**Molecular characterization of interactions between Lectin, a protein from the common edible mushroom (*Agaricus bisporus*) and dietary carbohydrates**

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Lectins are widely found in living organisms such as animals, fungi, plants, bacteria, and viruses. Most lectins from plant sources are storage proteins and play a critical role in the defense against external threats. Thanks to its ability to bind to carbohydrates and glycoconjugates, lectin is known for its hemagglutinating properties, with its interactions being highly specific to certain glycoproteins, binding with both free and bound forms of the chemical moiety. However, the molecular mechanism of ligand binding and the binding stoichiometry between *Agaricus bisporus* lectin (ABL) and dietary carbohydrates are yet to be studied[1,2,3]. This work aims to identify the binding strength, stoichiometry, and stabilising interactions between the protein and common dietary carbohydrates.

As such, this study investigates the interactions between ABL and the common dietary sugars, glucose, and galactose, as well as their N-Acetylated amino sugar counterparts for comparison. In doing so, intrinsic fluorescence measurements were undertaken, with increasing concentrations of dietary carbohydrates/antigen recognition agents resulting in a considerable quenching of fluorescence intensity of the ABL solutions. This demonstrated that binding of the ligand occurred, with nonlinear fitting of quenching data showing that the binding strength of interactions is intermediate to strong, with galactose exhibiting the strongest molecular interactions. Circular dichroism and Fourier transform infrared analyses record alterations to the protein secondary structure upon ligand binding, suggesting molecular interactions affect the secondary structure of the protein molecule. Molecular docking highlights the likely binding positions of each ligand to the ABL molecule, further arguing for the presence of stable interactions between the protein and the ligands, which differ in the conformation of a single epimeric hydroxyl group at position four of the sugar ring. These findings give a deeper understanding of the molecular interactions between ABL and dietary carbohydrates providing a theoretical basis for its functionality as a nutraceutical with hypoglycemic capability.

**References**

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