Natasha Kulviwat was a Grade 6 student at the Long Island Institute of Creative Problem Solving. She would like to thank the Institute of Creative Problem Solving for serving as the first place that made her realize her passion for STEM competitions and research and ultimately serving as a catalyst for her future endeavors.

Today, Natasha is the first author of two published journal articles and a conference publication, winner of math and science competitions and research fairs, and a founder of a non-profit organization empowering students from underserved communities with math knowledge.

Journal of Humanities and Social Science Research

Vol: 2, Issue:2
March-April/2023
DOI: http://dx.doi.org/10.47742/jhssr.v2n2p1
https://jhssrnet.com/index.php/jhssr

Utilizing Multiple Linear Regression Models to Predict Intentions to Vaccinate for COVID-19

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ARTICLE INFO

Article history:
Received: 2 March 2023
Revised: March 2023
Accepted: 19 April 2023
Publication: April-30, 2023
DOI: 10.47742/jhssr.v1n1p1

ISSN: **2957-9236**

ABSTRACT

The purpose of this research is to develop a multiple linear regression model to predict the intention to vaccinate for COVID-19. An anonymous cross-sectional online survey utilizing Qualtrics software was conducted. Descriptive statistics and inter-correlations between predictors and criterion variables were presented. Multiple linear regression was used to analyze associations among predictors and criterion variables. Overall, results indicated that while 79% of participants reported their intentions to get vaccinated against COVID-19 when a vaccine becomes available, 21% reported not being likely to. Further, results showed that six socio-demographic, health-related, and belief factors had positive effects on intentions to vaccinate for COVID-19. Specifically, the predictive variables of the belief in the effectiveness of the COVID-19 vaccine, political party affiliation, previous influenza vaccinations, employment status, perceived knowledge of COVID-19 and the COVID-19 vaccine, as well as education level have crucial roles in predicting the dependent variable of the intention to vaccinate for COVID-19.

This research contributes to our understanding of the various factors that influence the decision to vaccinate for COVID-19. Overall, the proposed regression model with the variables present in this study represents a strong effect and explains the proportion of the variability in the intention to vaccinate with over 70% accuracy. These results have important practical as well as theoretical implications for public health policymakers. With significant percentages of the population that are still hesitant to vaccinate, future studies should focus on finding this missing link and implementing any social/public health policies to level up individual intentions.

Keywords: **COVID-19, intention to vaccinate, multiple linear regression model, Mathematical model, health-related issues, effectiveness of vaccine**

Contents lists available at ScienceDirect

Applied Food Research

journal homepage: www.elsevier.com/locate/afres

The impact of alginate composites enriched with spent black tea, green tea, jasmine tea, and Oolong tea wastes on the shelf-life extension of fruits and vegetables

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ABSTRACT

Bananas and tomatoes are of the most valuable staple foods in the world. They are widely cultivated in tropical countries. Freshly harvested green bananas and tomatoes are brought from the plantation field, packed and shipped to many countries such as the USA and European countries. However, being climacteric fruits, a major challenge for bananas and tomatoes supply stakeholders is the short post-harvest shelf-life due to rapid onset of ripening and undesirable ripening-associated changes, which result in their major losses. This work aimed to determine the impact of biocomposites based on spent tea waste (STW) and alginate on Cavendish banana (*Musa acuminata*) and tomatoes shelf-life. STW from black tea, green tea, jasmine tea, and Oolong tea were obtained through hot water extraction. The highest and lowest recoveries were recorded for green tea powder (96.0%) and Oolong tea leaf (88.33%), respectively. Composites were fabricated in sodium alginate cross-linked calcium chloride with or without STW. The STW-alginate composites were investigated for their effects on water absorptivity, gas absorptivity, and ripening of mature green bananas and tomatoes via monitoring of peel color changes visually and comparing to the standard color charts. The results indicated that the STW-alginate composites had variable effects on water absorptivity compared to the control. The spent green tea powder-alginate composite displayed the highest water absorptivity (212%). Moreover, the STW-alginate composites were able to prolong the ripening of both bananas and tomatoes stored in both plastic containers and modified atmosphere storage (MAP) bags at room temperature compared to the control. Composite enriched with spent green tea retained banana greenness for up to **seven** weeks compared to less than **three** weeks for the control. The results were consistent for follow-up study using MAP bags with banana and tomato. Specifically, compared to controlled group, green tea powder followed by Jasmine tea powder were the only two composites could extend to six weeks. Accordingly, STW-alginate composites hold potential as simple and novel bio-sorbents that can be applied in extending post-harvest banana shelf-life in a safe and sustainable manner.