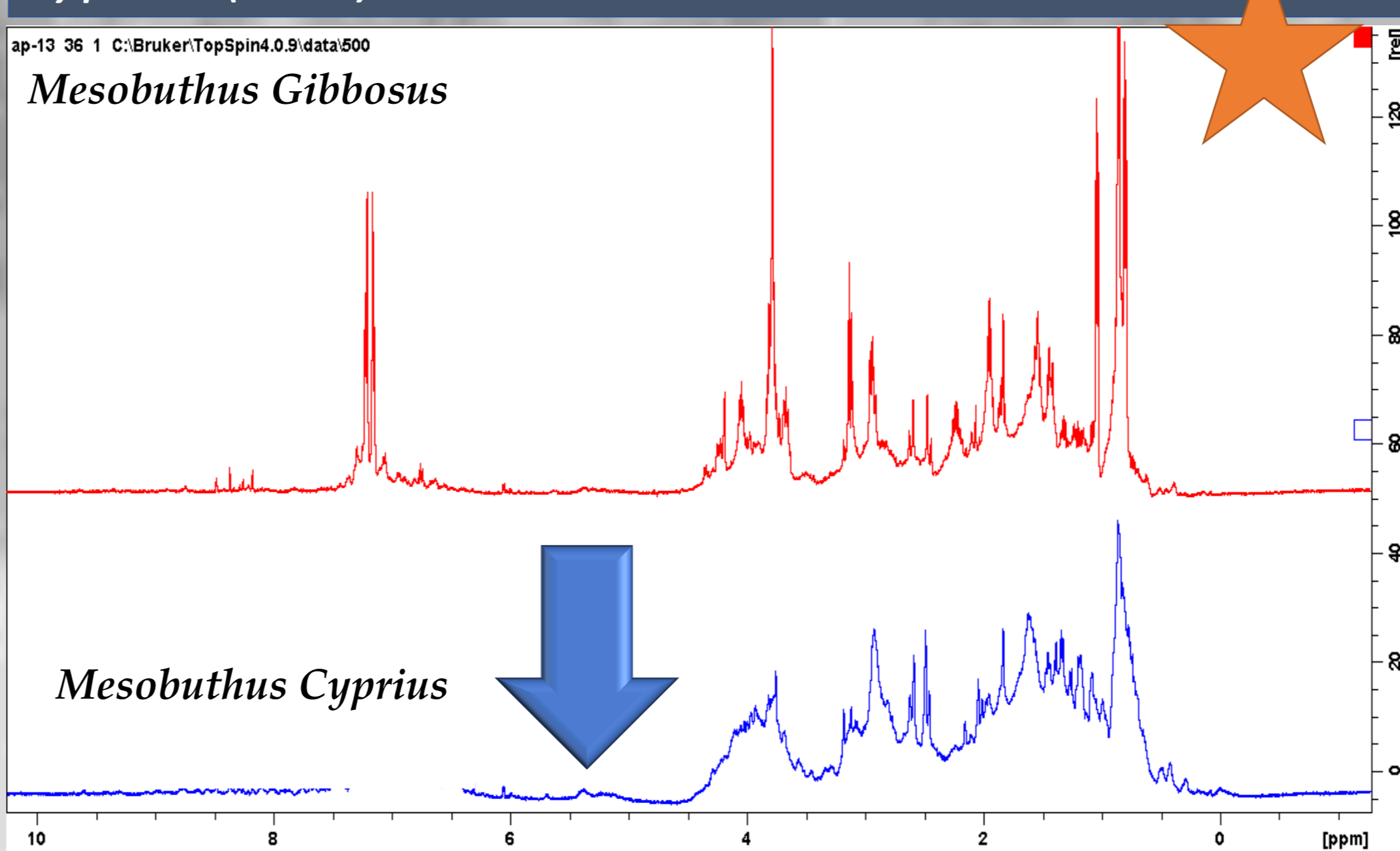
Chromatograms of *Mesobuthus Cyprius* and *Mesobuthus Gibbosus* using UPLC-MS/M



SIR mode of UPLC-MS/MS of the MC and MG venoms.

