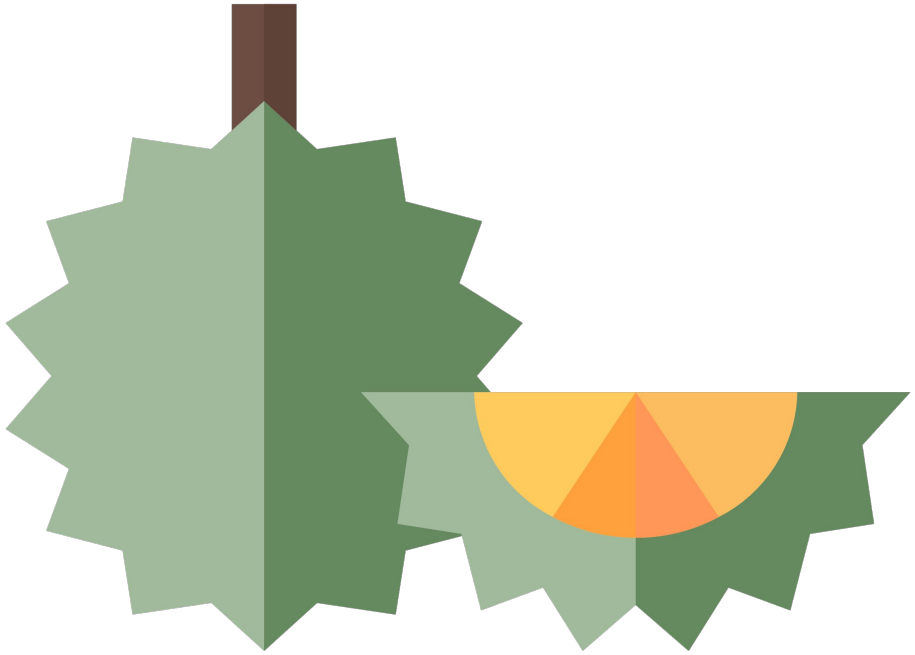


# Saver Durian

Adjuvant product series**.** Adjuvant (from German *Adjuvant*, from Latin *adjuvans*, genitive *adjuvantis* — "helping, supporting") — a compound or complex of substances used to enhance the immune response when administered simultaneously with an immunogen

# Adjuvant helps with tasks

Saver Durian

**Extension of shelf life for fruits, vegetables, and root crops**

Up to 10 additional days of storage Powered by Solver+

**Reduction in fertilizer use**

Requires additional testing

**Reduction in pesticide use**

50% reduction in usage and 30% replacement with Saver Durian product

**Greater moisture retention**

Requires additional testing

**Stress resistance in freezing temperatures**

Requires additional testing

# Mechanism of action of technology for extending shelf life based on natural bacteria and fungi

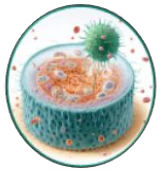
Saver Durian

**Spraying**

1. The agent is sprayed on the surface of vegetables and fruits.

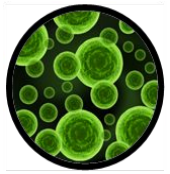
**Adsorption by microbial cell**

2. Microbes on the surface of vegetables and fruits absorb the agent. During adsorption, enzymes are recharged, leading to irreversible damage to the cells of microorganisms



**Release of substrates through the cell wall**

3. The effect of the agent leads to the release of vital substrates from the cells of microorganisms, disrupting their normal functioning



**Formation of a protective film**

4. A protective film forms on the surface of vegetables and fruits. This film blocks further penetration of fungi and bacteria, providing long-lasting protection of the produce.

## Advantages

- Transparent and odorless
- Does not alter the external appearance and taste of products.
- Long-lasting effect, extends the shelf life of fresh products.
- Safe for humans and animals, does not contain heavy metals, phenols, or chlorine.

## Treatment Effect

- Long-lasting antimicrobial effect, preventing reinfection.
- Thin protective film prevents penetration and proliferation of microorganisms.

