

## Short Communication

# Do vegetables/fruits act as a vehicle in the spread of COVID-19?

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### ABSTRACT

The current study was aimed to find out whether the COVID-19 virus is detectable upon the fruits and vegetables after coming in close contact with a patient suffering from nSARS-CoV-2. We included ten subjects, who tested positive for nSARS-CoV-2 RNA within seven days of the experiment. After explaining the experiment, a tray filled with seasonal vegetables and fruits were placed in front of them. The tray remained within their reach, for next thirty minutes. The subjects were requested to remove their face masks and remain so throughout the task. They were requested to manipulate the food articles the way they liked. Subjects were instructed to cough into their hands and then to manipulate each item at least 5 times, during the experiment. Thereafter, the trays were moved into an open and shaded area with free flow of natural air but no direct sunlight. After 1-hour, swabs were taken from surfaces of items by thoroughly rubbing over each of them. Samples were sent immediately to our RT-PCR lab. The nSARS-CoV-2 RNA was not detected, from the samples collected from the fruit/vegetable, at the end of one hour of the direct exposure to the COVID-19 patients. Our results suggest, even after direct exposure to and significant handling by the COVID-19 patients the nSARS-CoV-2 RNA remains undetected after one hour of storage in open. The fruits and vegetables, in real-life situations, are unlikely to act as a fomite and play any significant role in the spread of this disease.

**Keywords:** COVID-19, SARS-CoV-2, Food

### INTRODUCTION

The world is currently reeling under the COVID-19 pandemic. The human to human spread of this highly infectious virus happens through direct contact and aerosols (sneeze, cough, etc.). Hence preventive measures like physical distancing, hand washing, use of face mask are recommended to avoid the spread of the disease.<sup>1</sup>

The possibility of the disease spreading through the fomites has resulted in the recommendation of repeated sanitization of the environment.<sup>2</sup> The virus has been recovered from the various surfaces exposed to an infected person. Further, it is reported to remain active for

varying periods.<sup>3</sup> In the context, the World Health Organization comments are worth mentioning which mentioned that the spread of COVID-19 through food is highly unlikely.<sup>4</sup>

To the best of our knowledge, the vegetables/fruits as a potential fomite for COVID-19 have not been investigated. Therefore, we set out to investigate the same through an experiment. We aimed to find out whether the COVID-19 virus is detectable upon the fruits and vegetables after coming in close contact with a patient suffering from nSARS-CoV-2.

## METHODS

The experiment was conducted in the COVID-19 designated wards of a medical college hospital. We included ten subjects, who tested positive for nSARS-CoV-2 RNA within seven days of the experiment. The patient who required supplemental oxygen, assisted ventilation, and who were critically ill were not included. In camera consent was sought, and non-consenting subjects were not inducted into the study. Present experiment was approved by institutional research and ethical committee.

In India vegetables and fruits are mostly sold by street vendors. They procure the produce from the wholesale market in the morning, arrange them on a cart and sell it at the purchaser's doorstep. On average, two to three hours are lapsed before reaching the end-user.

A similar scenario was recreated while experimenting. Ten subjects with varying levels of symptoms, different ages, and both genders were selected (Table 1). After explaining the experiment, a tray of size 11x9 inches filled with seasonal vegetables and fruits was placed in front of them. The tray remained there, well within their reach, for the next thirty minutes.

The subjects were requested to remove their face masks and remain so throughout the task. They were requested to manipulate the food articles the way they liked. Patients were engaged in talks over the trays by the investigators (KT, RJ). Subjects were instructed to cough

into their hands and then to manipulate each item at least 5 times, during the experiment. The investigators remained with the subject throughout the procedure.

Thereafter, the trays were moved into an open and shaded area with free flow of natural air but no direct sunlight. The trays were kept there for the next sixty minutes, under constant surveillance. The environmental indices, on the day of the experiment, were temperature of 34°, humidity 54%, and wind 11 kph.

After 1 hour, swabs were taken from surfaces of items by thoroughly rubbing them over each of them. Samples were sent immediately to our RT-PCR lab. They were processed using the Applied Biosystems™ 7500 FAST Dx REAL-TIME PCR system.

## RESULTS

Results are presented in the (Table 1). Out of ten subjects (female n=5), one was asymptomatic contact, five had fever, and 5 had respiratory complaints. Six of the ten patients (patient number 5 to 10) were symptomatic on the day of the experiment. The nSARS-CoV-2 RNA virus was detected in their nasopharyngeal and/or throat swabs within seven days of the day of the experiment.

After one hour of the exposure, the nSARS-CoV-2 RNA was not detected, from the samples collected from the fruits/vegetables, at the end of one hour of the direct exposure to the COVID-19 patients.

**Table 1: Characteristics of patients enrolled in experiment and report of respective trays containing vegetables/fruits.**

Patient Number	Age (years)	Gender	Symptoms	Time gap PE*	Patient report SARS-CoV-2	Vegetable/fruit report SARS-CoV-2
1	30	F	Fever	7	Detected	Not Detected
2	40	F	Malaise	7	Detected	Not Detected
3	65	F	Malaise	7	Detected	Not Detected
4	48	F	Asymptomatic	7	Detected	Not Detected
5	22	M	Vertigo	7	Detected	Not Detected
6	58	F	Chest pain, cough	2	Detected	Not Detected
7	54	M	Fever, cough	2	Detected	Not Detected
8	13	M	Fever	2	Detected	Not Detected
9	26	M	Fever, cough	2	Detected	Not Detected
10	23	M	Fever, breathlessness, cough	2	Detected	Not Detected

\*Time Gap PE: Time gap between patient's 1<sup>st</sup> positive report and date of experiment.

## DISCUSSION

The virus has been recovered from the various surfaces exposed to an infected person. Further, it is reported to remain active for varying periods. In the context, the World Health Organization comments are worth mentioning which mentioned that the spread of COVID-19 through food is highly unlikely. In India vegetables

and fruits are mostly sold by street vendors. They procure the produce from the wholesale market in the morning, arrange them on a cart and sell it at the purchaser's doorstep. On average, two to three hours are lapsed before reaching the end-user. The vegetables/fruits as a potential fomite for COVID-19 have not been investigated. Therefore, we set out to investigate the same through an experiment. We aimed to find out whether the

COVID-19 virus is detectable upon the fruits and vegetables after coming in close contact with a patient suffering from nSARS-CoV-2. Our results suggest, even after direct exposure to and significant handling by the COVID-19 patients the nSARS-CoV-2 RNA remains undetected after one hour of storage in open. The fruits and vegetables, in real-life situations, are unlikely to act as a fomite and play any significant role in the spread of this disease.

## CONCLUSION

Our study tries to understand the role of fruits and vegetables as a spreader of COVID-19. It is known that this virus remains active for a different time on various surfaces. Our results suggest, even after direct exposure to and significant handling by the COVID-19 patients the nSARS-CoV-2 RNA remains undetected after one hour of storage in open. The fruits and vegetables, in real-life situations, are unlikely to act as a fomite and play any significant role in the spread of this disease.

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