P-1.101

Lea4 Protein Family Group Originated from Ramonda Serbica: Structural Analysis

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Desiccation (5-10% of relative water content) leads to protein denaturation and aggregation and affects the membrane integrity. Ramonda serbica is an ancient resurrection plant, that survives a desiccation and fully recovers metabolic functions upon watering. The key constituents of desiccation tolerance resurrection plants are Late Embryogenesis Abundant Proteins (LEAPs). This heterogeneous group of IDPs forms mostly random conformation when fully hydrated, turning into compact α -helices during desiccation. In this study, we produced three LEAPs belonging to the LEA4 group from R. serbica and purified with a purity higher than 95%. Using circular CD for structural characterisation, it has been shown that all three LEAPs were mostly disordered at different pH. The LEAPs predominantly folds into an α -helical form when 2,2,2-trifluoroethanol and lipid mimetic detergent are present, suggesting the significance of structural plasticity. LEAPs protective role and their ability for structural disorder-toorder transitions might be crucial in the desiccation tolerance mechanism. We propose that the protective role of LEAPs in cells by this structural duality is most likely a result of interactions with membranes and proteins that are desiccation-sensitive. Our research provides new insights into the link between the structure and function of LEAPs in resurrection plants.