

Pandemic-Resilient Microscale Meat Processing: Bubble-Type Setting to Reduce COVID-19 Transmissibility in Emulsified Sausage Production

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INTRODUCTION & AIM

Bubble-type setting is a social network-based distancing strategy in which personnel works in a bubble where they are only allowed to interact with someone within the same group, and study showed that it is the most effective approach in flattening the curve of COVID-19 cases (Block et al., 2020). This study puts interest on the utilization of bubble-type settings, particularly the different variants of the virus and the screeners (e.g., masks and ventilation), to control the transmissibility of COVID-19 virus in microscale production of emulsified sausage products.

METHODS

The microscale production process of emulsified sausage products in a bubble-type setting was simulated using AnyLogic Version 8.7.6 Personal Learning Edition (2022), and Wells-Riley model was adapted to determine the effect of the different variants of the virus (Wuhan, Delta, and Omicron) and the effect of the screeners (e.g., masks and ventilation), and its combined effects on the probability of infection (POI) of COVID-19 virus. Two scenarios were evaluated in this study: (i) one infected personnel, and (ii) two infected personnel, in a working bubble with three manpower where everyone is vaccinated and wearing PPEs. Two-way ANOVA was used at 0.05 level of significance using IBM SPSS Statistics 22 to determine if different factors have significant effect on the POI and if there is an interaction between factors.

RESULTS & DISCUSSION

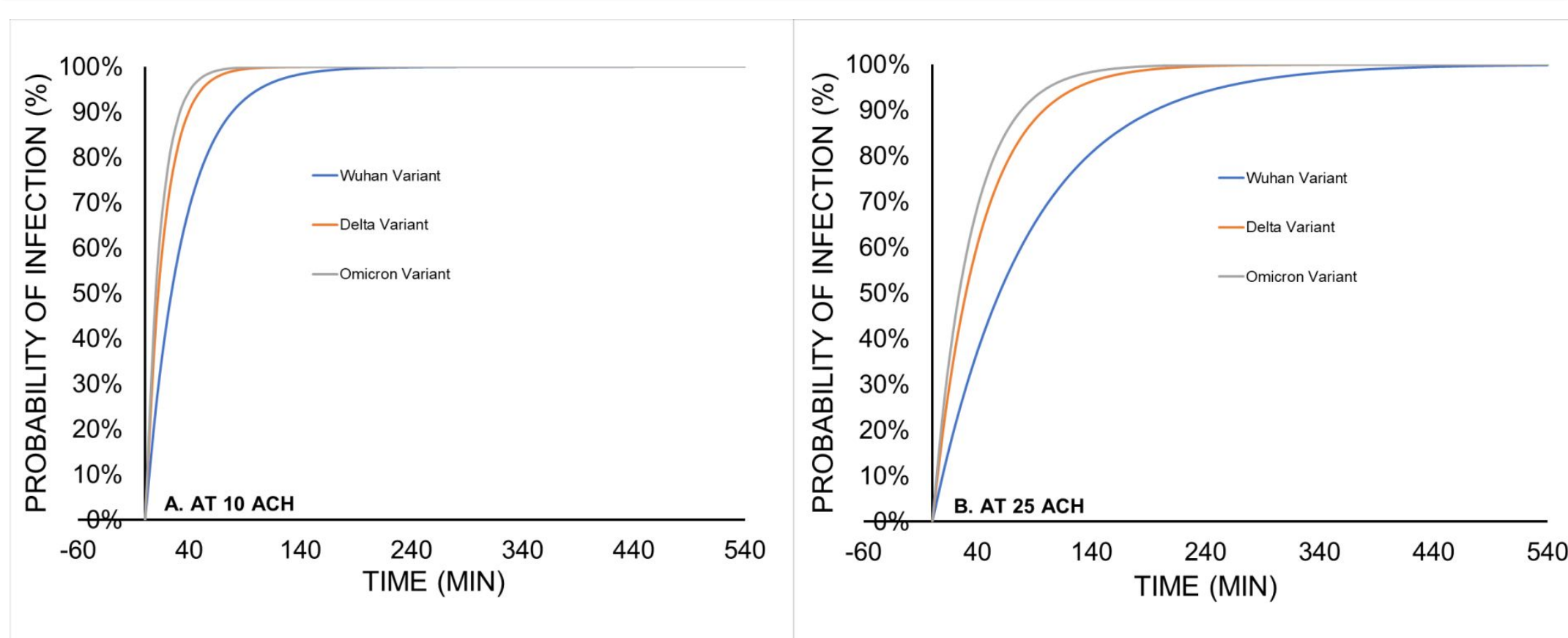


Fig 1. Probability of infection at (a) 10 ACH and (b) 25 ACH without mask for Case 1.

