

EDIBLE COATING FOR FRUIT AND VEGETABLES: Beewax coating for strawberry – case study ¹

ERIKA PARDEDE ²

1. *FACULTY OF AGRICULTURE, HKBP NOMMENSEN UNIVERSITY – MEDAN –INDONESIA*
2. *Presented on DAAD Alumni Autumn School 2009 “Post-harvest Technology and Renewable Energy”, 1st to 12th November 2009, Georg August University of Goettingen - Germany.*

PART I

INTRODUCTION
PROLONG SHELF LIFE OF FRUIT & VEGETABLES
EDIBLE COATINGS

PART II

BEEWAX COATING FOR STRAWBERRIES

PART I

INTRODUCTION
PROLONG SHELF LIFE OF FRUIT & VEGETABLES
EDIBLE COATINGS

FRUITS & VEGETABLES

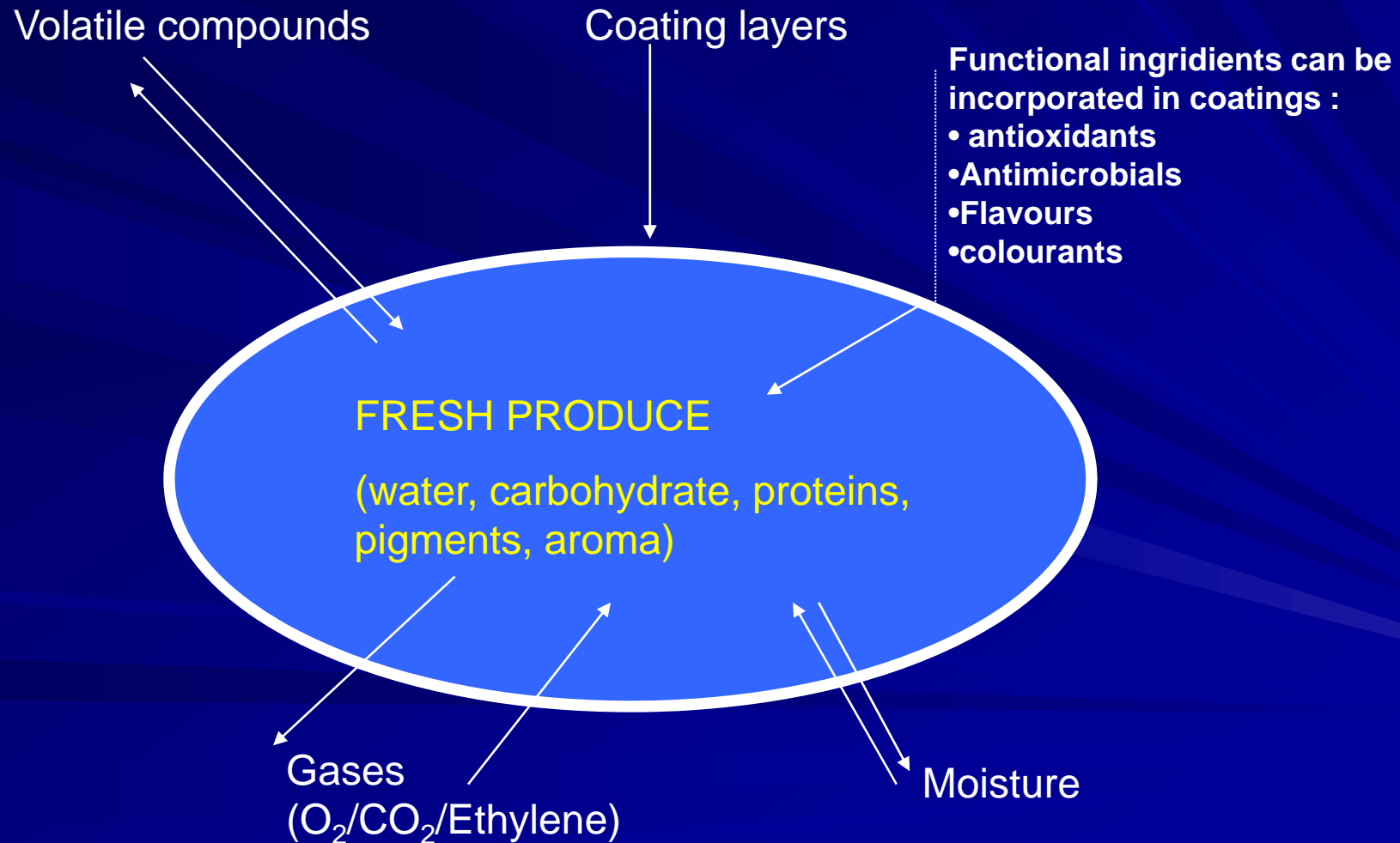
- Fruit & Vegetable : perishable products
- F & V are remain as living tissue
- Quality : appearance, texture, flavour & aroma, nutritive value, safety.
- Quality is affected by pre-harvest and post harvest factors

