

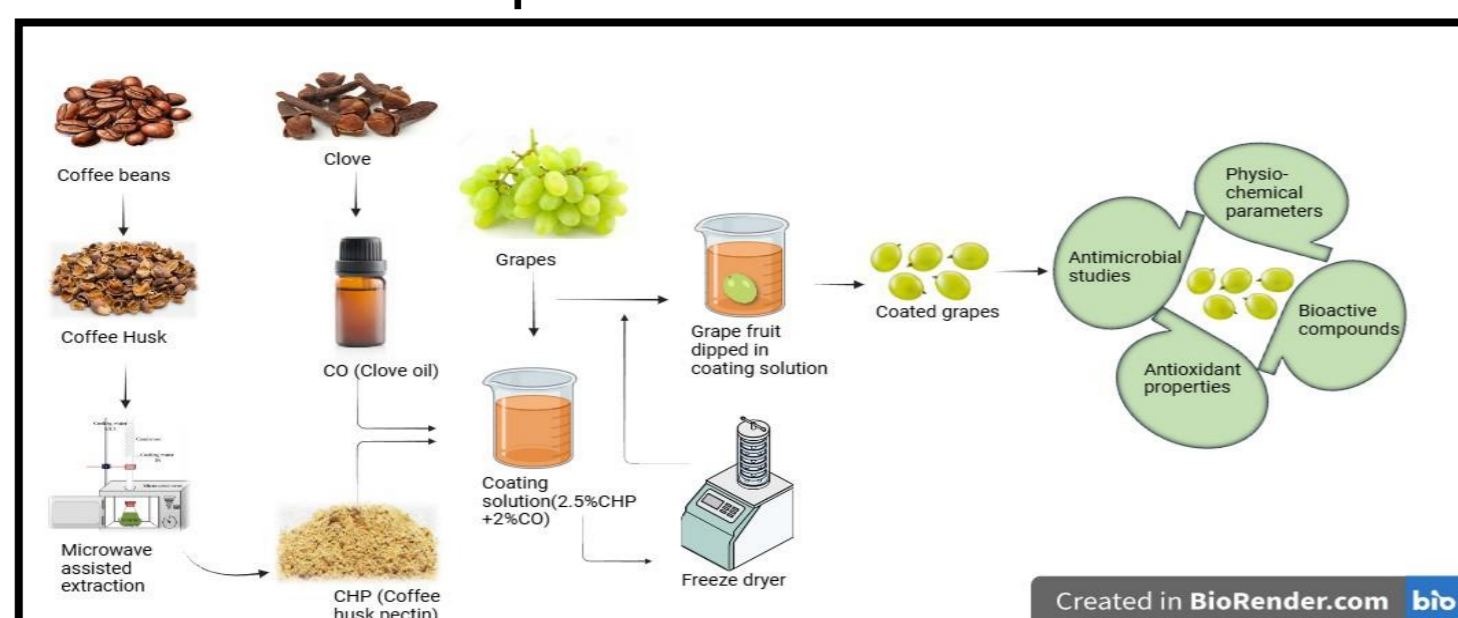
## Assessment of Antimicrobial Edible Coatings Derived from Coffee Husk Pectin and Clove Oil for Extending Grapes Shelf Life

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### INTRODUCTION & AIM

Utilizing agricultural by-products like coffee husks offers a sustainable approach to creating natural coatings, while clove oil's potent antimicrobial properties help inhibit bacterial growth. The freeze-dried structure further improves the coating's effectiveness, making it a promising solution for food preservation and extending shelf life by preventing contamination. Below is the graphical representation of overall process.

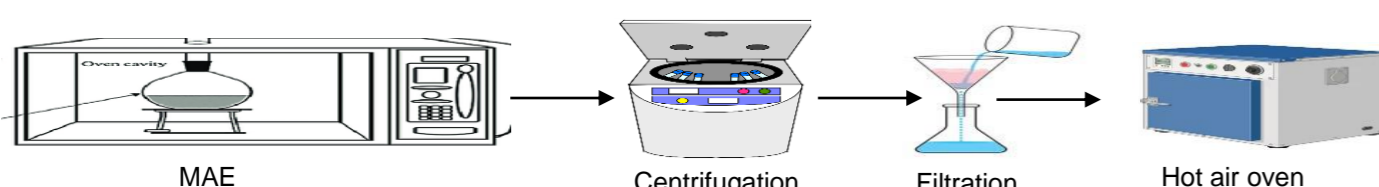


The research aims to develop a natural, sustainable edible coating using clove oil (CO) and coffee husk powder (CHP) to extend grape shelf life. It compares the properties of coated and uncoated grapes and evaluates freeze-dried coatings (FD-CHP-CO) for improved barrier qualities and reduced food waste.

