



Food and Agriculture
Organization of the
United Nations



One Country
One Priority Product

The Green Development of Special Agricultural Product - Banana in China

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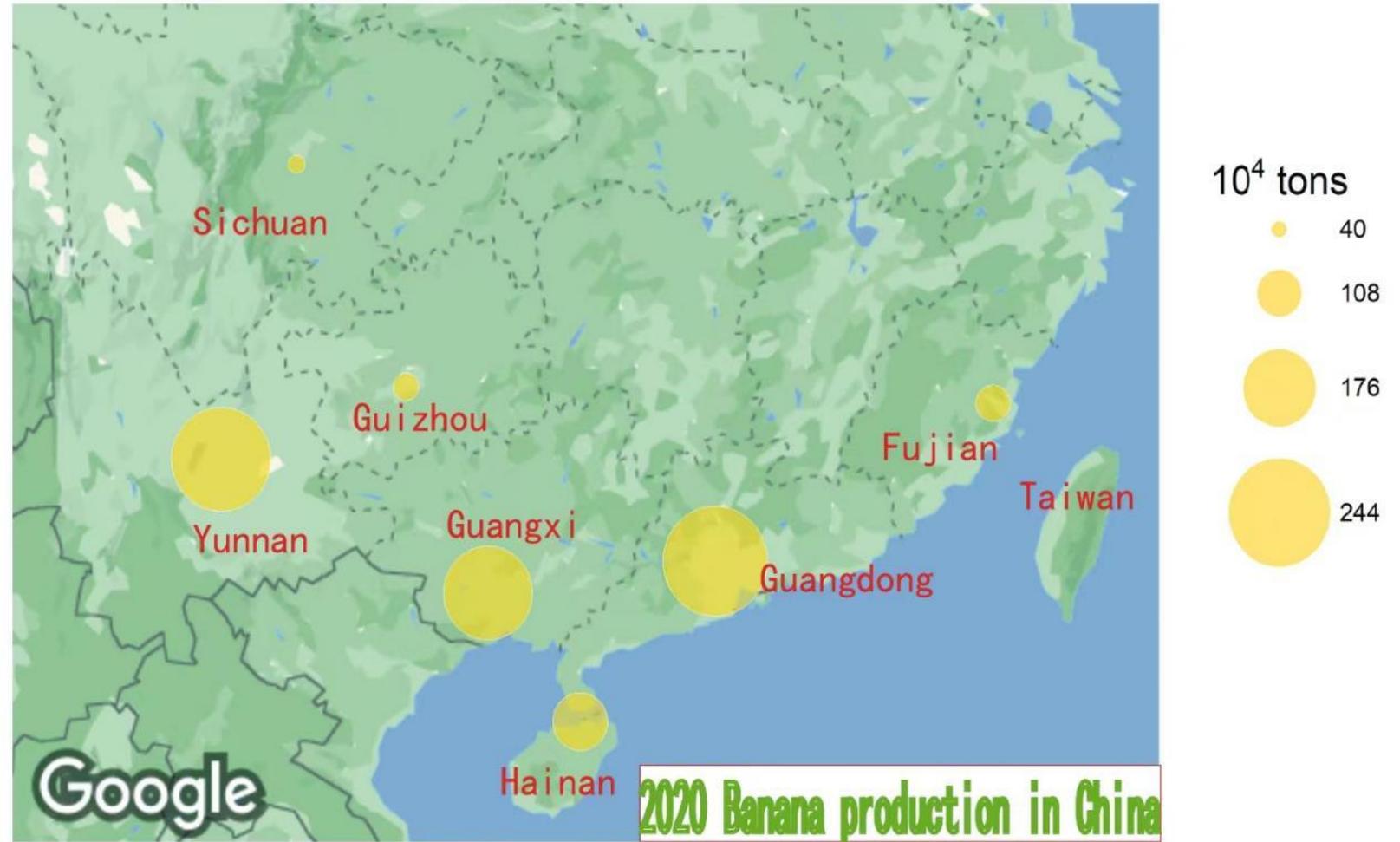
Main Content

- *Importance*
- *Comparative Advantages*
- *Demands*
- *Challenges*
- *Strategy*
- *Key Action*
- *Key Technologies*
- *Effectiveness*
- *Experience and Lessons*
- *Suggestions*



Importance

- Globally, China ranks No.2 in terms of productivity. Its annual production totaled 10 million tons in recent years.
- China currently cultivates bananas in 300,000 hectares of lands
- It provides livelihood for millions of people in China's tropical regions.



Comparative Advantages

- Employment – Two million people receive direct and indirect benefits earning CNY 20 billion(3.1 billion US dollar) per year.
- The investment is estimated to be about CNY35 billion (5.4 billion US dollar) eg. infrastructures, banana plantations, agricultural materials, offices, services.
- Develop related industries such as transportation package, food, consumer goods, and manpower services in Southern China.
- Play a major role in poverty alleviation in the local community.



