



# Study on the Problem and Countermeasure of Fruit Production Quality and Safety in Yanshan Mountain

Haisheng Gao, Bin Du, Fengmei Zhu

## ► To cite this version:

Haisheng Gao, Bin Du, Fengmei Zhu. Study on the Problem and Countermeasure of Fruit Production Quality and Safety in Yanshan Mountain. Daoliang Li; Yande Liu; Yingyi Chen. 4th Conference on Computer and Computing Technologies in Agriculture (CCTA), Oct 2010, Nanchang, China. Springer, IFIP Advances in Information and Communication Technology, AICT-347 (Part IV), pp.355-360, 2011, Computer and Computing Technologies in Agriculture IV. .

**HAL Id: hal-01564826**

**<https://hal.inria.fr/hal-01564826>**

Submitted on 19 Jul 2017

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution 4.0 International License

# **Study on the Problem and Countermeasure of Fruit production quality and safety in Yanshan Mountain**

Haisheng Gao, Bin Du, Fengmei Zhu

School of Food Science and Technology, Hebei Normal University of Science and Technology, 066000 Qinhuangdao, P. R. China

**Abstract:** In this paper, the main problem and countermeasure of fruit production quality and safety were studied in Yanshan Mountain. The subjective factor was fruit farmer quality and safety consciousness faint, and the objective factors were: severe orchard environmental pollution, faint fruit post-harvest handling, lag in process technology, fruit quality determination and market inspection system is not yet perfect. The measures of improving fruit quality and safety production in Yanshan Mountain were proposed. On the premise that adjusting and optimizing regional distribution, building and improving quality and safety production management system, controlling post-harvest handling and circulation contamination, implementing organic strategy, establishing Green Silicon Valley.

**Keywords:** Yanshan Mountain; Fruit quality; Fruit safety production; Problem; Countermeasure

## **1 Introduction**

The center of Yanshan mountain is  $39^{\circ} 45' \sim 41^{\circ} N$ ,  $115^{\circ} 40' \sim 119^{\circ} 50' E$ . Yanshan Mountains are a major mountain range north of the North China Plain, in northern Beijing, Tianjin and Hebei Province. The length of Yanshan Mountain is 330 Km from east to west, 120 Km from south to north. Yanshan Mountain has a marked continental monsoon climate. The average annual sunlight is 2600~2800 hours. The mean annual precipitation of this region is 607.5mm. It is suitable to plant fruit trees in the hilly region and the plain. The main fruits are: apple, pear, grape, hawthorn, chestnut, walnut, jujube, peach, apricot, plum, cherry and so on [1].

With the rapid development of science and technology and modern industry and the progress of human civilization, it is becoming increasingly clear of the awareness for the industrial pollutants and drug residue by food chain are harmful to human health and it is increasingly intensive for demand of fruit safety. What is more, the agricultural product quality and safety is the hot issue of government attention, social attention and global focus. The fruit product quality and safety is also the key problems of implementing the agriculture and rural economy structure adjustment and improving international competitiveness of fruits. So, it is significant for improving fruit production quality and promoting fruit industry development by carrying out fruit production quality and safety in Yanshan Mountain and strengthening

environment control. This paper for the first time reports the problem and countermeasure of fruit production quality and safety in Yanshan Mountain.

## **2 The problems of fruit production quality and safety in Yanshan Mountain**

### **2.1 The weak quality and safety awareness of most fruit farmers**

The fruits production makes the family as the basic unit in China nowadays. The decision subject of production management is farmer. They were lack of safety awareness and the legal system because they were restricted by the cultural level and technical condition, and stimulated by the economic interests. In orchard management, they fertilize more chemical fertilizer and less organic fertilizer, more nitrogen fertilizer and less phosphate and potash fertilizer. They rely mainly on chemical pesticides for pest control. And in the eradication of pests but also kill the natural enemies of pests by improper application. They have to use high toxic pesticide residues due to the increasing pest resistance. All of this leads to rapid deterioration of the orchard ecological environment and over standards of fruits pesticide residue.

### **2.2 The growing problems of environmental pollution in orchard**

In recent years, with the development of modern industry, the dramatic increase of industrial wastewater, exhaust and residue emissions leads to deterioration of the orchard ecological environment and poor fruit growth and development and lower fruits production. Accumulation of toxic substances in fruits results in decreased safety and quality, even some fruits can not eat. In addition, the extensive use of agricultural chemicals, fertilizer and herbicide in some production areas causes the dramatic decrease of atmosphere, water and soil quality and the deterioration of ecological environment, and fruits serious pollution.