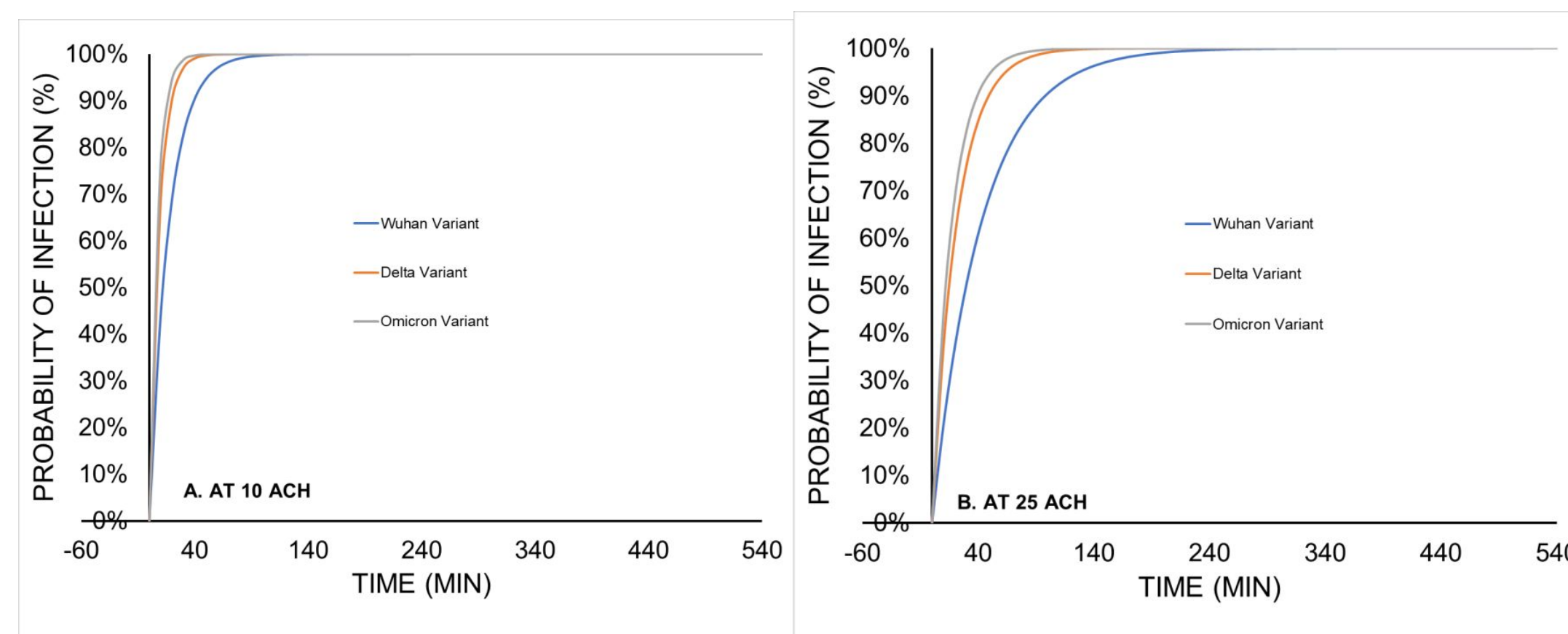


Fig 3. Probability of infection at (a) 10 ACH and (b) 25 ACH without mask for Case 2.

