The slow down maturity of banana

Miss Supichaya Kamphuy, Miss Kotcharat Ratchatathanikul, Miss Nichakan Chanthapan Miss Supawadee Lasang, Miss Wilaiwan Phromrit, Miss Phakamat Phanwilai, Miss Prakaikan Chaithong, Mr. Rachata kraisee Mr. Chaiwichit Boonsaner Mr. Kawin Thongpetch

Kanthararom School, Si Sa Ket, Thailand 33130

The Background and Significance.

Banana is a short cycled plant that is grown in quantities. Because of this plant is not difficult to plant. In our daily life, A banana is a plants that are beneficial to humans and animals very much. We able to take raw and ripe bananas for to be processed. It is look good taste. Leaves of banana can to make a dessert pack. A twig of bananas are used as animals feed. It is a highly nutrition, food. The nutrition value of bananas are high and good for the body. It is easy to find out. If you always have banana. It is usually beneficial to health. In particular, the high calcium in bananas helps to strengthen bones and teeth. There are multiple vitamin, such as vitamins B1, which can anti-beriberi, vitamin B2 often enhances the growth of the body. vitamin C prevent common colds, disease scurvy. There are many valuable nutrients and other. The parts of the banana can be used cooking dessert and food of main course or to make any appliance such as a woven rope, banana leaf. From the research found that both of raw and ripe bananas are produced a benefit medicine. The raw of bananas are astringent taste the oil has a faint trace of an active substance name tannin(tannin) which are used to treat diarrhea. To eat the rind or chopped dried and ground into a powder mixed with hot water, make a tablet. In addition to it is also has properties to inhibit the growth of bacteria and ulcers in the stomach as well. Sweet ripe fruit has a laxative properties. When you are eaten 2 times a day morning – evening and to eat at least 7-10 days, it can help prevent a bound belly. The active ingredients in banana is pectin(pectin), which will help to cover a partition the stomach. It is cured wounds in the stomach to get faster results. In addition to the quality of a ripe banana are longevity medicine property and to nurture and nourish the body.

A branch of Banana have about 10 cluster of bananas and will be harvested when cut banana blossom at the age after about 100 to 120 days. During 2-3 weeks after we are cut it from the branch of banana. Ripening of bananas are not simultaneously.
But about five days later. The ripe banana is a fruit. If you do not have its. All bananas will be rotten and damage completely.

The team is designed of this project. To study the solve to slow down the ripening of banana and for to be useful in keeping the store and at home. So we are found the solve to leading supplier in the market. And to extended periods of storage for long kept. we are study the way to reduces the damage of the product. We are have the experimental to compare how slow down maturity of bananas. By the design we use potassium permanganate, powdered ground roasted white rice, ground charcoal, chalk powder, white ashes. These are substance which have the most effective and ability to slow down the ripening of the bananas.

Objective

1. To study the ability to slow down the maturation of banana that used KMnO₄, powdered ground roasted rice, ground charcoal, Chalk powder and the white ashes.
2. To create an automatic-model to slow down the ripening of bananas.

Problem

There are lots of ripe bananas that the result, we are not eaten its and must to be discarded.

Hypothesis

If potassium permanganate, Ground roasted rice, powdered ground charcoal. Powdered chalk ground and white ashes which can delayed the ripening of bananas. Therefore, which the chemical can be kept bananas longer.

Related variables.

1) Independent Variable : Types of chemicals used were potassium permanganate, powdered ground roasted rice, ground charcoal, powdered chalk. And white ashes.
2) Dependent Variable : Ripening of bananas.
3) control Variable : Location of the study, The light, Temperature of room experimental, Moisture in the air, The storage place, packaging, size, color and age of the banana.
The scope of the study.

1. Location of the study: Kanthararom School, Kanthararom district, Sisaket, Thailand.
2. The duration of the study: January-February 2555.

The results was expected to receive.

1. Known what kind of substances that can slow down the ripening of bananas.
2. Can extend the life of a bananas
3. Can apply the knowledge obtained in this study to make the application on a daily life.
4. Can take bananas that make a used with benefit maximum.

Definitions.

Ripening of bananas are discoloration from green to yellow bananas that have the area at least 50 percent or more of the yellow color. So can observed by using a color calibration.

Documents.

In this study, The maturation slow down of banana by using potassium permanganate, roast rice, ground charcoal, chalk and white ashes. This study investigated the following related documents.