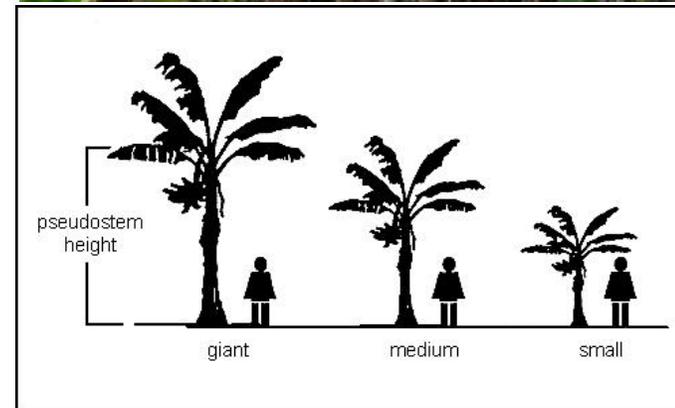
Demands

- ***Technology for sustainable banana development***
- ***Banana quality and safety techniques***
- ***Modern banana processing technology and equipment***
- ***Technology for manufacturing banana products with a variety of applications***
- ***Utilizing banana resources efficiently.***



Industry challenges

- Pests and diseases:
 - Black and Yellow Sigatoka
 - Panama disease
 - CMV, BBTV
 - Nematodes...
- Plant height: usually high
- Post-harvest losses: 10-20%
- Fruit quality: low shelf life
- ...



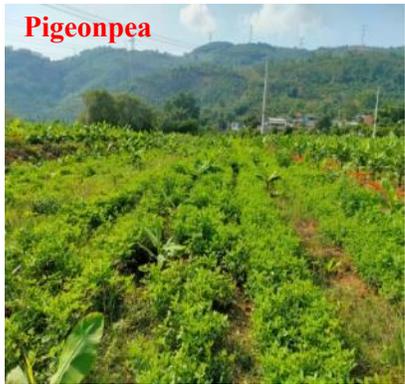
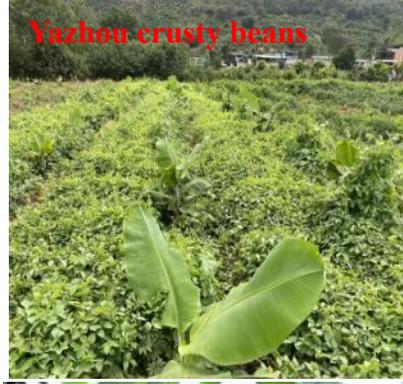
Strategy

- Resolve the key problems with seedings and soil.
- Develop green technologies and superior varieties to support a high-quality banana industry.
- Increase the added value of the industrial value chain.
- Promote integrated management(*Fusarium* wilt) technology for bananas.