### **2.3 The faint treatment of fruits commercial post-harvest**

The fresh fruits achieve fast development recently. The fresh fruits post-harvest would dehydrate and shrink, the flesh would brown. The fruits would be rot in preservation and transportation. Relatively, the cultivation before harvest was taken seriously in China fruits production, and the post-harvest treatment was neglected. The treatment of fruits commercial post-harvest and cold chain circulation seriously lag. The facilities condition of preservation and transportation is poor. There are some pollution problems in the treatment of fruits commercial post-harvest and preservation, transportation and sale. For instance, not strict fruits grade, simple and rough package,

improper preservation and transportation management measures and unscientific disease control in preservation. All of this not only aggravate the fruits decay losses in post-harvest circulation, but also affect fruits quality and safety<sup>[2]</sup>.

#### **2.4 The relative backward processing technology**

In addition to juice and wine production, other fruits production is based mainly on middle and small enterprises in China at present. These enterprises have poor processing facilities conditions, low processing capacity, defective fruit as raw material, low scientific and technological content in production, low added value and unstable quality. There are irregular operations and not complete cleaning and sterilization in some fruits production enterprises. These lead to microbiological contamination by yeast, lactic acid bacteria and mould, further lead to over standard of microorganism. At the same time, there are some problems such as irregular additive application, over standard in fruits production. The cleaner in fruit washing and the disinfectant in packaging sterilization also cause chemical hazards.

#### **2.5 Imperfect quality determination and market inspection system**

The building of test organizations lags in China. Most provinces can not detect the pesticide residues. The building of fruit market test organizations is very weak. There are few instruments and inspectors in farmers market and fruits market. In addition, the detection methods were still lagging behind, the detection efforts are not enough, and the detection standard can not conform to international standard.

### **3 The Countermeasures of fruit production quality and safety in Yanshan Mountain**

#### **3.1 Adjusting and optimizing regional distribution**

The regional culture is a basic condition achieving fruits safe production. Planting fruit trees in unsuitable areas is not only affecting species characteristics, but applying complicated fertilization and spraying because of pursuit of high quality. These increase pollution links and make fruits safety worse. The important mark of fruits trees production modernization is adjusting structure, optimizing fruits trees distribution, improving product composition and meeting market demand. The optimizing and adjusting fruits trees structure is adjusting species structure. On the one hand, the specific measures are: with the combination of mountain and plain green, selecting less pollution hilly and sandy beach land, developing adaptable ecology forest and forest net, fruit crop intercropping, controlling the development of large amount of fruits, developing famous dried fruits, adjusting early maturing, maturing, late maturing variety, supplying reasonable market. On the other hand,

regional adjustment is the crucial measure. In accordance with the principles of tree species selected for suitable planting site, gradually realizing regional culture of fruits trees.

### **3.2 Building and improving quality and safety production management system**

The actual situation of current fruits production is thousands of households decentralized management. Building the perfect safety production management system, regulating production activities and technical measures, reducing the infection of harmful substances and achieving safety production are important. The four measures are as follows:

3.2.1 The key technologies are environmental technology system, production technology system and quality standards technology system.

3.2.2 The environmental quality monitoring system includes the non-pollution environmental monitoring system of water, soil, atmosphere and Living creature.

3.2.3 The regulations systems include building produce quality and safety detection and monitor system and produce quality regulations system.

3.2.4 The service system includes organizing or supporting the management system combined with farmers, firms, technology demonstration base and market, turning service for agricultural production into service for agricultural products, integrating the agricultural efficiency with economic benefits.

### **3.3 Controlling post-harvest treatment and circulation contamination**

The fruits post-harvest mechanization commercial treatment accounts for 5% at present, while the fruits post-harvest losses account for 20%. Post-harvest treatment is the bottleneck of restricting fruits into high ranking market<sup>[3]</sup>. Therefore it is very important for us to intensify fruits post-harvest treatment, formation production cooperatives, implement the measures — decentralized production , centralized grading and packaging and centralized sale, enhance the competitiveness of Chinese fruits in international market. The major measures are as follows: the first is pre-cooling. The pre-cooling is essential for fruits post-harvest in place of production. The role of pre-cooling is dispersing heat of fruits, lowering metabolic intensity and maintaining the freshness of fruits. The second is grading. Excluding disease fruits and mechanical injury fruits, then reasonable grading was applied according to fruits shape, color, freshness for transportation, storage and sale. The third is washing and waxing. The steps are washing the dirt, pesticide, oil and germ by fruits detergent, then showering using water and drying in the air. The wax of fruits was destroyed by washing. The fruits would loss water in storage and transportation. So treating the fruit surface by wax, shellac, starch film and sucrose membrane. This treatment could maintain the freshness and nutrition of fruits and beautify fruits. The fourth is storage and preservation. The fruits would be rot by the germ infection, so using the preservative is essential before storage. The natural biological agents and herbal extracts, are selected as antiseptic, preservative and packaging. The fifth is package.