# Unprocessed durians, 5 samples

Saver Durian

| Values per 10 bunches | Days | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | **3** | 4 | 5 | 6 |
| | **Appearance+ weight** | **Appearance + weight** | **Appearance + weight** | **Appearance + weight** | **Appearance + weight** | **Appearance + weight** |
| Percentage of loss in appearance | 0% | 3% | 6% | 8% | 9% | 17% |
| Weight (g) | 1,759.4 | 1,701.6 | 1,650.6 | 1,609.4 | 1,594.7 | 1,204.5 |
| Temperature(C) | 31.5 | | 27.3 | 28.5 | 27.9 | |
| Fungus[1] (yes (1)/no (0) | 0 | 0 | 0 | 0 | 0 | 0 |
| **Texture/density[1] (thick (2)/medium (1)/soft (0)** | 2 | 2 | 2 | 2 | 2 | 2 |
| Percentage of loss in appearance | 1 | 20% | 20% | 60% | 80% | 100% |
| **Relation of sellable/unsellable** | 5/0 | 4/1 | 4/1 | 2/3 | 1/4 | 0/5 |



[1.] Medium value

# Processed durians, 5 samples

Saver Durian

| Values per 10 bunches | Days | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | **3** | 4 | 5 | 6 |
| | **Appearance+ weight** | **Appearance + weight** | **Appearance + weight** | **Appearance + weight** | **Appearance + weight** | **Appearance + weight** |
| Percentage of loss in appearance | 0% | 3% | 6% | 9% | 12% | 17% |
| Weight (g) | 1,364.6 | 1,317 | 1,275.4 | 1,242.6 | 1,199.8 | 1,140 |
| Temperature(C) | 31.5 | | 27.3 | 28.5 | 27.9 | 30.5 |
| Fungus[1] (yes (1)/no (0) | 0 | 0 | 0 | 0 | 0.33 | 1 |
| **Texture/density[1] (thick (2)/medium (1)/soft (0)** | 2 | 2 | 2 | 2 | 2 | 2 |
| Percentage of loss in appearance | 0% | 0% | 0% | 0% | 20% | 100% |
| **Relation of sellable/unsellable** | 5/0 | 5/0 | 5/0 | 5/0 | 4/1 | 0/5 |



[1.] Medium value

Saver Durian

# Conclusions

**60** Of processed durians more than unprocessed was saved on day 5

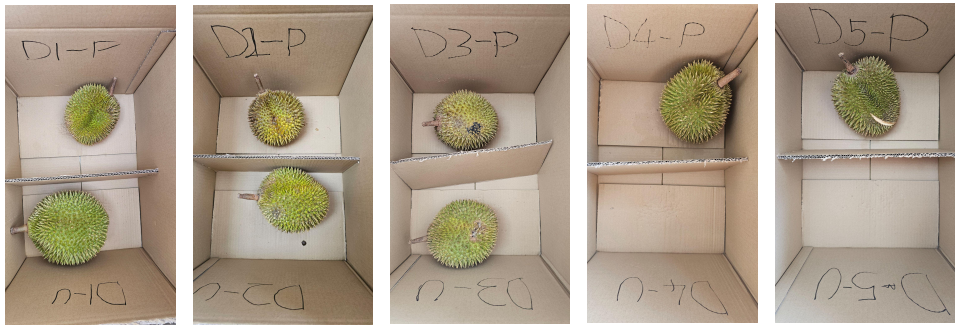
**Kg** There were no significant difference in wight loss, meaning that the level of difference in humidity is insignificant

