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# Xing et al. 2016 Protocol

Xing et al.<sup>1</sup>, Ely Bor<sup>2</sup>, Jade Knight<sup>2</sup><sup>1</sup>Parent Research; <sup>2</sup>IGEM

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Observation on tomatoes and green beans life spans when dipped in a chitosan spray and a combination of the chitosan spray with cinnamon oil. It is the replication of the **"Chitosan-Based Coating with Antimicrobial Agents: Preparation, Property, Mechanism, and Application Effectiveness on Fruits and Vegetables"** experiment by Xing et al. 2016.

Xing et al., Ely Bor, Jade Knight 2021. Xing et al. 2016 Protocol. [protocols.io](https://protocols.io/view/xing-et-al-2016-protocol-by8zpzx6)  
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- 1 Prepared the CS solution to dissolving CS in an aqueous acetic acid solution at an ambient temperature overnight.
- 2 Added Tween 80 to the solution and Stirred at 45C for 2 hours
- 3 Dropped CEO in to the solution for 30 mins

- 4 Weight ratios of CS to CEO 1:1
- 5 Added drop-wise of TPP solution into o/w emulsion (for CEO-CSN) or CS solution (for CSN) under constant stirring at room temperature for 60 mins.
- 6 Nanoparticles were centrifuged at 27,000g for 14 mins
- 7 Prepared separately by dispersing 0.15% (w/v) of each one in distilled water and kept at 4 C for two coating solutions of CSN and CEO-CSN) with final concentration of 1.5 g/L.
- 8 Wash and dry tomatoes and green beans.
- 9 Separate the tomatoes by size: small, medium, and large. One of each size goes into one of the three groups. Separate the green beans by length: long and short. Split them equally between the three groups.
- 10 Separate the container into three sections and its lid into three sections. Label one "control" for tomatoes on the container and "control" for green beans on the lid. Lay the vegetables for one group in their corresponding sections.
- 11 Next label another section "CS" on both the lid and container. Dip the second group of vegetables into the Chitosan spray for 2 minutes each. Then lay them out in their sections.
- 12 Label the last section "CS+COE" like before. Take the last group and also dip all the vegetables for 2 minutes each and lay them out in their sections.
- 13 Every three days observe and changes and take a photo. Repeat until 15 days are reached.