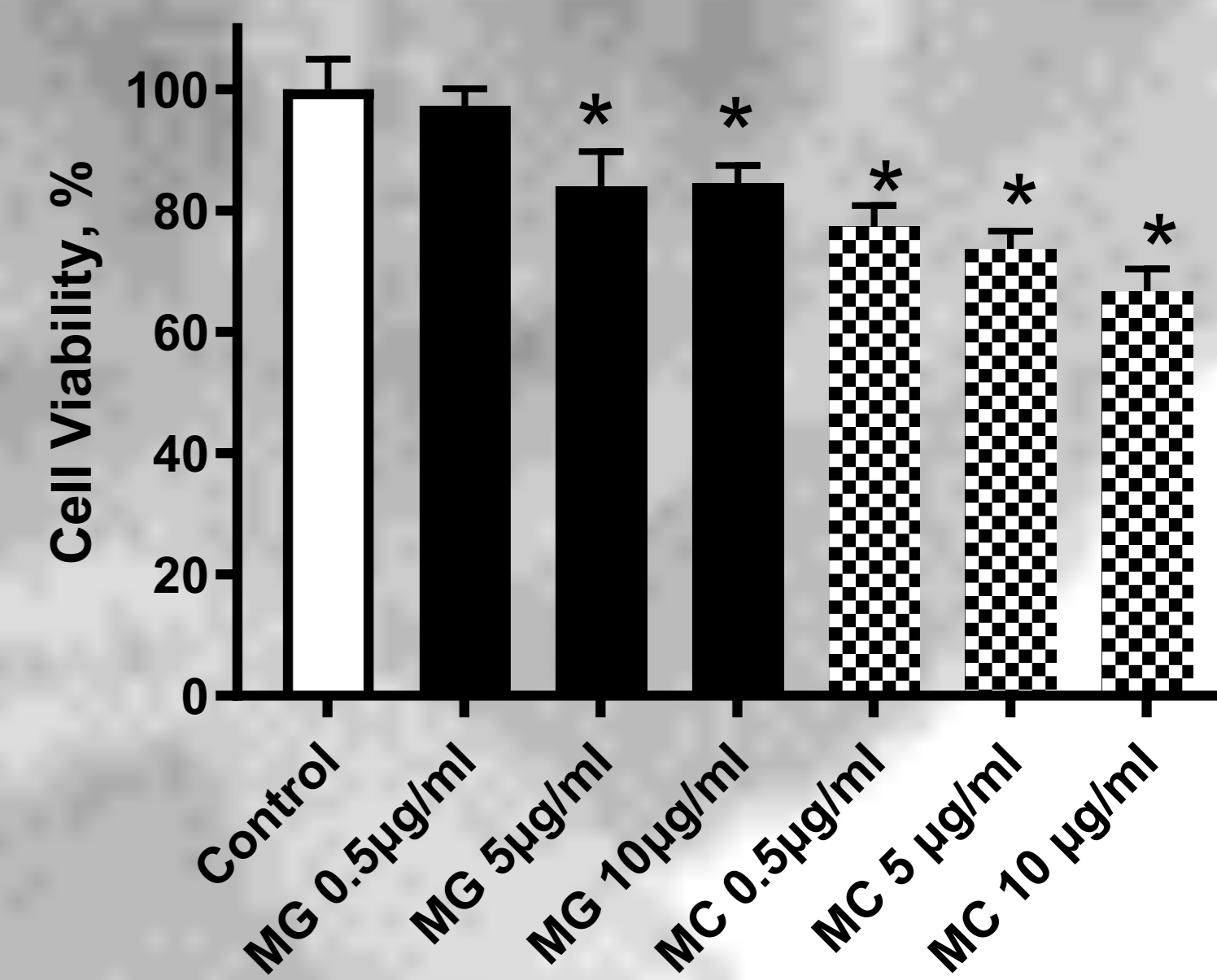


NMR spectra of the crude venoms of *Mesobuthus Cyprius* (Blue) and *Mesobuthus Gibbosus*



