Current Situation of the Industrialization of Bean Sprouts Production, Processing and Marketing in China

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2011-10- Las Vegas. USA
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THE BACKGROUND

The development of economy
Acceleration of life style
Enhanced working pressure

Easily lead to obesity, diabetes and other diseases

Bean sprouts are nutritional and healthy food due to their high contents of various proteins, vitamins and minerals.
Fig. 1 GDP growth of China in recent 10 years

Demand on healthier and safer food is increasing with the growing GDP
The mungbean sprout and soybean sprout are traditional vegetable of supply 200,000t/year in China.

The scale of bean sprouts production have changed from backyard family operation to the production newly styles that were intensive, mechanical, automation and modernization.

The sprouts industrial chain formed.
## Typical Bean Sprouts in China

<table>
<thead>
<tr>
<th>English Name</th>
<th>Latin name of seed</th>
<th>English name of seed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mungbean sprout</td>
<td><em>Vigna radiata</em> (L.) Wilczek</td>
<td>Mungbean</td>
</tr>
<tr>
<td>Soybean sprout</td>
<td><em>Glycine max</em> (L.) Merrill</td>
<td>Soybean</td>
</tr>
<tr>
<td>Broad bean sprouted</td>
<td><em>Vicia faba</em> L.</td>
<td>Broad bean</td>
</tr>
<tr>
<td>Pea seedling</td>
<td><em>Pisum sativum</em> L.</td>
<td>Pea</td>
</tr>
<tr>
<td>Grass peavine seedling</td>
<td><em>Lathyrus palustris</em> L. Var. Pilosus (champ)</td>
<td>Grass peavine</td>
</tr>
<tr>
<td>Peanut sprout</td>
<td><em>Arachis</em> L.</td>
<td>Peanut</td>
</tr>
<tr>
<td>Alfalfa sprout</td>
<td><em>Medicago sativa</em> L.</td>
<td>Alfalfa</td>
</tr>
<tr>
<td>Adzuki bean seedling</td>
<td><em>Vigna angularis</em>(Willd.) Ohwi et Ohashi</td>
<td>Adzuki bean</td>
</tr>
<tr>
<td>Lentil sprout</td>
<td><em>Lens culinaris</em> Medic.</td>
<td>Lentil</td>
</tr>
<tr>
<td>Amino acids</td>
<td>Mung bean</td>
<td>Mung bean sprout</td>
</tr>
<tr>
<td>--------------------------</td>
<td>-----------</td>
<td>-----------------</td>
</tr>
<tr>
<td>Tyr</td>
<td>3.27</td>
<td>3.28</td>
</tr>
<tr>
<td>Phe</td>
<td>5.66</td>
<td>5.70</td>
</tr>
<tr>
<td>Aromatic amino acids</td>
<td>8.93</td>
<td>8.98</td>
</tr>
<tr>
<td>Thr</td>
<td>3.15</td>
<td>3.20</td>
</tr>
<tr>
<td>Cys</td>
<td>0.75</td>
<td>0.77</td>
</tr>
<tr>
<td>Met</td>
<td>1.92</td>
<td>1.95</td>
</tr>
<tr>
<td>Sulfur-containing amino acid</td>
<td>2.67</td>
<td>2.72</td>
</tr>
<tr>
<td>Leu</td>
<td>8.36</td>
<td>8.53</td>
</tr>
<tr>
<td>Ile</td>
<td>4.74</td>
<td>4.70</td>
</tr>
<tr>
<td>Lys</td>
<td>4.19</td>
<td>4.26</td>
</tr>
<tr>
<td>Val</td>
<td>5.20</td>
<td>5.20</td>
</tr>
<tr>
<td>Trp</td>
<td>0.97</td>
<td>1.00</td>
</tr>
<tr>
<td>Essential amino acids</td>
<td>38.2</td>
<td>38.6</td>
</tr>
<tr>
<td>Asp</td>
<td>13.5</td>
<td>13.5</td>
</tr>
<tr>
<td>Glu</td>
<td>21.7</td>
<td>21.5</td>
</tr>
<tr>
<td>Pro</td>
<td>4.23</td>
<td>4.20</td>
</tr>
<tr>
<td>Ser</td>
<td>4.95</td>
<td>4.80</td>
</tr>
<tr>
<td>Gly</td>
<td>4.26</td>
<td>4.20</td>
</tr>
<tr>
<td>Ala</td>
<td>4.35</td>
<td>4.41</td>
</tr>
<tr>
<td>Arg</td>
<td>6.33</td>
<td>6.35</td>
</tr>
<tr>
<td>His</td>
<td>2.49</td>
<td>2.42</td>
</tr>
<tr>
<td>inessential amino acids</td>
<td>61.8</td>
<td>61.4</td>
</tr>
<tr>
<td>Leu/Ile</td>
<td>1.76/1</td>
<td>1.81/1</td>
</tr>
</tbody>
</table>