1. Bananas
2. Ripening of the fruit.
3. Extending post-harvest fruit.
4. Substances that slow down the ripening of the fruit.
   4.1 Potassium permanganate.
   4.2 Roasting rice.
   4.3 Ground charcoal powder
   4.4 Powdered chalk.
   4.5 White ashes.
5. Studies on the slow ripening of the fruit.
Experimental procedures.

Chemical
1. Potassium permanganate.
2. Ground roasted rice.
3. Finely ground charcoal.
4. Powdered chalk ground.
5. White ash.

Materials - Equipment.
1. Bananas.
2. Plastic bags.
3. Papers.
4. Rubber band.
5. White cloth.
6. Weighing machine
7. Thermometer
8. Label paper
9. Keeping box of bananas

Experimental methods.

A. The process of preparing bananas.
1. Took the bananas one bunch of bananas, divide into 3 groups
   Group 1 Bananas that cut off from the top of the bundle.
   Group 2 Bananas are cut from the center of the bundle.
   Group 3 Bananas are cut from the bottom of the bundle.
   1.1 in each division will have a banana split without the banana peel.
   1.2 clean bananas with water and wipe every banana for dry.
   1.3 writes symbols on to label paper.

B. Preparation of chemicals to retard ripening.
   1. Cut a rectangle of white cloth to the desired size.
   2. Add a potassium permanganate, 5 gram, 10 gram and 15 gram in plastic bag at
   the 1, 2 and 3 respectively the corner and tie.
   3. Add 5 g of finely ground roasted rice, 10 grams and 15 grams in plastic bag at 4,
      5 and 6, respectively.
   4. Add 5g of finely ground charcoal powder, 10 grams and 15 grams in plastic bag
      at 7, 8 and 9, respectively.
5. Add Chalk powder burned ground with 5 g, 10 g and 15 g in a bag at 10, 11 and 12, respectively.
6. Add the white ashes, 5 grams, 10 grams and 15 grams in a bag at 13, 14 and 15, respectively.
7. The experiment is set to 2, and 3 do the same.

C. Experimental procedure.

1. Division banana into 17 groups, each group with 3 bananas from the top, center and bottom of the bunch of bananas, the banana is packed into a bag and put retardants maturation as follows.
   Group 1: was a control group without any substance and putting it on paper.
   Group 2: not compounds, but put plastic into the bags.
   Group 3: Add 5 g of potassium permanganate and put into plastic bags.
   Group 4: Add 10 g of potassium permanganate and put into plastic bags.
   Group 5: Add 15 g of potassium permanganate and put into plastic bags.
   Group 6: Add 5 g of Finely ground charcoal and put into plastic bags.
   Group 7: Add 10 g of Finely ground charcoal and put into plastic bags.
   Group 8: Add 15 g of Finely ground charcoal and put into plastic bags.
   Group 9: Add 5 g of White ashes and put into plastic bags.
   Group 10: Add 10 g of White ashes and put into plastic bags.
   Group 11: Add 15 g of White ashes and put into plastic bags.
   Group 12: Add 5 g of Powdered chalk ground and put into plastic bags.
   Group 13: Add 10 g of Powdered chalk ground and put into plastic bags.
   Group 14: Add 15 g of Powdered chalk ground and put into plastic bags.
   Group 15: Add 5 g of roasting rice and put into plastic bags.
   Group 16: Add 10 g of roasting rice and put into plastic bags.
   Group 17: Add 15 g of roasting rice Baked rice and put into plastic bags.

2. Observing the color of bananas. Reported the maximum number of days it can be slowdown maturation in Experiment 4, if bananas are maturated then we take bananas to taste test that the taste are different or changes from the maturation of natural don’t it.
3. Experiment 2nd and the 3rd same the first experiment. But the experiment 3, when the bananas are maturated to the taste test by a three person, then we note 4 level that is compared the taste of bananas with the control group. 9 (The controller
must to taste test to be first. The next they taste test the second group experiment to the seventeenth group experiment.)

- Level 1: is very unsatisfied.
- Level 2: is least satisfied.
- Level 3: is satisfied.
- Level 4: is very more satisfied.

4. The maximum number of days that data on the chart to comparison the different types of slow down maturation and the level of satisfaction when we are using different types of slow down maturation.

5. Design modeling to slow down the ripening of bananas by automatic system. The members are designed construction model. Using the principles of automatic control by apply the sensor for check ethylene gas. When the ethylene gas is exceeded. The program system will operated to vacuum the air. Then it is ventilated ethylene gas out. So when the ethylene gas are decreased, the system are closed program.

