Real situation of polluted environment
and unsafe food link to cancer hazard in Vietnam

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TRỜI DÍ LA TRỜI... BIẾT ÂN GI CHƠ Añ TOÀN BÀY HÀ?!
VN is worst countries of death rates due to cancer

Annually average increase of 20% for cancer patients (>73% of cancer patients die)

estimated in 2020 will be 190,000 new cases/year

80% of cancer cause in VN are attributed to outside factors: pollution, unsafe food, toxic work environments
The relationship between pollution and unsafe food with cancer

Cancer directly related to:

- bad eating/drinking habits and unsafe food
- air pollution, water pollution
- infection (HBV, HCV, HPV, HP…)
Vietnam is a rapidly developing country with over 95 million people. Deforestation, motorbikes/traffic, and poor urban planning have caused air pollution.
Severe air pollution in Hanoi/ HCM city/ urban

>1000 coal fires/day in Hanoi

Smoke (waste incineration, traffic, industrial activities…)

CO, SO$_2$, NO$_2$, O$_3$
PM2.5, PM10, PAHs
- destroy DNA structure
- breast cancer, lung cancer

>70 cars and 700 motorbikes/1km of road in city
80% of the diseases in Vietnam are caused by polluted water.

Water pollution:

- Cancer-causing in water may include lead, mercury, chlorine, aluminium, arsenic contamination in the drinking water (for consumption) or irrigate rice/vegetable farms.

- High concentration of various toxins in the river/lake/sea: Formosa Ha tinh catastrophe, illicit waste, organic pollutants (oil waste and solids): these compounds can be accumulate and cause cell mutations -> high risk of stomach and colon cancer.
Lung cancer is often association with smoking and air pollution.

Risk Factors:
- Smoking cigarettes
- Environmental tobacco exposure
- Prior radiation in the chest area
- Asbestos, a toxic chemical
- Other lung diseases
- Genetics
- Radon, a radioactive gas found in soil

VN consumes > 80 billion cigarettes / years
Asbestos is an important cause of lung cancer and mesothelioma.

- VN is one of the top 10 countries asbestos consuming.
- Annually import 65,000 tons of asbestos raw material.
- A lot asbestos containing products are still using in VN.
- 90% lymphoma/ leukemia children contacted to building materials/toys/products using asbestos.
Unsafe food as the major cause of cancer

Pork become Beef ?!!

Auramin to dye food

Milk
Melamine

banned substances

banned chemicals, pesticide

Industrial chemicals for food processing
High risks of liver cancer

10 - 16.5% VN population have HBV infection and 3% HCV infection

- Eating moldy food/ aflatoxin contaminated
- Handling/ processing of contaminated crops and feeds

Consumption > 700 x10^6 liters of alcohol (200 M liters is not quality control) and 3.8x10^9 liters of beer / year
30-50% of all cancers are related to eating/drinking habits (5-10% genetic factors)

Smoke heavily and drink alcohol frequently

Eating fried, grilled dishes with fatty oil

Eating meals full of dried and salty food
➢ Toxic chemicals using for food processing (make whitening, coloring, freshing, softness and elasticity or create the eye-catching)
➢ Antibiotics and banned substances for farming, for food preservation and processing
How to reduce cancer burden in VN

- Protect our environment (government and individual duty)
- Change lifestyle (healthy food, exercise, good habits…)
- Ensure food safety (not buying and selling goods at the mobile markets) need foods inspect strictly
- Cancer screening regularly for early diagnosis.
The Changes of Nutritional Values During Artificial Ripening of Banana (Musa spp) in Myanmar

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27-5-2017
Aim

- To investigate the changes of nutritional values during artificial ripening of Banana (Musa spp) in Myanmar

Objectives

- To present the use of artificial ripening agents in fruits
- To assess the changes of nutritional values in fruits
Scientific name : *Musa paradisiaca*

Genus : *Musa*

Species : *paradisiaca*

Family name : Musaceae

English name : Banana

Myanmar name : Phee-gyan-hnget-pyaw

Distribution : tropical and sub-tropical regions of the world
Different Names of Ripening Agent

- ethephon
- artificial ethylene
- ethylene glycol
- calcium carbide
- carbon monoxide
- potassium sulfate
- oxytocin

It was not carcinogen and is classified by IARC (International Agency for Research on Cancer) as group D (not carcinogenic to human).
1. Before treating, finger is hard and completely green
2. After treating for one day, green but with some traces of yellow
3. After treating for two days, become to be yellow
4. After treating for three days, more yellow than green
5. After treating for four days, yellow but with traces of green
6. After treating for five days, fully yellow
7. After treating for six days, yellow with black spots
### Some Physicochemical Properties of Banana Samples