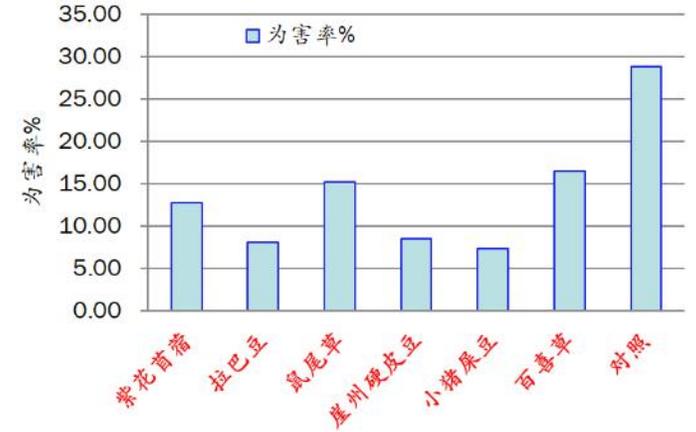


Key Technologies: IPM management and intercropping

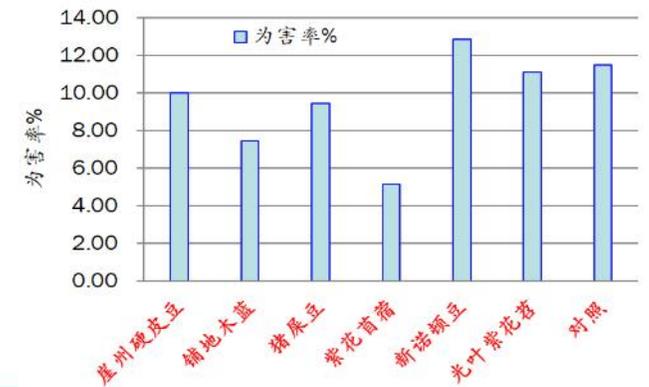
➤ Banana intercropping screening



➤ Effects of interplanting on *Spodoptera litura* damage

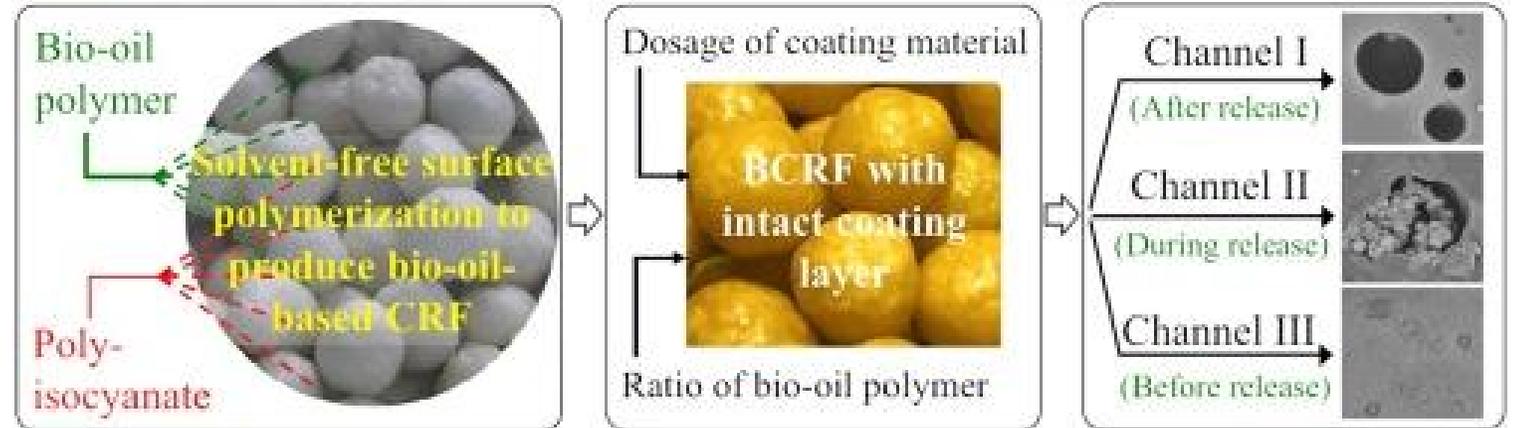


➤ Effects of Leaf Beetle Damage



Key Technologies: Crop spacing and fertilizer application control

When combined with controlled release formula fertilizer, the wide and narrow row planting pattern can reduce fertilizer application from 12~22 times to 3~4 times.



Key Technologies: Banana efficient production technology



Planting



Land preparation



Pipeline sprinkler system



Drip irrigation system



Weed control



Bagging



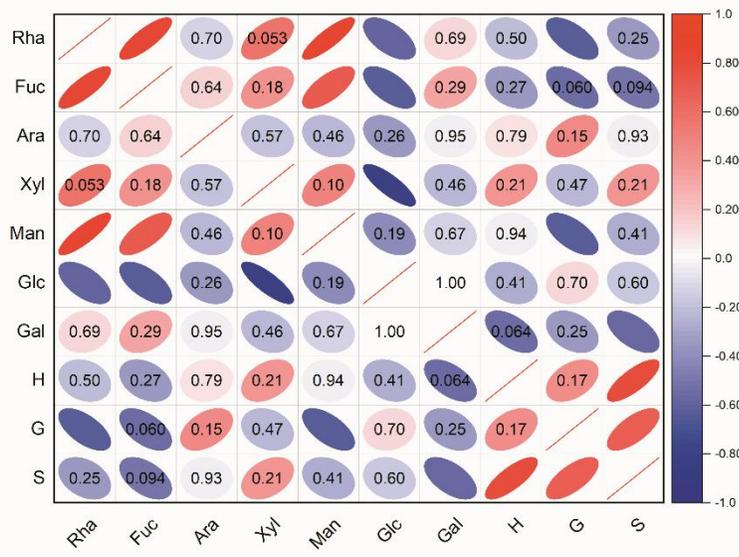
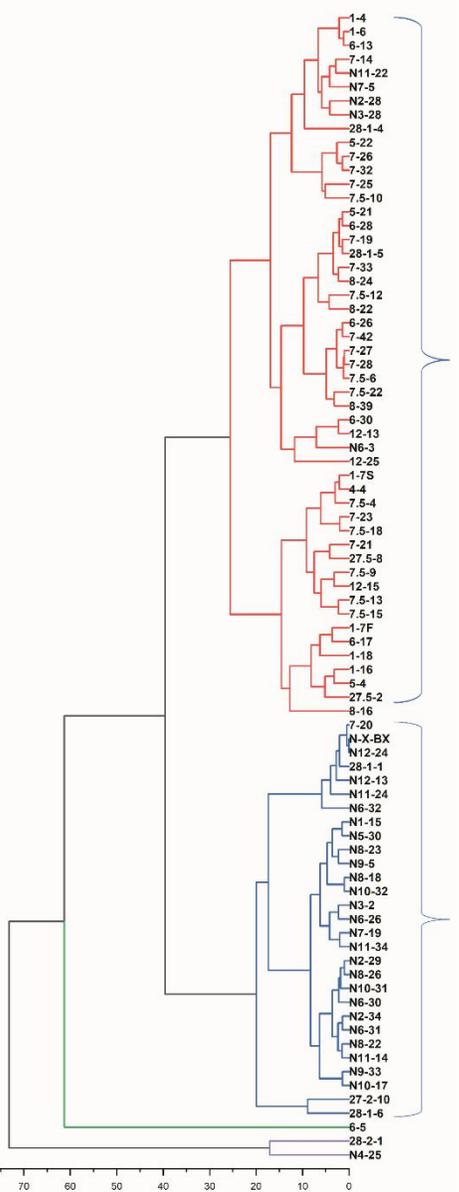
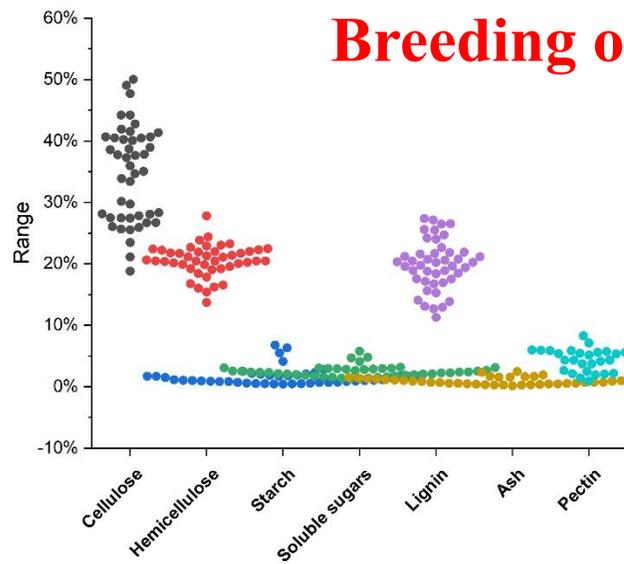
Cableway System



