Indian Ayurvedic herb, Ashwagandha for COVID-19 management
-Bioinformatics and experimental evidence-

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The recent outbreak of the novel coronavirus (SARS-CoV-2) in the Wuhan province of China has taken millions of lives world-wide. While new line of drug/vaccine development has been initiated world-wide, in the current scenario of high infected numbers, severity of the disease and high morbidity, repurposing of the existing drugs is heavily explored.

In this study, we have used a homology-based structural model of transmembrane protease serine-2 (TMPRSS2), a cell surface receptor, required for entry of virus to the target host cell. Using the strengths of molecular docking and molecular dynamics simulations, we have examined the binding potential of Withaferin-A (Wi-A), Withanone (Wi-N) and caffeic acid phenethyl ester (CAPE) to TPMRSS2 in comparison to its known inhibitor, Camostat mesylate.

We found that both Wi-A and Wi-N could bind and stably interact at the catalytic site of TMPRSS2. Wi- N showed stronger interactions with TMPRSS2 catalytic residues than Wi-A and was also able to induce changes in its allosteric site. Furthermore, we investigated the effect of Wi-N on TMPRSS2 expression in MCF7 cells and found remarkable downregulation of TMPRSS2 mRNA in treated cells predicting dual action of Wi-N to block SARS-CoV-2 entry to the host cells. Since the natural compounds are easily available/affordable, they may even offer a timely therapeutic/preventive value for the management of SARS-CoV-2 pandemic.