Interference by Nickel(II) Salts and Their 5-Methylimidazole-4-carboxylate Coordination Compounds on the Chloroplast Redox Chain

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Nickel(II) salts and their coordination compounds with ethyl 5-methylimidazole-4-carboxylate (emizco), $[Ni(emizco)_2Cl_2]$, $[Ni(emizco)_2Br_2]$, $[Ni(emizco)_2(H_2O)_2](NO_3)_2{\cdot}H_2O$, $Ni(NO_3)_2$, inhibit photosynthetic electron flow (basal, phosphorylating and uncoupled) and ATP-synthesis, therefore behave as Hill reaction inhibitors. Coordination compounds are more potent inhibitors than the salts. It was found that the target for $NiCl_2$; $NiBr_2$ and $Ni(NO_3)_2$ is at the b_6f level. On the other hand, the complexes $[Ni(Emizco)_2Cl_2]$, $[Ni(Emizco)_2Br_2]$ and $[Ni(emizco)_2(H_2O)_2](NO_3)_2{\cdot}H_2O$ binding sites are located at Q_B(D1)-protein and b_6f level. Therefore, they have a common inhibition site located at b_6f avoiding the PQH_2 oxidation. The Q_B inhibition site was corroborated by variable chlorophyll *a* fluorescence yield [V(j)]. The emizco ligand has no activity on photosynthetic electron flow.

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