Key Technologies: High yield and TR4 resistance banana variety



Breeding of 'RF1'



An efficient way to produce
healthy bananas *in vitro*



Key Technologies: An integrated technology to improve disease resistance in banana seedlings



Enhancing banana's own resistance by using beneficial microbes



Banana-specific organic fertilization



Healthy, high quality seedlings



Key Technologies: Green harvesting and storage



Packing shed operations



De-Hands



Washing



Cut surfaces



Air drying



Packed into boxes

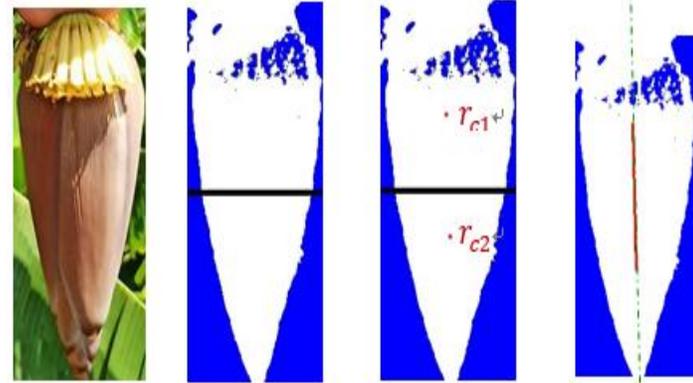
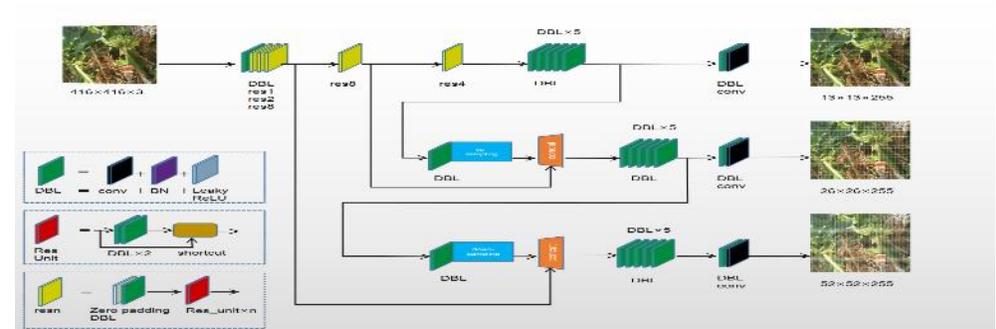
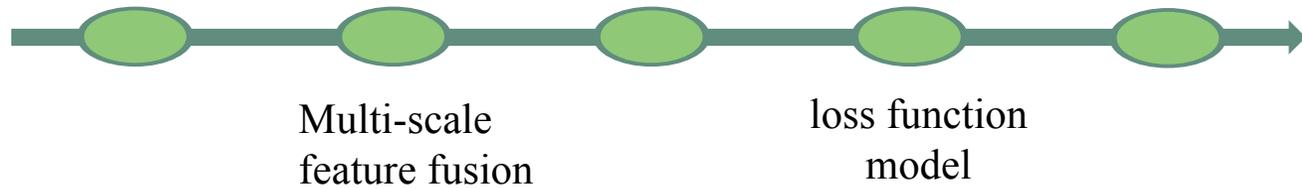