<table>
<thead>
<tr>
<th>Sample</th>
<th>Water (%)</th>
<th>Ash (%)</th>
<th>Protein (%)</th>
<th>Fiber (%)</th>
<th>Fat (%)</th>
<th>Carbohydrate (%)</th>
<th>Energy value (kcal/100g)</th>
<th>Reducing sugar (%)</th>
<th>Titratable acidity (%)</th>
<th>pH value</th>
<th>Ascorbic acid 1 (mg/100g)</th>
<th>Ascorbic acid 2 (mg/100g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural</td>
<td>70.69</td>
<td>1.21</td>
<td>1.18</td>
<td>0.33</td>
<td>0.05</td>
<td>26.54</td>
<td>111.33</td>
<td>13.59</td>
<td>0.35</td>
<td>4.62</td>
<td>12.67</td>
<td>13.12</td>
</tr>
<tr>
<td>250 ppm (ethephon)</td>
<td>72.06</td>
<td>0.96</td>
<td>1.09</td>
<td>0.31</td>
<td>0.03</td>
<td>25.55</td>
<td>106.33</td>
<td>13.02</td>
<td>0.40</td>
<td>4.59</td>
<td>9.45</td>
<td>9.66</td>
</tr>
<tr>
<td>500 ppm (ethephon)</td>
<td>72.88</td>
<td>0.91</td>
<td>0.98</td>
<td>0.31</td>
<td>0.03</td>
<td>24.89</td>
<td>103.75</td>
<td>13.69</td>
<td>0.43</td>
<td>4.52</td>
<td>8.44</td>
<td>8.86</td>
</tr>
<tr>
<td>1000 ppm (ethephon)</td>
<td>73.90</td>
<td>0.91</td>
<td>0.97</td>
<td>0.30</td>
<td>0.03</td>
<td>23.89</td>
<td>99.71</td>
<td>14.07</td>
<td>0.48</td>
<td>4.46</td>
<td>6.51</td>
<td>7.17</td>
</tr>
<tr>
<td>Market</td>
<td>73.66</td>
<td>0.86</td>
<td>0.91</td>
<td>0.30</td>
<td>0.02</td>
<td>24.25</td>
<td>100.82</td>
<td>14.44</td>
<td>0.46</td>
<td>4.37</td>
<td>6.78</td>
<td>6.22</td>
</tr>
</tbody>
</table>

1 = Iodometric titration method  
2 = UV–visible spectrophotometric method
| Sample                | Mineral Contents (mg/100 g) | K      | Na     | Ca     | Mg     | Fe     | Mn     | Zn     | Cu     | Cd    | Pb    |
|-----------------------|----------------------------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-------|-------|
| Natural               |                            | 420.31 | 7.38   | 29.31  | 76.21  | 0.84   | 0.32   | 0.41   | 0.17   | N.D   | N.D   |
|                       |                            | ±0.02  | ±0.01  | ±0.01  | ±0.01  | ±0.01  | ±0.02  | ±0.01  | ±0.01  |       |       |
| 250 ppm (ethephon)    |                            | 418.23 | 6.54   | 27.55  | 75.91  | 0.79   | 0.29   | 0.38   | 0.15   | N.D   | N.D   |
|                       |                            | ±0.01  | ±0.02  | ±0.03  | ±0.01  | ±0.02  | ±0.02  | ±0.03  | ±0.01  |       |       |
| 500 ppm (ethephon)    |                            | 410.91 | 5.73   | 26.10  | 75.04  | 0.79   | 0.27   | 0.33   | 0.12   | N.D   | N.D   |
|                       |                            | ±0.01  | ±0.01  | ±0.02  | ±0.02  | ±0.02  | ±0.02  | ±0.03  | ±0.02  |       |       |
| 1000 ppm (ethephon)   |                            | 409.75 | 5.54   | 26.06  | 74.91  | 0.74   | 0.26   | 0.28   | 0.12   | N.D   | N.D   |
|                       |                            | ±0.01  | ±0.01  | ±0.02  | ±0.02  | ±0.01  | ±0.02  | ±0.02  | ±0.01  |       |       |
| Market                |                            | 394.81 | 3.95   | 20.29  | 74.63  | 0.72   | 0.24   | 0.20   | 0.08   | N.D   | N.D   |
|                       |                            | ±0.01  | ±0.03  | ±0.02  | ±0.03  | ±0.01  | ±0.02  | ±0.02  | ±0.02  |       |       |
| RDA*                  | Men                        | 4700 mg | 1500 mg | 1000 mg | 420 mg | 8 mg   | 2.3 mg | 11 mg  | 900 μg | -     | -     |
|                       | Women                      | 4700 mg | 1500 mg | 1000 mg | 320 mg | 18 mg  | 1.8 mg | 8 mg   | 900 μg | -     | -     |

N.D = not detected, RDA = recommended dietary allowance
* = Dickinson, 2002; Wall, 2006
Conclusion

From the determination of nutritional values on the effect of ripening agents (ethephon) in banana (Phee-gyan-hnget-pyaw), the following inferences could be deduced.

