

# Venomics of *Leiurus abduallahbayrami*, the most lethal scorpion in the Levant region of the Middle East

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## Abstract

The scorpion *Leiurus abduallahbayrami* has been associated with severe/lethal envenomings throughout the Levant region of the Middle East, encompassing Turkey, Syria, and Lebanon, and only scarce information is available on its venom composition, activity, and antigenicity. We report on the composition of *L. abduallahbayrami* venom collected from Lebanese specimens using nESI-MS/MS, MALDI-TOF MS, SDS-PAGE and RP-HPLC. Venom lethality, through LD50 determination in mice (intraperitoneal), was also assessed (0.75 (0.16–1.09) mg/kg), confirming *L. abduallahbayrami* venom vertebrate toxicity. Fifty-four peaks were detected using RP-HPLC, half of which eluted in the gradient region between 20 and 40% acetonitrile. In reducing SDS-PAGE, most predominant components were <10 kDa, with minor components at higher molecular masses of 24.4, 43.1, and 48.9 kDa. Venom mass fingerprint by MALDI-TOF detected 21 components within the 1000–12,000 m/z range. Whole venom ‘shotgun’ bottom-up nLC-MS/MS approach, combined with in-gel tryptic digestion of SDS-PAGE bands, identified at least 113 different components belonging to 15 venom families and uncharacterized proteins, with ion channel-active components (K<sup>+</sup> channel toxins (28); Na<sup>+</sup> channel toxins (42); Cl<sup>–</sup> channel toxins (4); Ca<sup>+2</sup> toxins (2)) being predominant. A single match for a *L. abduallahbayrami* NaTx was found in the UniProt database with other congeneric species, toxin h3.1 from *Leiurus hebraeus*, suggesting this might be an indication of venom divergence within *Leiurus*, even though this warrants further investigation involving venom proteomics and transcriptomics of relevant species. Considering such potential interspecific venom variation, future work should address whether preparation of a specific anti-*L. abduallahbayrami* antivenom is justified.