



### **INDUSTRIAL RESEARCH AND CONSULTANCY CENTRE, IIT BOMBAY**

The SARS-CoV-2 affects the lungs of the host where it targets the receptors of human Angiotensin-Converting Enzyme 2 (ACE-2). As the disease progresses, most of the patients show acute respiratory distress leading to breathlessness and later organ failure, which is the major cause of fatality rates. Depending on the immune strength and co-morbidities of the host infected, the symptoms differ from mild to severe. Currently, the stratification of COVID-19 patients is based on the symptoms and the viral load that is cycle threshold value (CT) obtained from RT-PCR detection results. The nasopharynx is the primary exposure site for the viral entry, which elicits a complex molecular and immune response events in the infected host.

The proteomic approach to investigate such host proteins response towards the COVID19 infections will aid in the identification of prognostic biomarkers for the prediction of disease severity. Here, we enumerated the significant host proteins and molecular pathways using high-throughput mass spectrometry of nasopharyngeal swabs samples from COVID-19 infected patients. Thus, we establish a panel of host proteins that can be used for the assessment of the viral load in patient samples from nasopharyngeal swabs as well as the severity of the disease thereby aiding in diagnosis and prognosis of SARS-CoV-2. Using the nasopharyngeal swabs, we have been able to quantify proteins and peptides of both viral and host origins which can aid in understanding the severity of the disease. Mass-spectrometry based identification of proteomic signatures has been used for the development of the host response detection kit which will be safe, simple, rapid, and can be routinely used in the clinical or diagnostic laboratory. The present invention provides an assay based on a panel of prognostic COVID-19 protein biomarkers characteristic of host response using a nasopharyngeal swab collected in organic solvents. This invention has the scope for the prognosis of COVID-19 patients for the disease severity based on host protein biomarkers. It may also guide the clinicians in predicting the disease outcome as well as in the therapeutic decision-making.