**Results**

The project is to slow down the ripening of banana. In addition to this is presented by

1. The observation of the changing color of the banana. When used to slowdown the ripening varieties.
2. The taste test of bananas.
3. Designed the slowdown the maturation of bananas automatic system.

**Section I**

1. The observation of the color of the banana. When used to slow down the ripening varieties.

The experimental results of slow down the ripening of bananas. Using potassium permanganate, powder chalk, charcoal, white ashes, roasting rice. The experiment was conducted 3 times (3 experiments), the results shown in Table 1 and Figure 1.
Table 1 The maximum number of days to slow down the ripening of banana ripening retardants on the different types. Treatment 1, 2 and 3.

<table>
<thead>
<tr>
<th>The type of substances.</th>
<th>The weight of the substance used (g)</th>
<th>Treatment 1</th>
<th>Treatment 2</th>
<th>Treatment 3</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>-</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4.0</td>
</tr>
<tr>
<td>Do not put into the bag</td>
<td>-</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>5.3</td>
</tr>
<tr>
<td>Potassium permanganate</td>
<td>5 g</td>
<td>11</td>
<td>12</td>
<td>7</td>
<td>10.0</td>
</tr>
<tr>
<td>Potassium permanganate</td>
<td>10 g</td>
<td>12</td>
<td>13</td>
<td>7</td>
<td>10.7</td>
</tr>
<tr>
<td>Potassium permanganate</td>
<td>15 g</td>
<td>13</td>
<td>14</td>
<td>12</td>
<td>13.0</td>
</tr>
<tr>
<td>Powdered chalk</td>
<td>5 g</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6.0</td>
</tr>
<tr>
<td>Powdered chalk</td>
<td>10 g</td>
<td>7</td>
<td>6</td>
<td>6</td>
<td>6.3</td>
</tr>
<tr>
<td>Powdered chalk</td>
<td>15 g</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7.0</td>
</tr>
<tr>
<td>Activated charcoal</td>
<td>5 g</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>4.3</td>
</tr>
<tr>
<td>Activated charcoal</td>
<td>10 g</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>4.7</td>
</tr>
<tr>
<td>Activated charcoal</td>
<td>15 g</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>2.7</td>
</tr>
<tr>
<td>White ashes</td>
<td>5 g</td>
<td>2</td>
<td>2</td>
<td>5</td>
<td>3.0</td>
</tr>
<tr>
<td>White ashes</td>
<td>10 g</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>4.3</td>
</tr>
<tr>
<td>White ashes</td>
<td>15 g</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>4.3</td>
</tr>
<tr>
<td>Roasting rice</td>
<td>5 g</td>
<td>2</td>
<td>2</td>
<td>5</td>
<td>3.0</td>
</tr>
<tr>
<td>Roasting rice</td>
<td>10 g</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>4.3</td>
</tr>
<tr>
<td>Roasting rice</td>
<td>15 g</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>3.3</td>
</tr>
</tbody>
</table>

Table 1 shows that the maximum number of days that can slow down the ripening of banana retardants on the different types of treatment 1, 2 and 3 showed that when using potassium permanganate as a slow ripening of banana. It can slow down the ripening period of 14 days and the tenor are the same as every treatments.
Figure 1 compares the maximum number of days that can slow down the maturation of bananas. The use of slowdown ripening substance.

From the graph found that the substances that can slow down the ripening of bananas as long as possible is potassium permanganate. The result subordinate is powdered chalk and set of group does not have slow down substances but put it in a plastic bag, respectively, and use potassium permanganate of 15 g. that can be slow down the ripening of banana up in 14 days.

Section II

2. The testing taste of bananas.

The bananas taste test that use 3 participant and each person must to check and separate 4 level of the satisfaction when tasted.

Level 1 distasteful
Level 2 Less delicious
Level 3 delicious
Level 4 very delicious

And define the period points into the interpretation of results.

Interpretation
0.00 – 1.00 Means distasteful
1.01 - 2.00 Means Less delicious
2.01 - 3.00  Means delicious
3.01 - 4.00  Means very delicious

The taste result show in table 2.