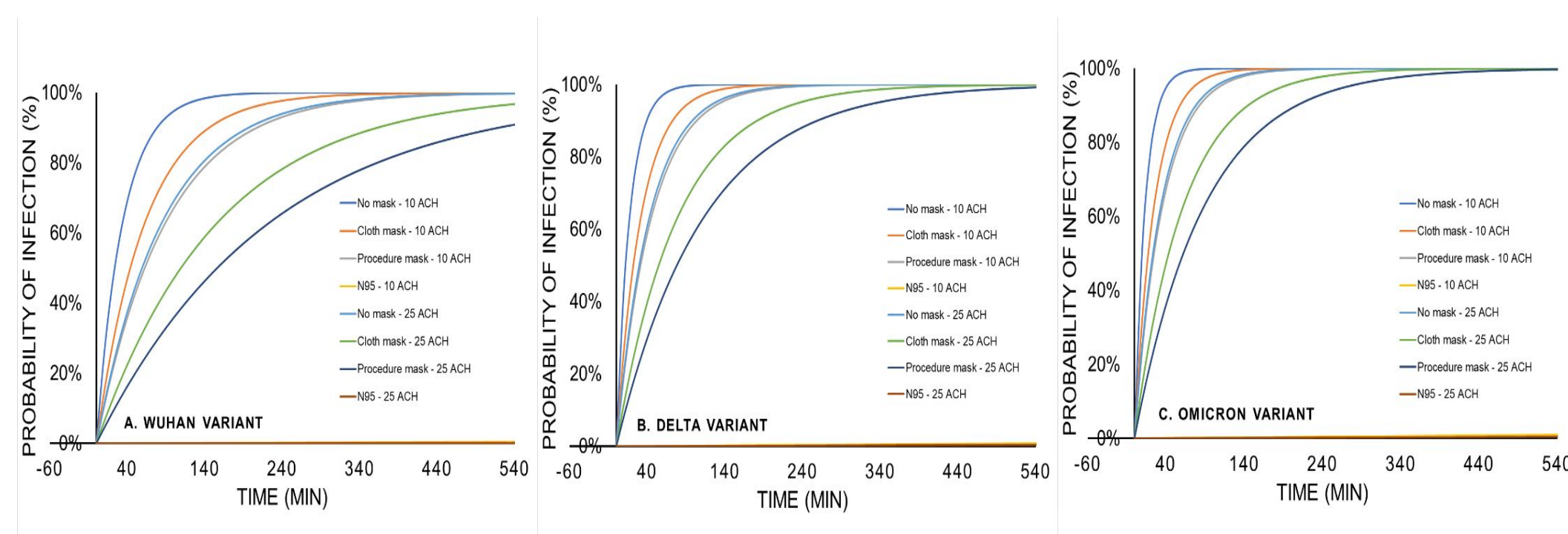


Fig. 2. Probability of infection of different screeners (mask) for Wuhan, Delta, and Omicron variant for Case 1

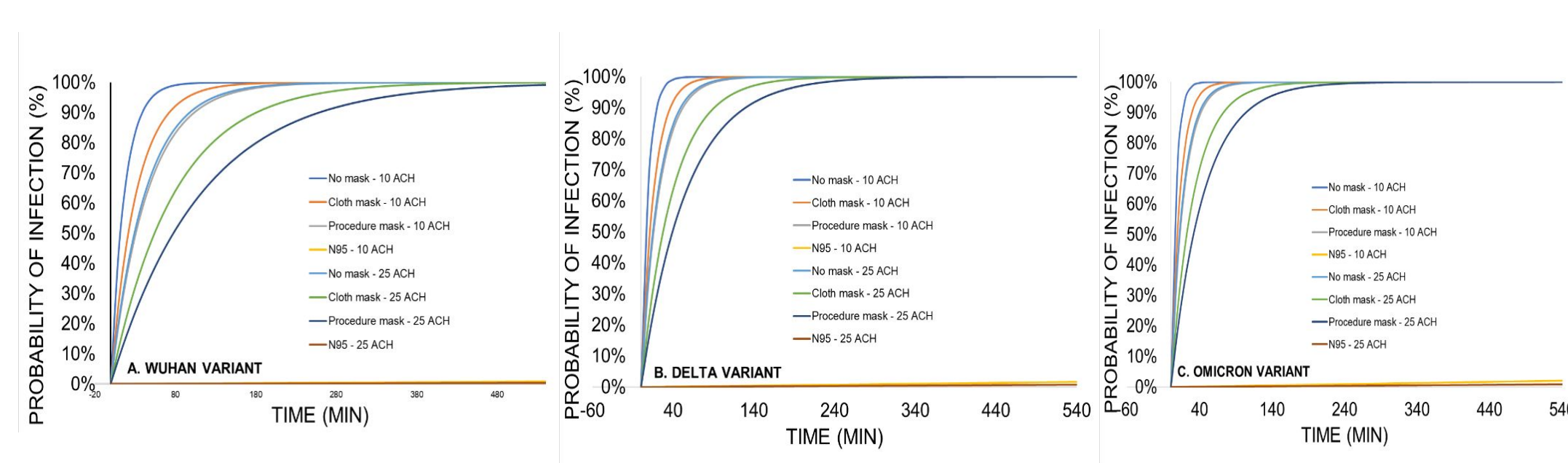


Fig. 4. Probability of infection of different screeners (mask) for Wuhan, Delta, and Omicron variant for Case 2

CONCLUSION

This study signifies that the utilization of a bubble-type setting control measures such as wearing masks and sufficient ventilation rate could be used to reduce the probability of infection of COVID-19 in microscale production of emulsified sausage products. Wearing an efficient mask and increased ventilation rate have the lowest infection probability, hence is an effective measure to control the transmission of the COVID-19 virus in a working bubble in microscale production of emulsified sausage products.

REFERENCES

Block, P., Hoffman, M., Raabe, I. J., Dowd, J. B., Rahal, C., Kashyap, R., & Mills, M. C. (2020). Social network-based Distancing strategies to flatten the COVID-19 curve in A Post-lockdown world. *Nature Human Behaviour*, 4(6), 588–596. Doi:10.1038/s41562-020-0898-6