A new peptide from Jatropha curcas seeds: insights through sequencing and ionic mobility

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INTRODUCTION: Jatropha curcas is a multipurpose small tree worldwide which is recognized by its oil and medicinal compounds. Available genome sequences and mass spectrometry analyses performed with seeds have supported its biological role in plant. Based on this fact, we provide insights on the isolation of a peptide from Jatropha curcas seeds and used its scaffold to synthesize linear and cyclic analogues to investigate its biotechnological potential.

MATERIALS AND METHODS: solid phase extraction and reverse phase multi-steps chromatography with mass spectrometry procedures were performed with the aim to obtain a new peptide sequence. RESULTS AND DISCUSSION: analysis was performed that yielded a peptide of molecular weight of 1342.43 Da. Through De Novo peptide sequencing by tandem mass spectrometry and Jatropha genome database search a sequence of fourteen amino acids residues was deduced. In silico prediction of its physicochemical properties were made to estimate solubility, net charge at physiological pH and iso-electric point. The Blastp tool was used for search database Non-redundant protein sequences (nr) using the peptide sequence query. A conserved hypothetical protein from Ricinus communis with LEA domain was the most significant alignment with E-value of 7e-05 and identity of 93%. In order to study structural and biological aspects of this peptide, linear (1342.43 Da) and cyclic (1324.43 Da) synthetic analogues with more than 90% of purity were acquired and compared by MS/MS fragmentation pattern and ionic mobility. Hemolytic activity was not detected up to 200 µM of both synthetic analogues. CONCLUSIONS: The approach utilized in this work is especially relevant since until now attempts to report the isolated peptide complete sequence from Jatropha curcas seeds have failed, furthermore the significant differences in the structural arrangement of the synthetic analogues suggest its outstanding biotechnological uses may be explored.

Key-words: peptides, Jatropha curcas, mass spectrometry
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