Table 2. Show the testing taste of bananas result

<table>
<thead>
<tr>
<th>The type of substances.</th>
<th>Taste test result</th>
<th>Average</th>
<th>S.D</th>
<th>Result interpretation.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The panelists.1</td>
<td>The panelists. 2</td>
<td>The panelists. 3</td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3.0 0.00</td>
</tr>
<tr>
<td>Do not put into the bag.</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3.0 0.00</td>
</tr>
<tr>
<td>Potassium permanganate 5g</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3.0 0.00</td>
</tr>
<tr>
<td>Potassium permanganate 10g</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>3.3 0.58</td>
</tr>
<tr>
<td>Potassium permanganate 15g</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>3.3 0.58</td>
</tr>
<tr>
<td>Powdered chalk 5 g</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3.0 0.00</td>
</tr>
<tr>
<td>Powdered chalk 10 g</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3.0 0.00</td>
</tr>
<tr>
<td>Powdered chalk 15 g</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>3.3 0.58</td>
</tr>
<tr>
<td>Activated charcoal 5 g</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>3.3 0.58</td>
</tr>
<tr>
<td>Activated charcoal 10 g</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>3.3 0.58</td>
</tr>
<tr>
<td>Activated charcoal 15 g</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>3.7 0.58</td>
</tr>
<tr>
<td>White ash 5 g</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>3.3 0.58</td>
</tr>
<tr>
<td>White ash 10 g</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>3.3 0.58</td>
</tr>
</tbody>
</table>
The type of substances. | Taste test result | Average | S.D | Result interpretation. 
---|---|---|---|---
| The panelists. 1 | The panelists. 2 | The panelists. 3 | 
White ash 15 g | 3 | 3 | 3 | 3.0 | 0.00 | delicious 
Pop rice 5 g | 3 | 3 | 3 | 3.0 | 0.00 | delicious 
Pop rice 10 g | 3 | 2 | 3 | 2.7 | 0.58 | delicious 
Pop rice 15 g | 2 | 3 | 3 | 2.7 | 0.58 | delicious 

From table 2, the result taste test of a bananas that has been slowdown maturation with substances that have found that banana powder charcoal has the satisfaction of tasting test high as 3.7, followed by potassium15 g powder white chalk, roasting rice and ashes.

**Section III**

3. Design to slow down the ripening of bananas automation.

The design shown in Figure 2.

![Figure 2](image)

Figure 2 show to delay the ripening of bananas automatically machine.
Principles of machines

1. The working by controlled amount of carbon dioxide gas at level of 5-10 percent due to carbon dioxide has increased. Breathing is reduced. The effect to ethylene gas are less. At normally it has about 0.03% carbon dioxide in the atmosphere. So if we can increased about 5 -10%, it will be prolong to keep of the fruit.
2. Because sensor is checked carbon dioxide gas that can found at market. Therefore, we choose which the sensor can measured amount of carbon dioxide gas. And set the motor pump gas into the system when a quantity of carbon dioxide gas less than the standard level that is less than 5-10 percentage.
3. Gas carbon dioxide (dry ice) can be purchased easily. Or can be obtained from the chemical reaction between the limestone reacts with acids such as formic acid, acetic acid etc.

The results and discussed.

Section I The observation of the changing color of the banana. When used to slow down the ripening substances.

The experimental results substances slow down ripening of banana. Using potassium permanganate powder, chalk, charcoal and white ash roasting. The experiment was conducted 3 times (3 trials) showed that when using potassium permanganate as a delay the ripening of banana. It can slow down the ripening period of 14 days and most likely the same in all treatments. but the other slow ripening substances cannot help to slow down the ripening of banana.

Potassium permanganate which can slow down the ripening of the banana. It can be caused due to potassium permanganate is a substance can absorb ethylene gas. By potassium permanganate to react with ethylene gas. The resulting compound is manganese dioxide and ethylene glycol which is not reverse reaction to ethylene gas.

By Equation..

\[ \text{KMnO}_4 + C_2H_4 \rightarrow C_2H_6O_6 + MnO_2 + K_2O \]

Thus, when ethylene gas is decreased which is urged the ripening of the fruit. So a volume of maturation of banana are lessen and that the. Effected to absorbing ethylene gas up.
Section II The taste of banana.

The taste test of a banana that has been slow down maturation with substances found that banana use with powder activated carbon has the satisfaction of tasting high as 3.7, followed by potassium 15 g of powdered chalk, charcoal and white ash, because of the charcoal can helps to absorb a bad smell. And activated charcoal can be used to absorb odors in the refrigerator as well.

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