**Macronutrients**

Water, acidity, reducing sugar $\rightarrow$ higher in treated samples than natural (untreated) ripening sample

Protein, carbohydrate, and Fiber and energy $\rightarrow$ lower in treated samples than natural (untreated) ripening sample

**Micronutrients**

Vitamin C and some elements $\rightarrow$ lower in treated samples than natural samples
Observation of Ripening Time and Shelf Life in Natural and Treated with Ethephon Samples

<table>
<thead>
<tr>
<th>No.</th>
<th>Sample</th>
<th>Ripening time (hours)</th>
<th>Shelf life (days)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>1.</td>
<td>Natural</td>
<td></td>
<td>54</td>
</tr>
<tr>
<td>2.</td>
<td>250 ppm (ethephon)</td>
<td></td>
<td>36</td>
</tr>
<tr>
<td>3.</td>
<td>500 ppm (ethephon)</td>
<td></td>
<td>29</td>
</tr>
<tr>
<td>4.</td>
<td>1000 ppm (ethephon)</td>
<td></td>
<td>24</td>
</tr>
</tbody>
</table>
Changes of ripening stage by the treatment of ethephon on Banana

1. Before treating, finger is hard and completely green
2. After treating for one day, green but with some traces of yellow
3. After treating for two days, become to be yellow
4. After treating for three days, more yellow than green
5. After treating for four days, yellow but with traces of green
6. After treating for five days, fully yellow
7. After treating for six days, yellow with black spots
SEA HERBS IN THE PREVENTION OF DEGENERATIVE DISEASES

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Hanoi, Vietnam
Degenerative Diseases

- Diabetes mellitus
- Cancer

Top 10 causes of death globally 2015

- Ischaemic heart disease
- Stroke
- Lower respiratory infections
- Chronic obstructive pulmonary disease
- Trachea, bronchus, and lung
- Diabetes mellitus
- Alzheimer disease
- Diarrhoeal diseases
- Tuberculosis
- Road injury

Deaths in millions

WHO (2017)
Sea Herbs
Sea Vegetables, Sea Algae, Seaweeds
Sea Herbs
Sea Vegetables, Sea Algae, Seaweeds

- Sulfated polysaccharides
- Carrageenan
- Alginic
- Agarose
- Cellulose
- Fucoidan
- Flavonoid
- Fatty acids
- Carotenoids
- Vitamins
- Minerals
- Dietary fiber
- Phenol
- Catechin
Biological Activities

Sea algae as Potential Source of Bioactive Secondary Metabolites

Marine Biotech Group, FFMS, Bogor Agricultural Univ.

Alga-Associated Fungi

- Endophytic fungi
  - Antibiotic
  - Anticancer
  - Antiviral
  - Immunostimulant
  - Enzymes

**Halimeda sp.**

**Sargassum sp.**

Macroalgae as Potential Host for Marine Fungi


Marine Biotech Group, FFMS, Bogor Agricultural Univ.
What NEXT?

Comparison of pharmaceutical products, herbal/supplement, personal care & cosmetics

<table>
<thead>
<tr>
<th>Product</th>
<th>Dev. (y)</th>
<th>Cost (US $ Mio)</th>
<th>Est. return (US $ B)</th>
<th>Est. growth (% /y)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pharmac.</td>
<td>10 - &gt; 15</td>
<td>231-500</td>
<td>US$ 75 - 150</td>
<td>6</td>
</tr>
<tr>
<td>Herbal/supplement</td>
<td>&lt; 2-5</td>
<td>0.15 -7</td>
<td>US$ 2.8</td>
<td>10-20</td>
</tr>
<tr>
<td>Personal care, cosmetics</td>
<td>&lt; 2-5</td>
<td>0.15 -7</td>
<td>US$ 2.8</td>
<td>10-20</td>
</tr>
</tbody>
</table>

Kate and Laird. (1999)
Collaborate
Aquatic Biotech. Division, Department of Aquatic Products Technology; Division of Marine Biotechnology, Center for Coastal and Marine Resources Studies, Bogor Agricultural University

Thank You