Key Technologies: Automated banana harvesting and image recognition technology

Classification of banana images

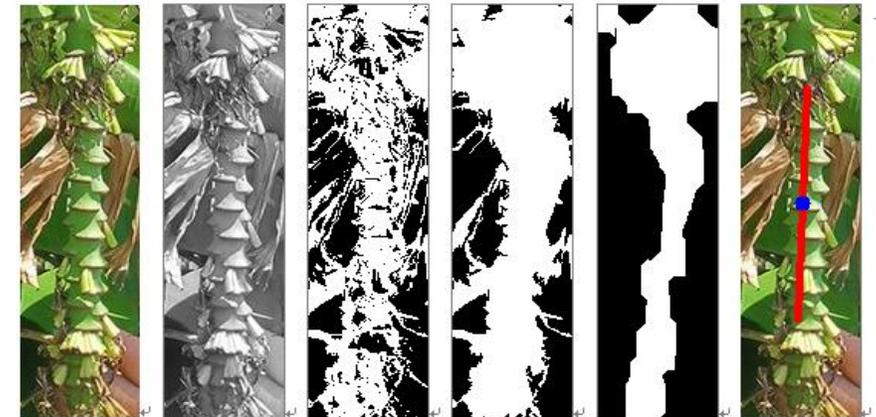
network structure

Model evaluation



a. 花蕾原图 b. 上下部分 c. 计算质心点 d. 中心轴线

Bud image centroid calculation

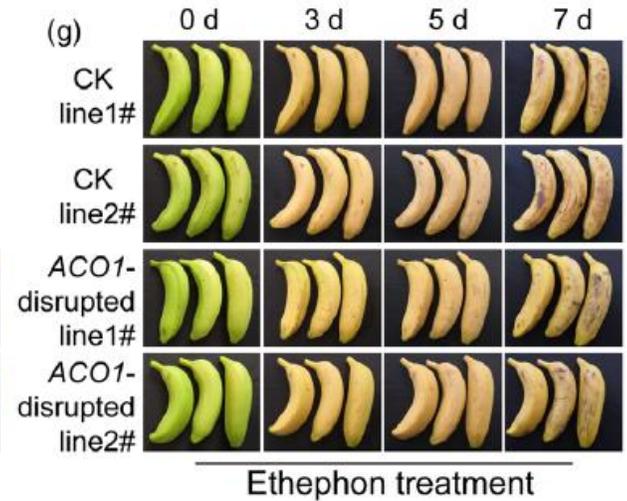
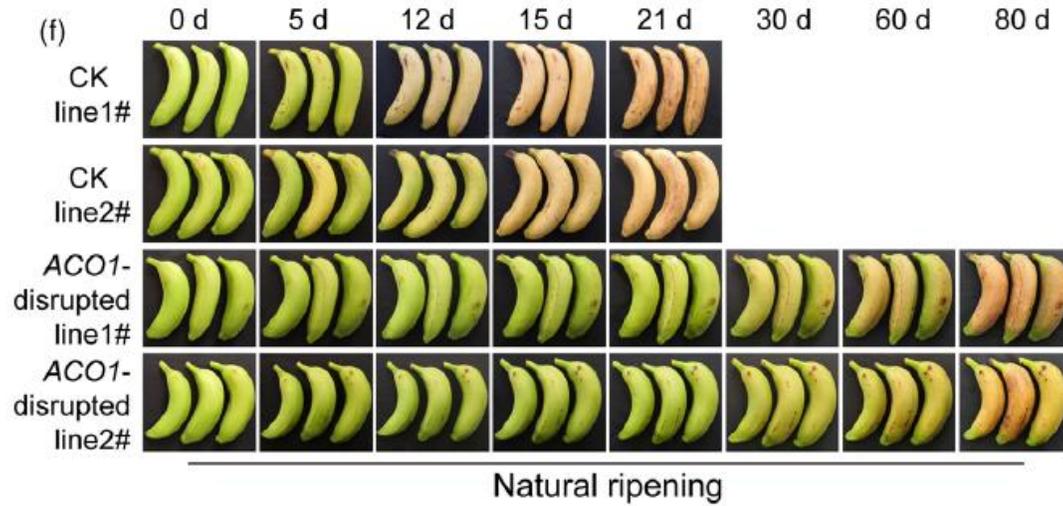
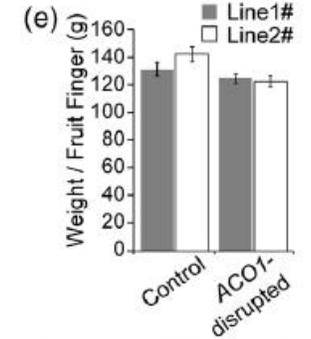
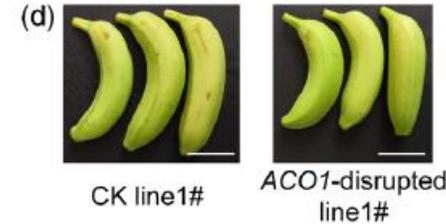
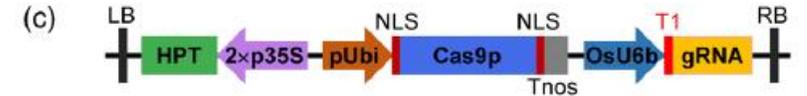
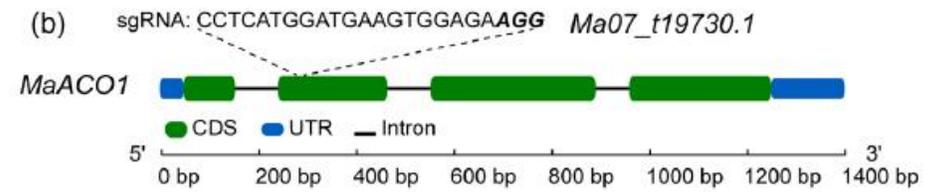
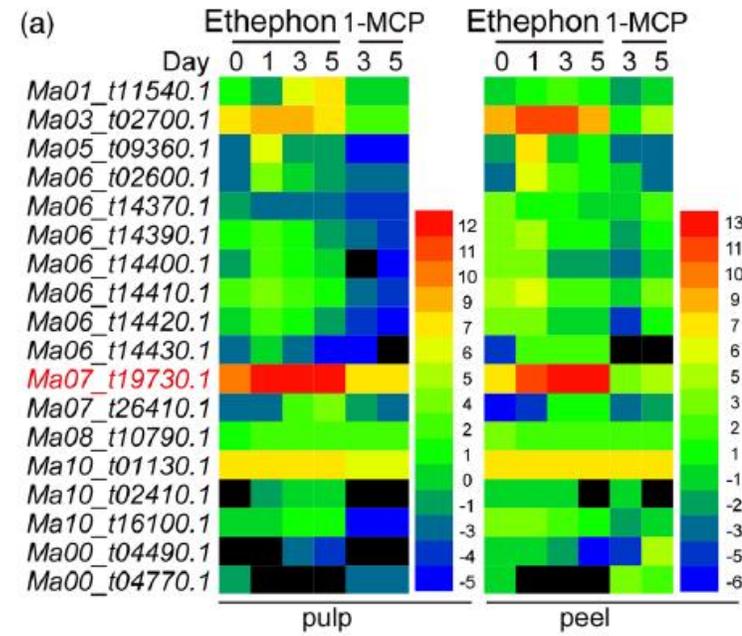