NMR SPECTRA FO THE CRUDE VENOMS

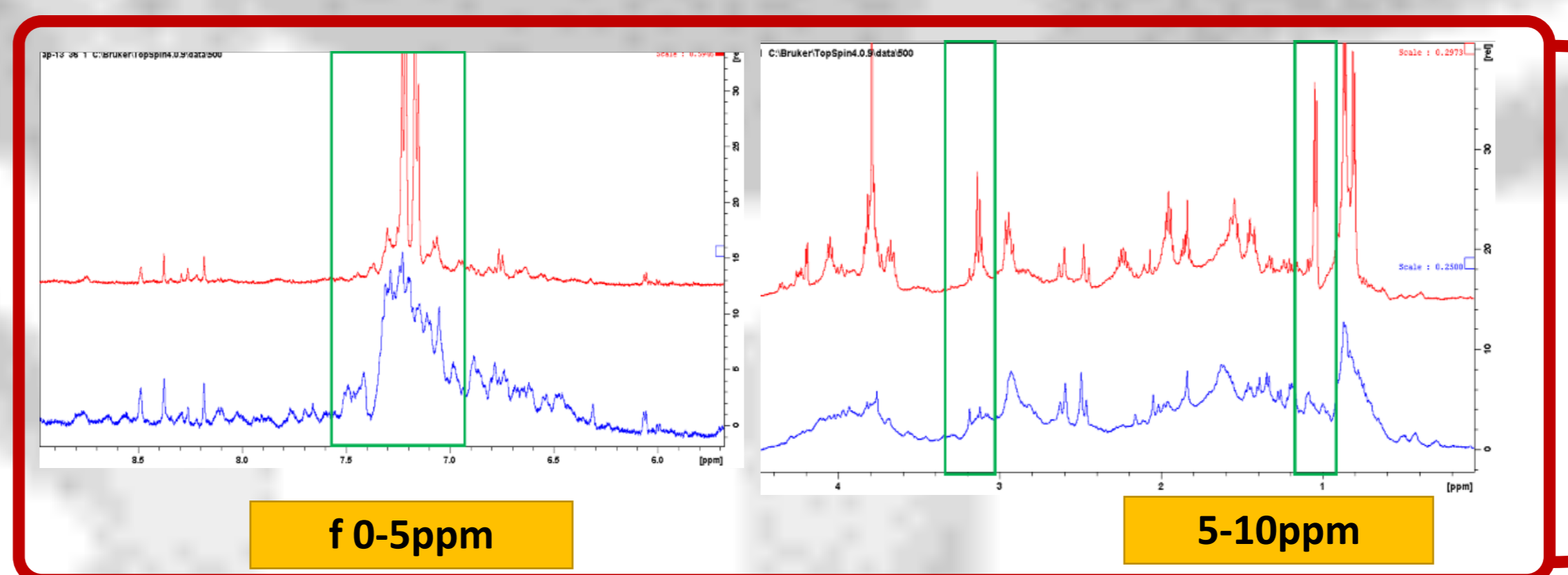
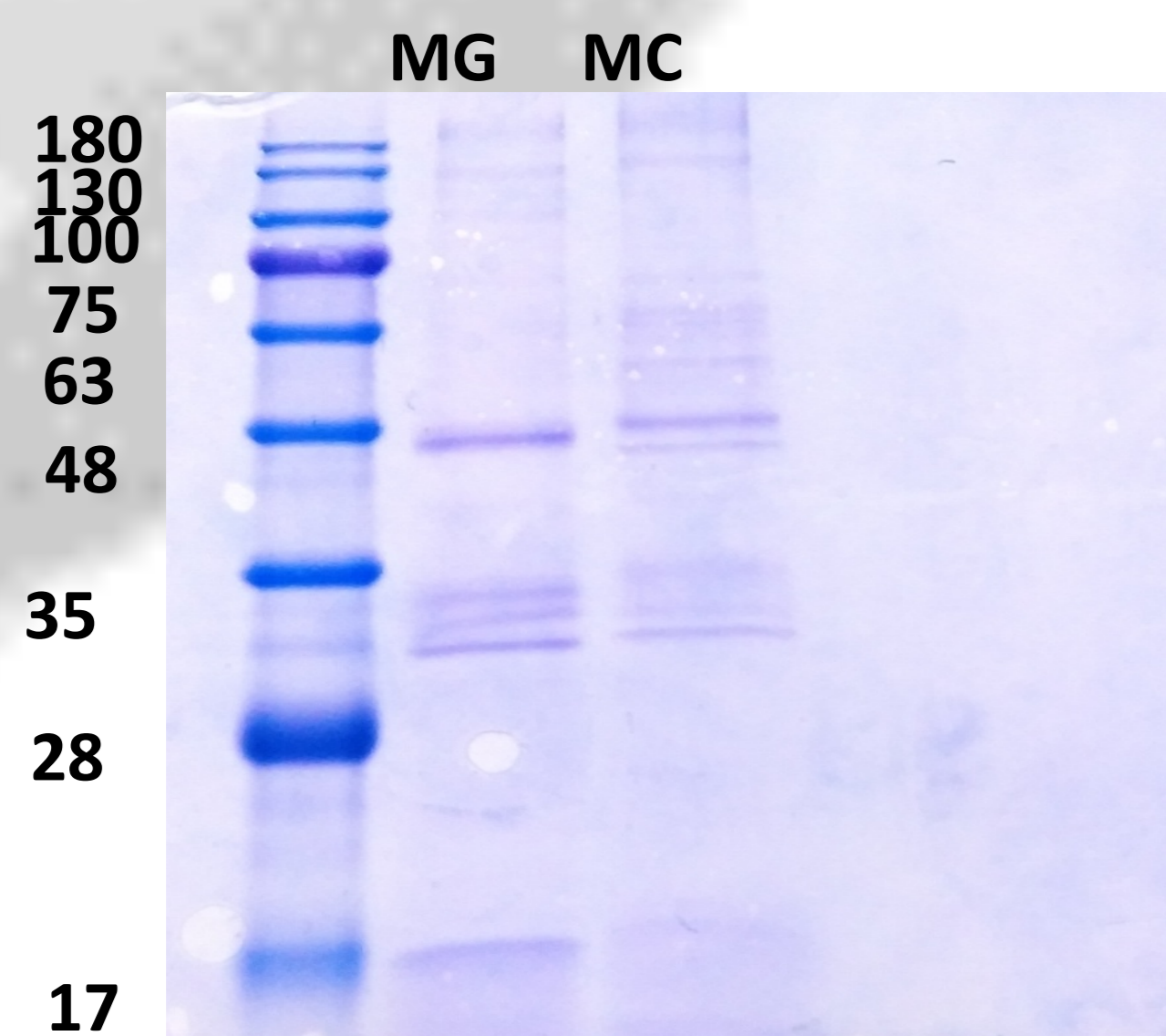
Cytotoxicity potential of Scorpion Venom



2. Results and Discussion

Proteomic profile of the venom of the scorpion *Mesobuthus Cyprius*

SDS-PAGE electrophoresis pattern of MG and MC venoms



The levels of aromatic amino acids (area 6.5 – 7.5 ppm) are significantly lower than the levels of aliphatic amino acids (1.5 – 4.5 ppm) indicating that the peptides contain mainly aliphatic amino acids.

3. Conclusions

The first attempt for the identification of the profile of the proteins of the endemic scorpion species of Cyprus, the *Mesobuthus Cyprius*

Mesobuthus Cyprius presented the protein bands of 60-65 kDa in contrast with *Mesobuthus Gibbosus* venom

Different profile of proteins between the MC and MG venoms, showing the importance of the interpretation of the proteins of MC. (Using UPLC-MS/MS)

The levels of aromatic amino acids (area 6.5 – 7.5 ppm), are significantly lower than the levels of aliphatic amino acids (1.5 – 4.5 ppm). The peptides contain mainly aliphatic amino acids.

Both venoms affect the viability of MDA-231 cells, with the MC venom being slightly more cytotoxic than the MG venom.