The amino acid contents of mungbean sprout increased than its seed.
# Seedlings nutrition contents of different pea varieties

<table>
<thead>
<tr>
<th></th>
<th>Vitamin C (μg/g)</th>
<th>Soluble sugar (mg/g)</th>
<th>Soluble protein (mg/g)</th>
<th>Crude fiber (%)</th>
<th>Crude protein (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellow pea seedling</td>
<td>19.53</td>
<td>15.91</td>
<td>4.96</td>
<td>12.81</td>
<td>52.65</td>
</tr>
<tr>
<td>Green pea seedling</td>
<td>18.85</td>
<td>9.67</td>
<td>3.07</td>
<td>12.28</td>
<td>50.85</td>
</tr>
<tr>
<td>Tibet pea seedling</td>
<td>19.03</td>
<td>14.89</td>
<td>3.45</td>
<td>11.80</td>
<td>50.82</td>
</tr>
</tbody>
</table>
Market and Potential

Quantitative consumption
- Yield
- Flavor & Taste

Qualitative consumption
- Nutritional components
- Health function
- Green pollution free

In China, the bean sprout market is of great potential. If 50% of population consumes bean sprout, then daily consumption may reach to 30,000 ton and the annual output value is about 10 billion RMB.
Overview of the sprouts production facility in BSIBA-CAED in China

- Eleven established plants
- Nine plants under establishment
- Four companies for trading of beans stock
- One equipment manufacturers

Predicted that 30 to 50 plants of scale of 100 ~ 200 tons sprouts daily in 31 provinces or cities in the next five years in China.

The annual supply sprouts will reach 300 million metric tons.
Industry Chain of Bean Sprouts in China

- Raw material supply
- Equipment manufacturing
- Sprouts production
- Marketing

Acquisition process
Production Bases
Breeding
Germplasm Evaluation
Energy-saving equipment
equipment For deep-pro.
Water Recycling
By-product Utilization

bilted Brand
R & D of Organic product
Standard and integrity
Safety

Combination strategies
Public Relations
After-sales service
1. PRODUCTION

Soybeans are mainly produced in the northeast of China. This area can provide sufficient beans of high quality, including extra small, small and moderate sizes of beans.

Soybean mechanization production base

Soybean

Dong sheng No.1
Soybean 9395
Soybean 02011

8~13g/100 Seed Weight
Production bases of the mungbean are mainly in few areas such as Yulin in Shanxi province, Zhangjiakou in Hebei province, Zhalute and Tongliao in Inner Mongolia, Taonan and Baicheng in Jilin province.

Mungbean production base

Bailv 522
Bailv 935
Zhonglv No.5
Breedid by Chinese Academy Agriculture Science
∮3.6～4.0mm/grain size
2. BEAN SEED PROCESSING

- **processing methods**
  - screening — seed size
  - Air separation — Aerodynamics
  - Gravity separation — seed density

- **processing facility**
  - air separation, gravity separation, hand and auto sorting/color separation/ weighing/ packaging

- **processing procedure**
  1. drying
  2. prescreening
  3. preliminary screening
  4. Gravity separation
  5. Color Selection
  6. packaging
Transportation and preliminary screening of mungbean in Taonan RUIDA

Combined procedure for Auto-processing of mungbean in Zalute ZHENGDA
3. Mungbean Price in Beijing

This year, price of mungbean declined from spring to autumn. The price remained 13 yuanRMB per kilograms during March to April, while decreased markedly after mid May. It may caused by the policies implemented by relative bureaus, and by media and consensus. Since mungbean is not easy to be stored in summer, which may also influence the price as well.

