Metal Cations Effect on Membrane Crystallized Lysozyme

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Microporous hydrophobic membranes are innovative tools in protein crystallization [1]. In this work, effects of $CoCl_2$ and $CuCl_2$, used as precipitant agents, on membrane-crystallization of hen egg white lysozyme (HEWL), are described. The HEWL*Co^{2+} complex gave rise to a new $P2_12_12_1$ orthorhombic form (a= 36.81 Å, b= 77.56 Å, c= 80.38 Å) beside the ordinary tetragonal one. Literature reports only another similar case: a $P2_12_12_1$ orthorhombic form of an HEWL*Ni^{2+} compound, grown under strong magnetic field [2]. Membrane crystallization of HEWL with $CuCl_2$ allowed to observe new coordination positions of Cu^{2+} to lysozyme (Asp18, Asp87) respect to ones already described (Asp52, Leu129, Arg14) [3]. DSC tests showed cobalt coordination increases lysozyme stability, while copper binding by oxygen atoms is unfavourable and decreases crystals melting point. HEWL specific activity increases after crystallization owing to its further purification and seems to be more affected by copper coordination.

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