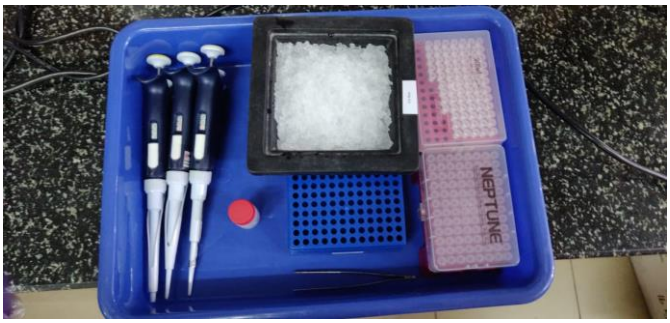
Economical COVID-19 test ‘COVIRAP’ gets ICMR certification

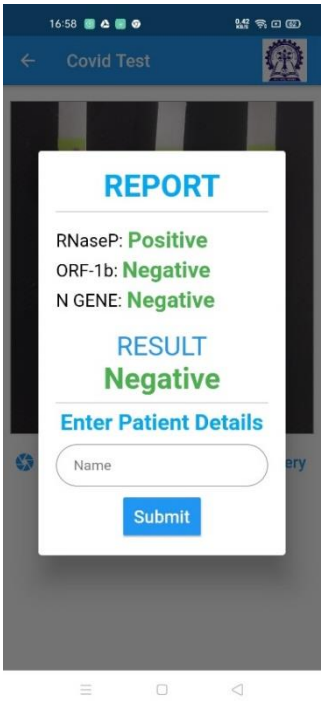
New Delhi, Oct 21 (India Science Wire): RT-PCR for detecting COVID-19 is a standard test. The Indian Institute of Technology, Kharagpur (IIT-Kharagpur) has developed a diagnostic machine that gives as close results as ones produced by RT-PCR test. The diagnostic machine ‘COVIRAP’ has been successfully validated for its efficacy in COVID-19 detection by the Indian Council of Medical Research (ICMR).

The machine is portable, low-cost, and user-friendly that can be used in the field, anywhere. "The machine can determine the results of a given sample in less than an hour. It can be set up in the middle of a field and doesn't require an air-conditioned laboratory. In fact, most of the testing done during the development process was conducted out in the open to test the efficacy of the machine," said Prof Suman Chakraborty, Professor, Department of Mechanical Engineering, IIT Kharagpur.



Tray containing the essential apparatus to conduct the tests

While explaining the working mechanism of the machine Prof. Chakraborty said "Each testing kit contains three master mixes which can confirm the presence of the virus. After the RNA sample is collected, it is mixed with master mixes and heated to a certain temperature after being inserted in the pre-programmed machine. This is quite like what is done in other tests as well. However, there is a second heating step which is exclusive to this device and has been patented, which makes the machine unique. After the heating processes are completed, the RNA samples are put on a strip. Whether a patient is COVID-19 positive or negative is dependent on whether lines appear on the strips or not. The strips are then inserted in a cartridge in the machine from where the app uses the camera and inbuilt analytical tool to determine whether the test is positive or negative."



COVID test results on mobile app

Sensitivity and specificity are the two common parameters used as indicators of efficacy of any diagnostic test. The machine displayed over 93% sensitivity and almost 98% specificity in its results. "The samples of various patients can be tested at once and that makes the machine quite scalable," declared Prof Chakraborty.

The cost of the machine is around Rs 5,000 and one test will cost between Rs 500-600. "The whole machine and testing process were developed by the institute itself during the lockdown, nothing has been imported from outside. We are hoping that the per-test cost will decrease once the COVIRAP is mass-produced," said Dr Chakraborty.

Elaborating on the validation process of 'COVIRAP' Diagnostic Test, Dr. Mamta Chawla Sarkar, an Internationally acclaimed virologist who oversaw the patient trials on behalf of ICMR-National Institute of Cholera and Enteric Diseases (NICED) said, "A detailed scrutiny of the testing results has clearly shown that this assay holds the capability of detecting extremely low levels of viral loads that any other method based on similar principles of testing, even those from the most celebrated research groups across the world, could not come up with so far. In practice, this means that very early stages of infection can be detected, thereby isolating the patient and arresting the uncontrolled spread of infection in the community via asymptomatic patients."

Speaking about the commercialization of 'COVIRAP,' Prof. V.K. Tewari, Director, IIT Kharagpur said, "While the Institute can produce the testing kit up to a certain scale, patent licensing will facilitate commercialization opportunities for medical technology companies. Any corporate or start-up can approach the Institute for technology licensing and commercial scale of production. The Institute is open to tie-ups, with due measures of protecting the interest of public health amidst the pandemic situation." Subsequent financial support to this project was provided by the IIT Foundation, USA, to meet the various expenses in the clinical testing phase. Partial financial support has also been provided from the Common Research and Technology Development Hub on Affordable Healthcare, established by Council of Scientific and Industrial Research (CSIR), at IIT Kharagpur. (India Science Wire)

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