a. 原图 b. 明度通道 c. 二值化 d. 降噪 e. 形态学处理 f. 最终求解结果

Extraction of inflorescence axis and calculation of growth direction



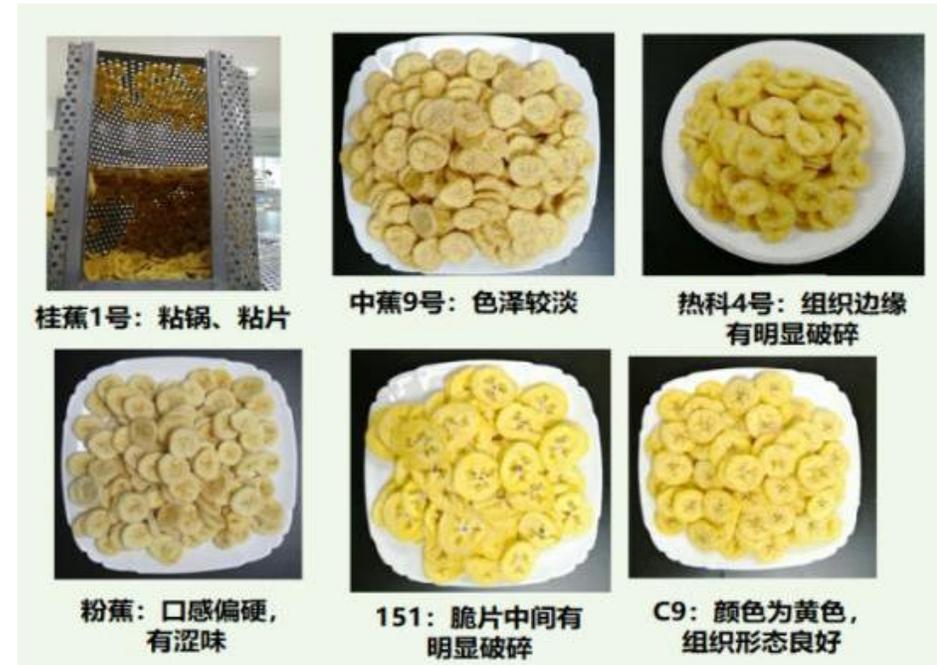
The shelf life of bananas can be greatly extended by gene editing technology.