PROLONG SHELF LIFE OF FRUIT & VEGETABLES

- Pre-cooling
- Curing
- Controlling temperature (Cold storage)
- Controlling atmosphere (MAP)
- Packaging
- Coating edible)

Functional properties of an edible coating on fresh fruits and vegetables

(source: Lin & Zhao, 2007)



EDIBLE COATINGS

- Moisture barrier
- Gas barrier
- Restrict exchanging volatile compounds
- Physical protection
- Carrier for functionals ingredients

EDIBLE COATINGS

- Lipid based coatings: parafin, **waxes**,...
- Polysaccharide-based coatings: starches, chitosan, **aloe vera, seaweeds**,...
- Protein-based coatings : zein, gluten, ...
- Combination

PART II

BEEWAX COATING FOR STRAWBERRIES



Beewax emulsion (oleic acid triethanolamine beewax)

- The coating solution used in this work was prepared from the formulation defined through pre-experimental. Three different concentrations of bee waxes emulsion in water i.e 12 %, 8%, and 4% have been prepared, with addition of oleic acid and triethanolamine as emulsifiers.

Materials & Methods

- Mature strawberries were harvested from commercial local farms in the area of Daulu, Berastagi, North Sumatera and transferred to the laboratorium.
- Strawberries were washed in running tap water and allow to drying with muslin cloth prior to application of the coating solution.
- Strawberries dipped in formulated emulsion (coatings) at room temperature and allowed to dry again before storing at room temperature.
- Three (3) treatments were performed to strawberries and will be compared with untreated group (control group)

RESULTS & DISCUSSION

Analysis on:

Texture

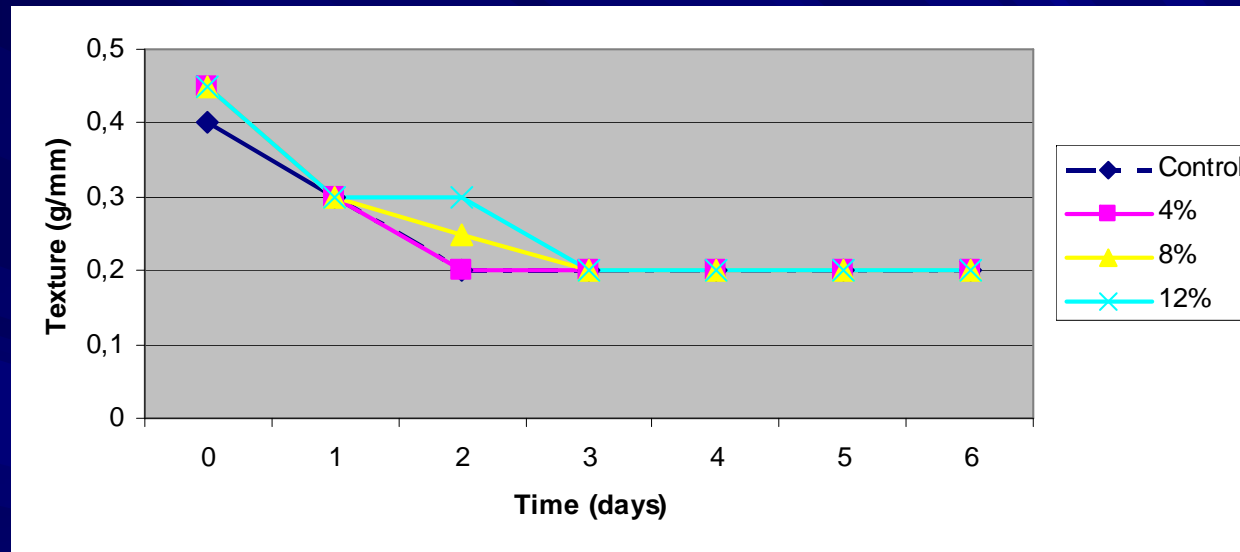
Color development

Total soluble solid

Titrateability

Ascorbic acid content

TEXTURE



- Coating significantly affect the texture of strawberries, but only to the 2-days of storage by beewax 12%
- Coating can not controlling the integrity and firmness of strawberries during storage.