The package is favorable to protect fruit, facilitate transportation and storage and facilitate the purchase. It is important for package to guarantee fruits safety transportation and sale. Especially export fruit, the package quality and tactics are crucial. The carton should be treated using disinfectant. The sixth is proposing food quality traceability system and food market access system to effectively protect the legitimate rights and interests of producers and consumers.

In the circulation, the industrialization management should be paid attention to. Building industrialization mechanism is the important content of developing modern fruit production and also is the essential measure of reducing fruits pollution links, building fruits safety production system. Therefore, the first is to develop value added processing and market building, nurture leading enterprises. The second is to strengthen the connection of leading enterprises, base and farmers. The third is to build the matching management system and operation mechanism, realize scale operation, scientific management and social service, build the new pattern of forest industry development of production, supply and sale, maintain the sustainable development of fruits industry.

### **3.4 Implementing organic strategy**

There are two patterns of global agricultural development: On the one hand, the conventional agriculture is extensive use of fertilizers, pesticide. The pursuit of this pattern is economic objectives. Conventional agriculture is the main form of agriculture nowadays. On the other hand, Organic agriculture is the form that excluding or strictly limiting the use of chemical compounds. The pursuit of organic agriculture is combination of economic and ecological benefits. Organic agriculture is the development direction of modern agriculture<sup>[4,5]</sup>.

The product of organic agriculture is organic food. Organic food is a kind of sustainable food. The goal is environmental protection, safety, health, quality. Organic strategies must be implemented and organic fruit production must be progressively developed. So the safety of fruits is ensured fundamentally.

Implementing the organic strategies is a gradual process. On the basis of improve pollution-free fruit and green fruit, developing organic fruits step by step. The current main tasks are as follows: the first is improving environment and environmental protection; the second is reducing fertilizer application, promoting application of organic fertilizers and microbial Fertilizers; the third is promoting biological control technology, using biological pesticides or non-pollution pesticides, improving the credibility of the fruits in Yanshan Mountain.

### **3.5 Establishing Green Silicon Valley**

The development of fruits safety production should learn experience from “Silicon Valley”, and strengthen scientific and technological research and practical technical reserves. Building green fruits production base, and making it as fruits production test with high technology, the base of senior technical personnel, the place of practical technology, the model base of organic fruits and safety production. Depending on the

example of green Silicon Valley, and promoting the development of national fruits safety production, ensuring the long-term development of fruits production in Yanshan Mountain.

## 4 Conclusions

In a word, Yanshan Mountain has unique advantage of producing high quality fruits. However, there are low level of farmer organization and deep traditional business. Industrialization is the primary measure of activating fruits industry development. In accordance with the requirements—uniform production technology, uniform product standards, uniform monitoring method, uniform management measures and uniform pesticide regimen. Building a group of green fruits production export demonstration garden and promoting the development of national fruits safety production.

Strengthening the construction of fruits pesticide residue monitoring network system and building regular fruits pesticide residue monitoring system are crucial. Putting Emphasis on fruits production base, fruits wholesale market and fruit operation market circulation, equipping with instruments and equipment in processing, enriching the test personnel, improving test level, expanding test project, implementing the market access system. The aim is implementing the measures such as emphasis on investment, building base, controlling heading enterprises, connecting farmers and developing market, and putting Yanshan fruits industry business into the development track of industrialization.

## References

1. Science and Technology Department of Hebei Province: Characteristic industry science and technology development planning in rural areas in Yanshan mountain, Hebei Province. Development planning writing group. 1--3 (2008)
2. Haisheng, G., Xiyan, Z., Runfeng, L.: Review of post-harvest treatment and preservation technologies of fruit and vegetable. *Trans. CSAE.* 2, 273--278 (2007)
3. Haisheng, G., Runfeng, L., Xiufeng, L.: Advance in Past-harvest Commoditization Processing Technologies of Horticultural Products. *Food Sci (in Chinese).* 9, 627--631 (2008)
4. Xiaogui, S., Qingdang, G.: Discussion of Fruit Security in Shandong Province. *Nonwood forest res.* 1, 68--70 (2004)
5. Fengtian, Z., yang, Z.: China Food Security: Problems and Policy Measures. *China Soft Sci.* 3, 16--20 (2003)