Key Technologies: Green Processing



Appearances of different chip processing methods



Processing characteristics of some varieties of chips



Banana powder

Flow diagram



Drum drying(Drum-dryer): Pureed bananas are applied thinly to the surface of a heated drum, and then the dry solids shall be scraped off with a knife.



Banana puree



Banana powder

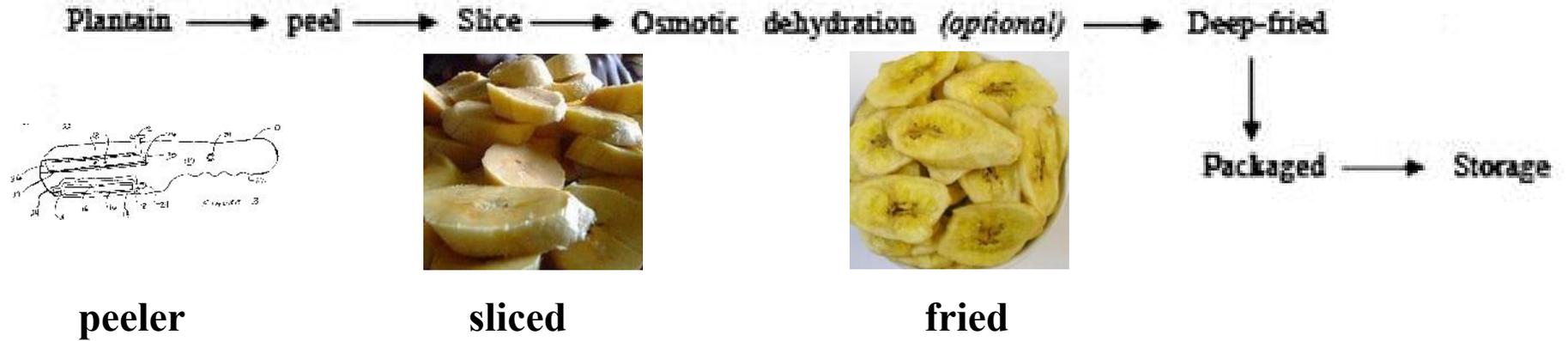


Screw conveyors



Banana chips

Flow diagram



Osmotic dehydration: Immersion in an osmotic solution is used to remove water partially from plant tissues.



Key Technologies: Fiber extraction and degumming technology

Banana fiber can be used in a variety of fields, such as heavy metal adsorbent, spinning performance, environmental protection, agriculture, etc.