Colour development



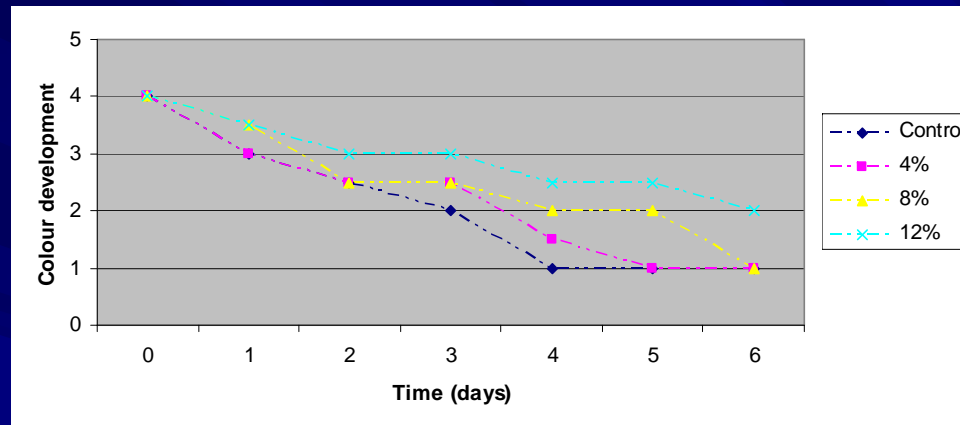
Score 4

Score 3

Score 2

Score 1

Colour development



- Beewax coating has an effect on colour by slowing down the development of strawberries colour.
- The 12 % beewax could better retain the colour development until 3 to 4 days of storage.