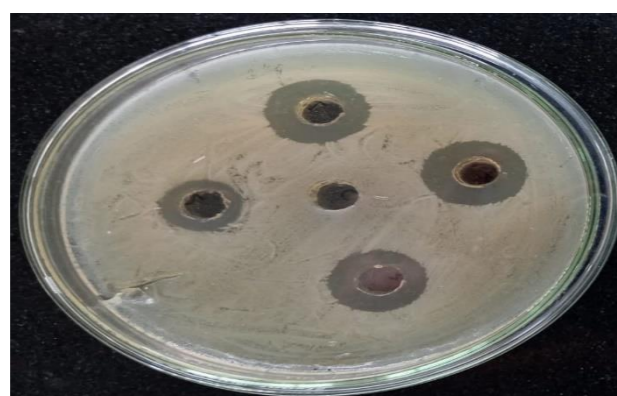
### METHOD

The methodology followed in the research:

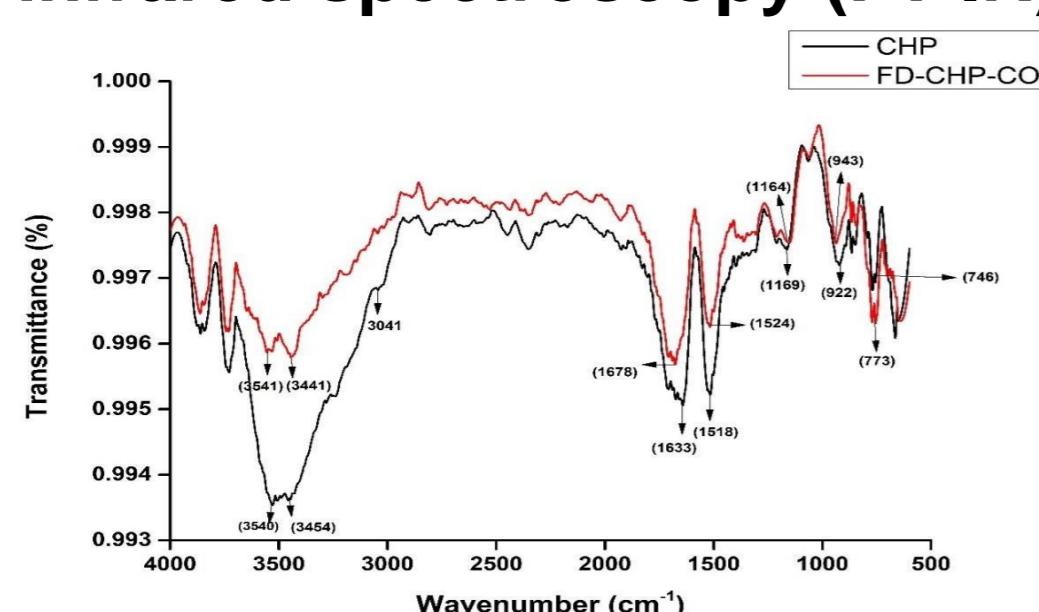
#### ❖ Pectin extraction from coffee husk