Fig.2  Recent price trends of mungbean in wholesale market
Production facilities

Type of bean sprouts production facilities very in scale and level of automation.

Example: Ningbo WuLongTan mechanical equipment development Co., LTD.
A. rinsing and disinfection of raw beans
B. monitoring system for incubation temperature control
C. spraying system
D. hatching tub
E. Automatic bean sprouts cleaning system
F. Automatic cooling system for mungbean sprouts

Fig.3 production facilities
Production of sprouts

A. Seed cleaning

B. Seed soaking

C. Incubation/Cultivating workshop

D. Harvest

E. Cleaning and dehulled

F. Cooling

Fig. 4 procedure of production of sprouts
**PACKAGING**

- **Bulk**
  The sprouts products are mainly marketed after simple packaging about 10kg/unit in whole sale market.

- **Small unit package**
  Range from 350~450g by auto-packing equipment
  Mainly for supermarket in big cities
Marketing is the key activity for achieving profit.

The company always pays attention to distributors management to ensure the sprouts food safety in the field.

Cooling vehicles

Small unit package in supermarket
Beijing DongSheng the agriculture technique to develop (group) Co., LTD

Ningbo WuLongTan vegetable food Co., LTD

Jiangsu Sue Ya food Co., LTD

Brands

Hangzhou QingShanHu vegetable food Co., LT

Chengdu AnDer vegetable food Co., LTD

Zhengzhou new rural vegetable food Co., LTD

Suzhou ZhongShiDa vegetable food Co., LTD

Hubei YuRuYi green food Co., LTD

Qingdao FuHong vegetable food Co., LTD
Price of mungbean fluctuated among seasons. Price decreased slightly after August, and it may be related to sufficient supply of beans.
Fig. 6  Recent price trends of soybean sprouts in wholesale market

Price of soybean fluctuated and remained about 1.6 RMB per kilograms among seasons.
Distribution channel

- Producers
  - Free market
  - Logistics
  - Export sales
    - Retail
    - Supermarkets
    - Processing enterprises
      - Consumers
      - Export
With rapid development of sprouts industry, food safety issues are of high concern to relevant government agencies. To guarantee food safety and standardized production, “HACCP” production practice is recommended in sprouts industry.
Industry Self-discipline

BSIBA-CAED in China offered us a platform of communication and cooperation. It promotes the development of sprouts industry.
Our aims

- Establish industry standard to ensure food safety
- Be honest and respond to the changing market
- Enhance science and technology innovation, to improve the sprouts quality
The textbook《Legume Sprouts and Seedlings》will be published by the Higher Education Press in December 2011. The editors in chief are KANG Yufan and CHENG Xuzhen.
“Legume Sprouts and Seedlings”

“Legume Sprouts and Seedlings”, It covers botany, plant breeding, seed biology, culture, architecture, food processing, marketing, enterprise management, agricultural economics, and information technology associated with sprouts and seedlings production and market.
Need your help

- There is one chapter about historic events on sprouts and seedlings globally.
- We would like to include ISGA as part of the international development of sprouts and seedling: if possible please provide us information of each annual convention such as numbers of attendees, date, theme and location of conventions.
Technologies for sprouts production remains to be improved in China. We sincerely welcome all of you come to China and visit production bases and facilities for closer communication and cooperation among the global sprout society!
Wish to be the hoster of 2013/14 ISGA Annual Convention

Proposed cities: Beijing, Ningbo or Hangzhou

Date: Beijing (mid October) or Ningbo, Hangzhou (mid April)

Theme:
1. The Safety and Health of Bean Sprouts Production
2. The Production and Supply of Raw Materials for Bean Sprouts

Agenda:
1. Holding ISGA conference, 2 days
2. Visiting bean sprouts manufacturing enterprises, 1 day
3. Touring and sightseeing, 1day
Welcome to Beijing!

Bird's Nest
The Great Wall
The Palace Museum
The Summer Palace
Forbidden City
Ning Bo, Are you ready?

The Ningbo River and Bridge

Hangzhou Bay Bridge

Ningbo Catholic Church

wu Longtan Nature Reserve
Hang Zhou, Do you love it?

The West Lake

Qiantang river tide

Longjing tea
Thank you for your attention!