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Research paper

# Guar gum micro-vehicle mediated delivery strategy and synergistic activity of thymoquinone and piperine: An in vitro study on bacterial and hepatocellular carcinoma cells

Sanghita Das<sup>a, b</sup> ... Anindita Dey<sup>b</sup>

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### A Bioinformatics Study of SARS-CoV-2 Surface Glycoprotein in Indian Perspective

Anindita Dey<sup>1,2\*</sup>, Sumanta Dey<sup>2,3</sup> and Papiya Nandy<sup>2</sup>

Department of Biostatistics, Epidemiology and Environmental Health Sciences, Jiann-Ping Hsu College of Public Health, Georgia Southern University, Statesboro, GA 30460, USA

\*Corresponding Author: Anindita Dey

Department of Botany, Asutosh College, Kolkata-26, Centre for Interdisciplinary Research and Education, 404 B Jodhpur Park, Kolkata-68, India

Tel: 8240737707

E-mail: sunimondal@yahoo.com

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#### Abstract

The 20th-century world is facing its biggest problem to combat with deadly SARS-CoV-2, a virus that has locked us down in a new world and 5,47,321 lives have already been sacrificed. The only possible way to cope with this virus is to design a suitable drug or a vaccine. India at present is also on the platform with ~ 7, 46,500 positive cases and a death toll of 20,684. Since the viral spike protein is the outermost surface-exposed protein and responsible for viral entry into the host cell, it is important to characterize the spike protein for the development of any therapeutic response to infections from this virus. In this article we have done the in-silico analysis of the Indian spike protein by studying phylogenetic relationship, nucleotide and amino acid characterization, codon usage bias, transition/transversion matrix, hydropathy index, parameters for protein characterization and epitope prediction in different aspects. Our further analysis shows some reasonable potential epitope regions which would be effective for vaccine designing and can elicit an immune response against the viral infection.

**Keywords:** SARS-CoV-2; Spike protein; phylogenetic tree; 2D graphical representations; transition/transversion ratios; amino acid composition; hydropathy profile; codon usage bias; epitopes; pathogenicity; vaccines

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#### Introduction

The world threatened by the pandemic disease 'corona' announced by the World Health Organisation (WHO) on 11th March 2020, is caused by SARS-CoV-2, the well-known Novel Corona Virus which was first isolated in Wuhan city of China [1]. The existence of corona virus was first identified in the mid of 1960 causing infection to varieties of animals as well as human beings [2]. Severe acute respiratory syndrome (SARS-CoV) was quite common from 2002 and Middle East Respiratory Corona Virus (MERS-CoV) was known to us since 2012 [3-6]. However, in 2020, the most serious and deadly human pathogen, SARS-CoV-2 develops a global challenge to prevent the virus as early as possible to rescue the human population. On 30th January 2020, WHO declared this as a public health emergency of international concern (PHEIC). People attacked by this virus are suffering from one or more symptoms like nasal congestion, headache, runny nose, conjunctivitis, sore throat, diarrhoea, loss of taste, smell, a rash on skin or discoloration of fingers or toes and mild to heavier respiratory problems. The coronavirus is a singlestranded RNA virus that belongs to the family Coronaviridae under the order Nidovirales and the genus is Betacoronavirus [7-9]. Among all RNA viruses this virus possesses 26.4 to 31.7 kb genomes



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Anindita Dey,<sup>1</sup> Papiya Nandy<sup>2</sup>





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## An Overview on Cancer-Fighting Phytochemicals from Selected Medicinal Plants in Bengal

Sanghita Das<sup>1,2</sup>, Anindita Dey<sup>2,3\*</sup>, Sukhen Das<sup>1</sup>, Papiya Nandy<sup>3</sup>

<sup>1</sup>Department of Physics, Jadavpur University, Kolkata-700032, India

<sup>2</sup>Department of Botany, Asutosh College, Kolkata-700026, India

<sup>3</sup>Centre for Interdisciplinary Research and Education, 404B, Jodhpur Park, Kolkata-700068, India

**\*Corresponding author:** Anindita


Dey, Department of Botany, Asutosh College, Kolkata

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## A novel approach to utilise nanoparticles on agricultural sector: A brief review

 [Anindita Dey](#)<sup>\*</sup><sup>1</sup>, Debbithi Bera<sup>2</sup>, Papiya Nandy<sup>3</sup>

<sup>1</sup> Assistant Professor, Department of Botany, Asutosh College, Kolkata-26

<sup>2</sup> Centre for Interdisciplinary Research and Education, 404 B Jodhpur Park, Kolkata-68

<sup>3</sup> Formerly, Director, Jagadis Bose National Science Talent Search (JBNSTS) Emeritus Fellow and Professor of Physics, Jadavpur University, Kolkata, Presently Scientist, Centre for Interdisciplinary Research and Education (CIRE) 404 B Jodhpur Park, Kolkata

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