#### ❖ Preparation of edible coating solution via antibacterial activity



#### ❖ Characterization of edible coating solution using fourier transform infrared spectroscopy (FT-IR)



#### ❖ Application of edible coating solution to grapes

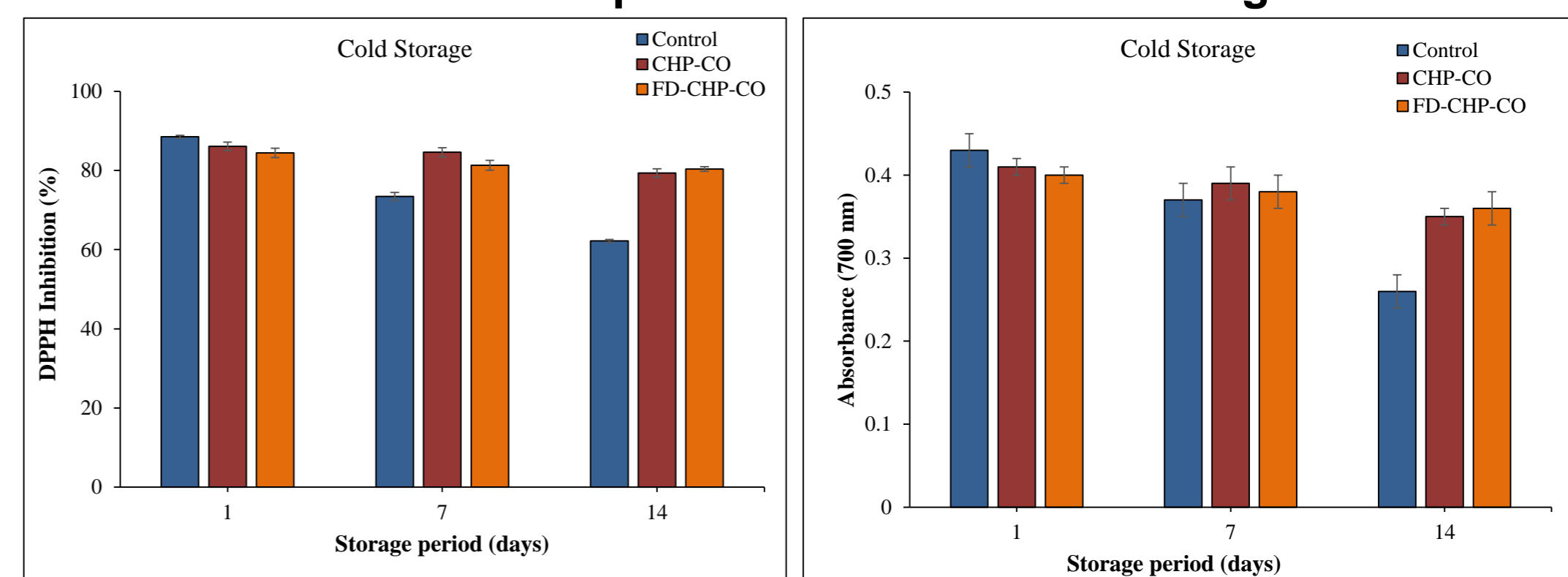


#### ❖ Evaluation of quality changes of coated grapes during storage

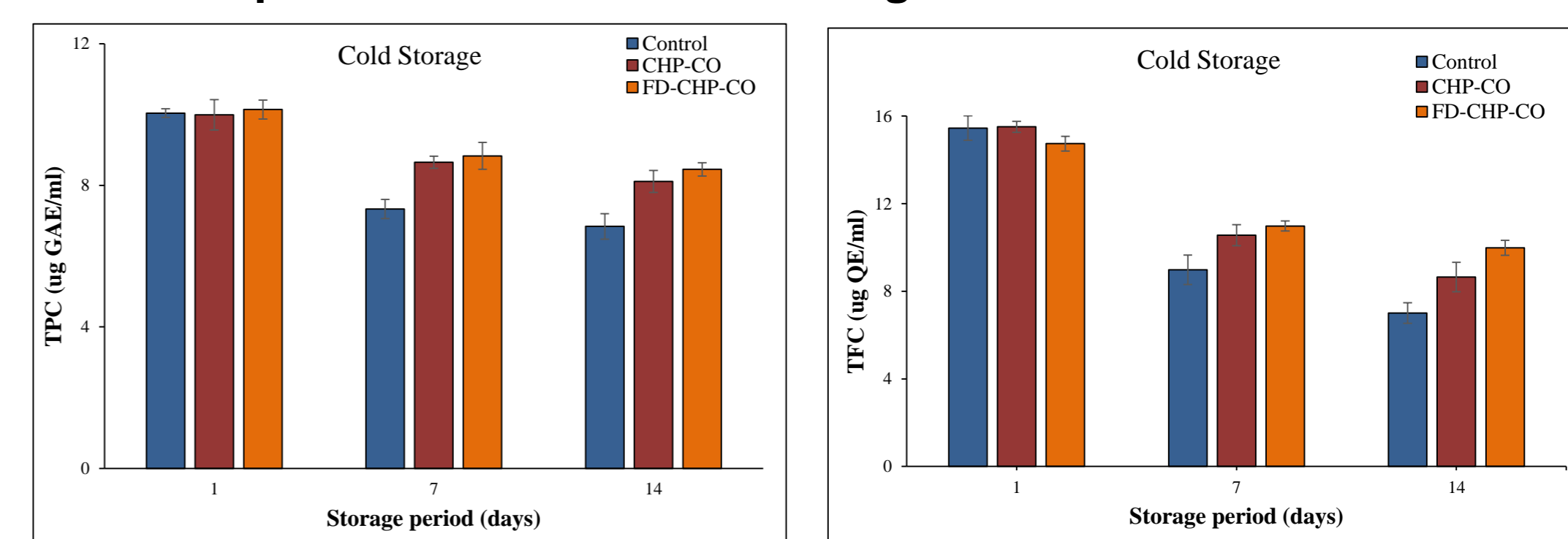
Weight loss, pH, TSS (Total soluble solids), Color measurement, Titrable acidity, DPPH assay, Total phenols, Total flavonoids, FRAP assay, Antibacterial activity