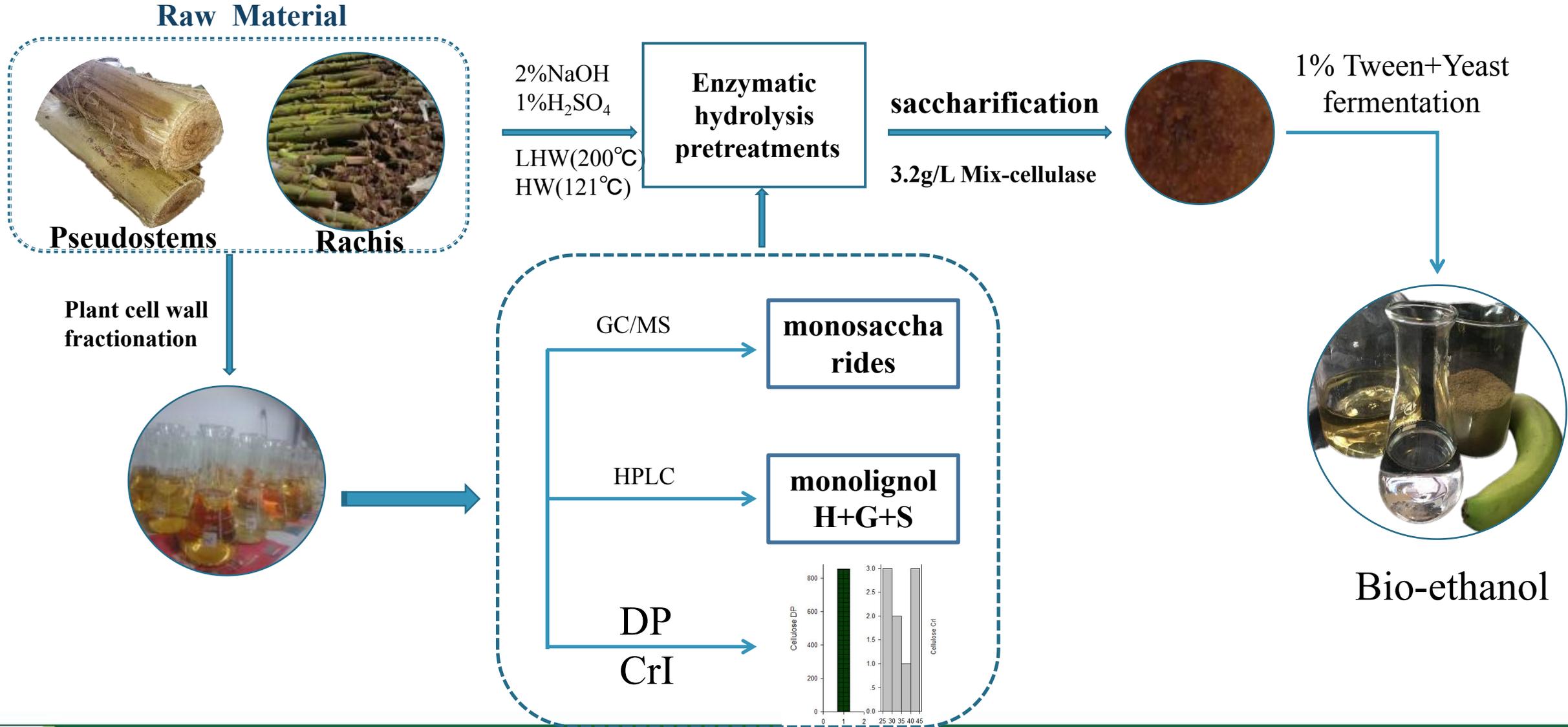


Key Technologies: Banana pseudo-stem organic fertilizer

Banana stem organic fertilizer is obtained via technology of composting fermentation using banana stalk waste as the main raw material. This technology can help to avoid the environmental pollution from banana waste and chemical fertilizer.

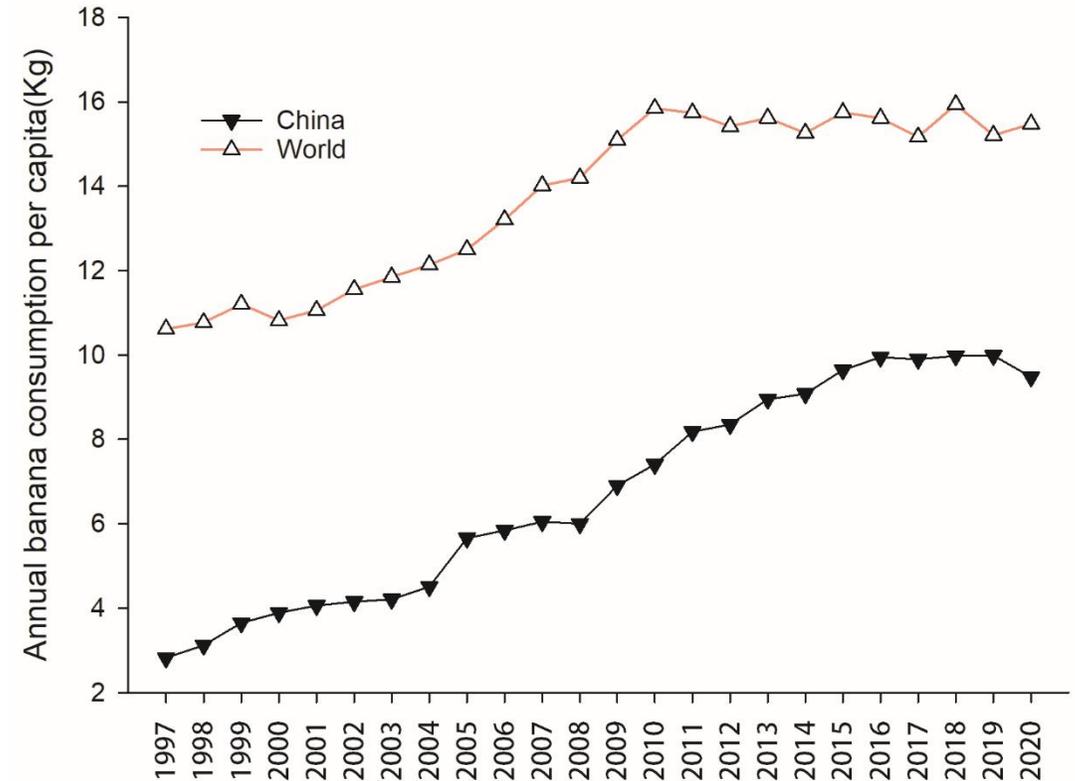


Key Technologies: Production of bioethanol from banana waste lignocellulose



Effectiveness

- World banana consumption peaked in 1997 at 10.62kg per person, and reached 15.48kg by 2020, with an average annual growth rate of 1.89 percent.
- China's banana consumption per capita increased by 6.83%, from 2.82kg to 9.48kg.
- There is still a lot of room for growth in China's banana consumption market



Experience and Lessons

A comprehensive prevention and control system for *Fusarium* wilt has been developed

Soil pathogen
detection

Soil
regulation

Disease-
resistant
varieties

Bacterial
Fertilizer

A no-till
system



Suggestions

1. Continually improve banana production conditions.
2. To encourage workers to take part in banana production more actively, develop a reasonable incentive system.
3. Expand banana planting scale and develop farmers' cooperative associations.
4. Expand agricultural primary products to products with higher added value. Strengthen banana value chain training.
5. Enhance regional cooperation, foster cross-border banana trade, and expand banana value chains.





Thank you