0 - day

4 - day

6 - day

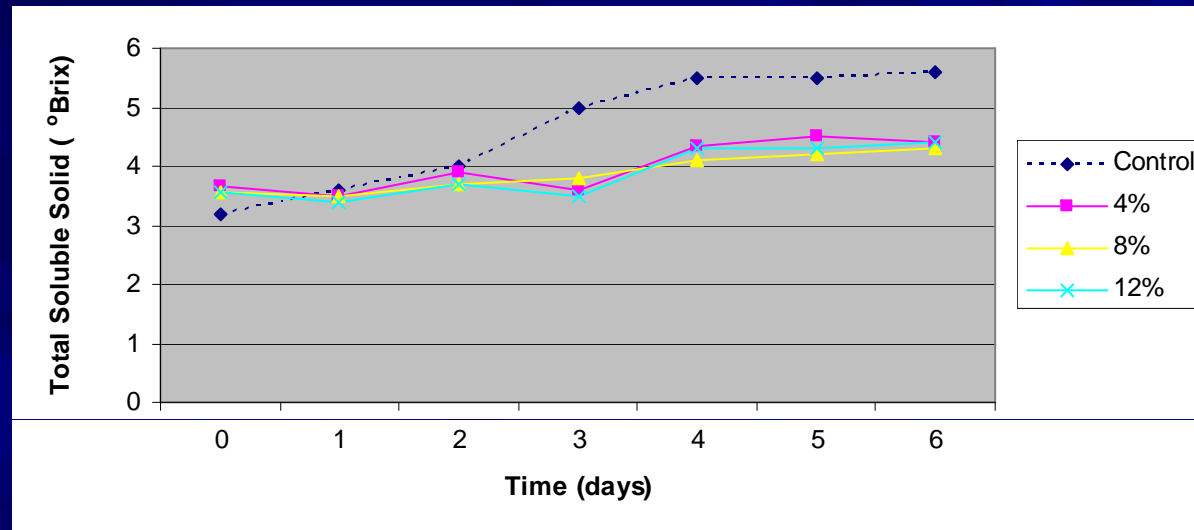
Beewax 12 %



Uncoated

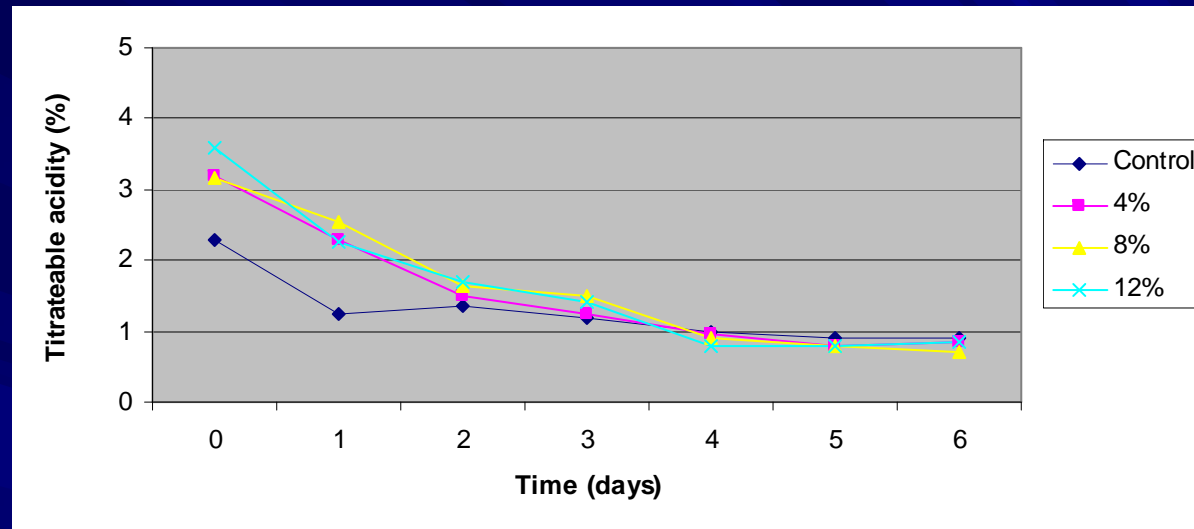


Total soluble solid



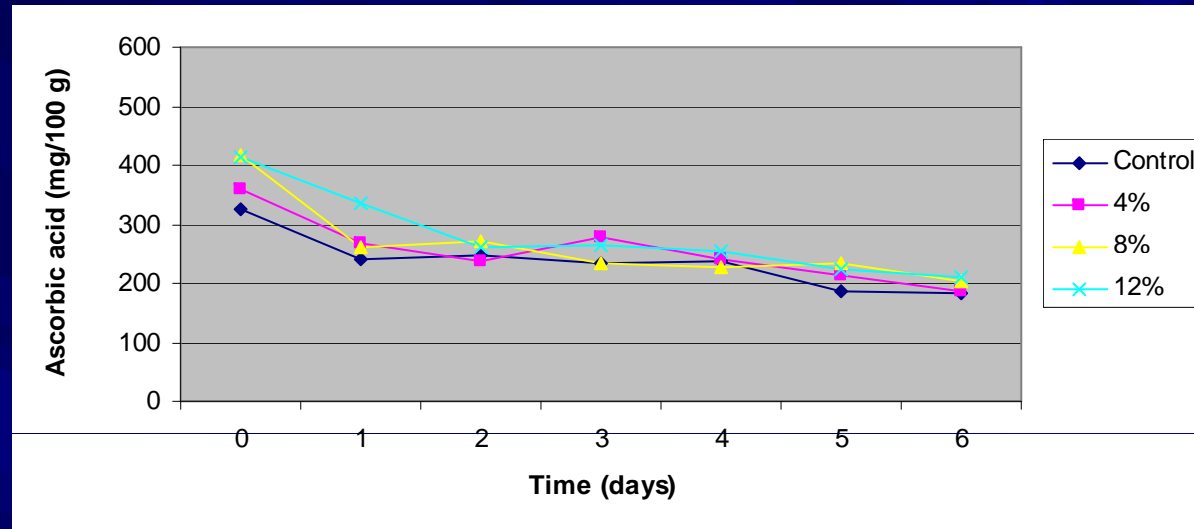
- It seems that bee wax coating contributed to the Total soluble solid (TSS)
- TSS is increasing during storage
- Up to 3 days of storage, coating could retard the TSS content of strawberry

Titrateable acidity



- Both coated and uncoated strawberries showed a gradually decreasing in acid content during storage
- There was an indication that coating contributed to the acid content of sample.

Ascorbic acid



- Decreasing on Ascorbic acid found during storage of both coated and uncoated strawberries
- Coating also contribute to the Ascorbic Acid content
- Starting by second days of storage there was no difference between coated and uncoated.

Conclusions

- Beewax as coating is promising
- Strawberry: early maturity stage
- Challenges:
 - ✓ Need further research on other suitable produces
 - ✓ Possibility of blending different coating
 - ✓ Seek further on combination with packaging at different storage condition

Thank you !

Terimakasih !