### RESULTS & DISCUSSION

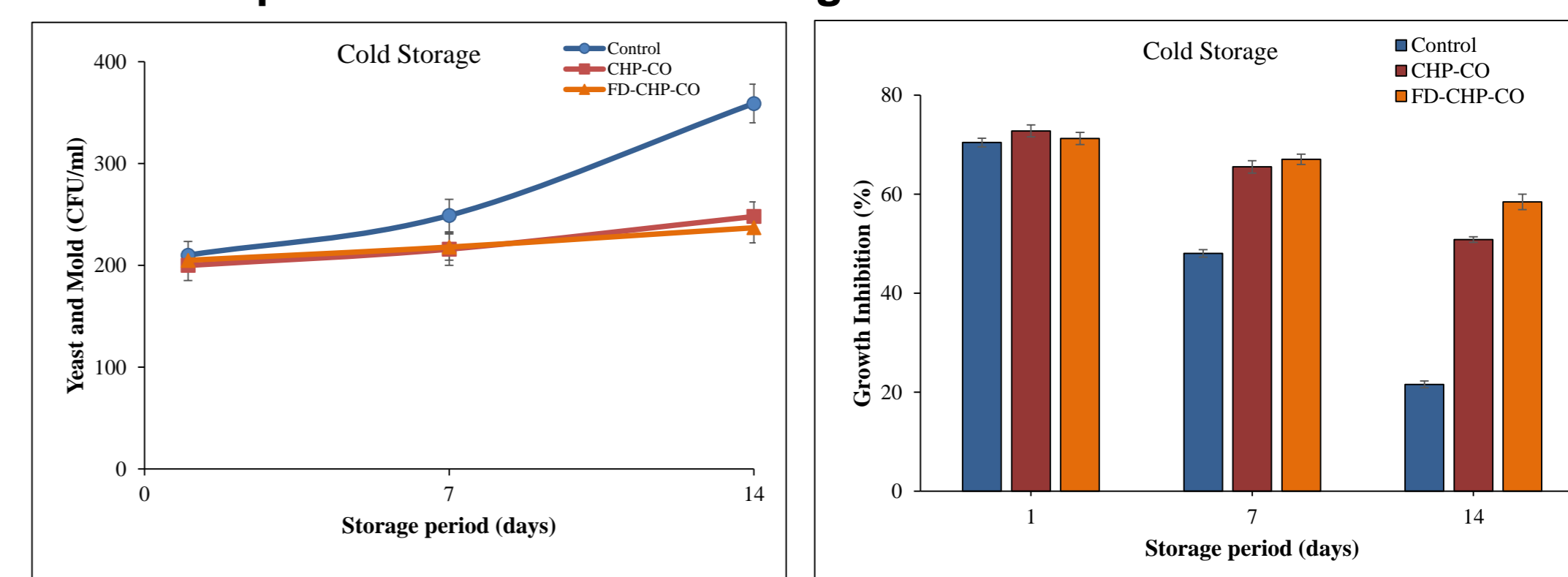
Effect of Storage Period (1, 7, and 14 Days) on DPPH Inhibition (%) and Potassium Ferricyanide Reducing Power (PFRAP) Assays of Uncoated and Coated Grapes Stored under Cold storage condition.



Effect of Storage Period (1, 7, and 14 Days) on Total phenol content (TPC) and Total Flavonoid Content (TFC) of Uncoated and Coated Grapes Stored under Cold storage condition.



Effect of Storage Period (1, 7, and 14 Days) on Yeast and Mold Counts and Growth Inhibition (%) of *S. aureus* MTCC 96 by Uncoated and Coated Grapefruits under Cold storage condition.



### CONCLUSION

The study successfully demonstrated the effectiveness of CHP-CO and FD-CHP-CO edible coatings in preserving the quality and extending the shelf life of grapes as physicochemical parameters such as weight loss, pH, total soluble solids (TSS), and titratable acidity (TA) were better maintained in coated grapes. The FD-CHP-CO coating showed better retention of antioxidant properties and also antimicrobial properties.

### FUTURE WORK / REFERENCES

- ❖ Future research should investigate the precise mechanisms by which CHP-based edible coatings, especially with essential oils and freeze-drying, affect metabolic processes in fruits.
- ❖ Additionally, optimizing coating formulations for various produce types and scaling up for commercial use could enhance their applicability in the agricultural and food industries.