**!** Expermient was performed on 10 durians collected from a farm. Needed bigger volume of durians - 50

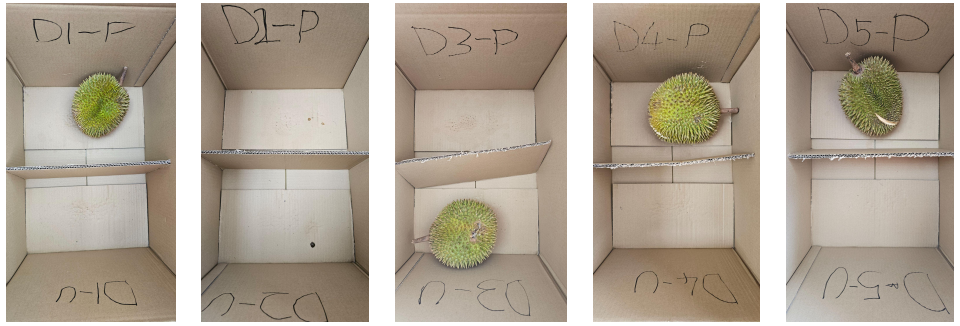
Processed
Unprocessed

## Day 1

## Day 4




## Day 5



# Increase the profit of your production

Saver Durian

totaling

7,800

euros per ton

**Price of Durian**

The price per kilogram is 38 RD

which amounts to

936

**euros per ton**

**Savings**

With a preservation rate of 60% for an additional day (20% more time), we potentially save 12% of the total

one ton

50

euros

**Cost of Processing**

The processing cost is 200 euros (depending on the exchange rate) * 0.25 = 50 euros

**Let's conduct an experiment**

# Timeline

Saver Durian

**Step 1**

- Estimation of total durian production volumes on the farm.

**Step 2**

- Assessment of the economic benefits of using the preservative.

**Step 3**

- Conducting testing on a small batch of durians.

**Step 4**

- Pre-order the product for mass testing.

**Step 5**

- Use of the preservative in mass testing.

**Step 6**

- Mass introduction of the preservative for use on all products.

# Stages of preparation

Saver Durian

## 1. Preparatory work:

- Providing the required amount of preservative.
- Preparation and calibration of spray equipment.
- Installation of temperature and humidity sensors.
- Preparing trays for separating products.
- Conduct a workshop for testing personnel on the proper use of the preservative and safety precautions.

## 2. Creating cards:

1) Treatment (U – not treated, S – spraying, D – dipping)
2) Numbers 1, 2, 3, 4, 5
3) solution 0.5%, 1% and 2%
4) Sellable/non-sellable
5) Fungus/no fungus
6) Soft/medium/firm

**Cards example**

1)U1 to U5 – Untreated
2)S51 to S55 – 0.5% spray solution
3)D51 to D55 – 0.5% immersion solution
4)S21 to S25 - 2% spray solution
5)D21 to D25 - 2% immersion solution

## 3. Preparation of working solution:

**Solution 0.5%:**
Take 1 liter of water and add 5 ml of the product to it.
**Solution 1%:**
Take 1 liter of water and add 10 ml of the product to it.
**Solution 2%:**
Take 1 liter of water and add 20 ml of the product to it.

## 4. Processing methods:

**Immersion:**

- First, pour into a dipping bowl. Process all products intended for dipping.
- After dipping all the ingredients, pour the remaining liquid into a measuring container and take a photo.

**Dispersed spraying:**

- It is used for uniform application of preservative on products.
  We pour the remainder for spraying and process.
- After spraying, pour what remains into a measuring container and take a photo

## 5. Division into groups:

- 7 groups of products divided according to two criteria: with and without the use of preservatives.
- Testing time: depending on the product.

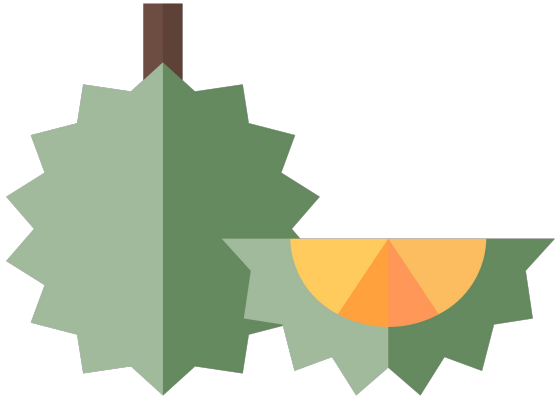
## 6. Monitoring and data collection:

- Inspections are carried out daily.
- To ensure standardization and convenience of the data collection process, a special application called "Checklists" is used. These checklists record the results of visual inspections of the condition of products on a daily basis, as well as other important data.

## 7. Analysis of results and reporting:

- Comparison of shelf life and product quality between test and control groups.
- Assessing the economic benefits of reducing food losses and reducing product weight.
- Prepare a detailed report with the results for presentation to the supermarket management.

# Thank you for your attention



Saver Durian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