

HANOI UNIVERSITY OF SCIENCE AND TECHNOLOGY
SCHOOL OF BIOTECHNOLOGY AND FOOD TECHNOLOGY

FRUITS IN NORTH VIETNAM: CURRENT STATUS AND FUTURE PROSPECTS

Chu-Ky Son

Email: chukyson-ibft@mail.hut.edu.vn
 Website: <http://sbft.hut.edu.vn>

Training Workshop on "Characterisation of fresh and processed fruit quality", July 23-25, 2012

8 FRUIT PRODUCTION ZONES IN VIETNAM

- Central Highland: avocado, persimmon
- Central South: mango, grape, dragon fruit ...
- South East: Durian, rambutan, mangosteen, mango, citrus
- Mekong River Delta: citrus, durian, pineapple, banana, mango, dragon fruit, star apple, mangosteen

Outline

- Overview on fruit production in North Vietnam
- Potentials for fruit production and export
- Factors influencing fruit quality and post-harvesting losses
- Challenges for fruit supply chains in Vietnam
- Strategy to develop some key fruits in North Vietnam until 2020
- An example on litchi production, storage and processing
- Conclusion

Training Workshop on "Characterisation of fresh and processed fruit quality", July 23-25, 2012

Area and production of major fruits in North Vietnam in 2011

Fruit types	Areas (1000 ha)			Production (1000 tons)		
	North	Country	North/Country (%)	North	Country	North/Country (%)
Oranges	29.2	86.7	33.7	174.3	700.0	24.9
Pomelo	11.8	39.7	29.7	119.4	417.6	28.6
Litchi	88.9	88.9	100.0	200.9	200.9	100.0
Longan	44.0	97.9	44.9	176.8	614.0	28.8
Banana	44.8	106.2	42.2	799.9	1670.0	47.9
Pineapple	17.0	38.6	44.0	174.3	533.0	32.7
Mango	12.1	76.7	15.8	52.4	596.0	8.8
Others	66.8	240.8	27.7	-	-	-
Total	314.6	775.5	40.6	-	-	-

Training Workshop on "Characterisation of fresh and processed fruit quality", July 23-25, 2012

8 FRUIT PRODUCTION ZONES IN VIETNAM

- North East: citrus, longan, litchi, pear, custard apple
- North West: citrus, mango, banana, persimmon, plum
- Red River Delta: longan, litchi, banana, citrus, papaya
- Central North: citrus, pineapple, banana, mango

Some large and concentrated zones for fruit production in North Vietnam

Litchi: mainly planted in Bac Giang province: Luc Ngan (80,000 tons), Luc Nam (41,000 tons) and Yen The (16,000 tons)

- *Longan*: smaller sizes of longan plantation in Hung Yen, Ha Tay, Son La
- *Citrus*: biggest area for orange plantation in North Vietnam: Ham Yen (Tuyen Quang), Bac Quang (Ha Giang)

Large and concentrated sizes for the production of special varieties of pamelos (Dien, Doan Hung, Phuc Trach, Thanh Tra) established in Hanoi, Phu Tho, Ha Tinh, Hue, respectively


- *Pineapple*: large and concentrated sizes for pineapple production in Lao Cai, Ninh Binh, Thanh Hoa and Nghe An.
- *Banana*: mainly planted in Phu Tho, Khoai Chau and Quang Tri

Training Workshop on "Characterisation of fresh and processed fruit quality", July 23-25, 2012

School of Biotechnology and Food Technology - Hanoi University of Science and Technology

Potentials for fruit production and export

- Large number of varieties with good to premium quality fruits in both tropical and subtropical fruits (deciduous fruits)
- Increased export volume of Vietnam fruits and its values in a number of markets in the world.
- Government policy and efforts to encourage fruit production, processing and export



Training Workshop on "Characterisation of fresh and processed fruit quality", July 23-25, 2012 7

School of Biotechnology and Food Technology - Hanoi University of Science and Technology

Factors influencing fruit quality and post-harvesting losses

Postharvest

- Maturity
- Transport and storage conditions (temperature, humidity, atmosphere)
- Handling and packaging
- Postharvest processing
- Fresh cut products

Other factors

- Infrastructures
- Weather conditions
- Human resources



Training Workshop on "Characterisation of fresh and processed fruit quality", July 23-25, 2012 10

School of Biotechnology and Food Technology - Hanoi University of Science and Technology

Potentials for fruit production and export

- 11 fruit crops with competitive advantages identified and approved by MARD including: dragon fruit, milk apple, mangosteen, citrus, mango, durian, pineapple, litchi, longan, coconut, papaya.
- Recent establishment of some concentrated fruit growing areas in large scale such as Thanh Ha litchi, Luc Ngan litchi, Hung Yen longan, Ha Tay late longan, Ban Nguyen banana, Thanh Tra pampelo, Ha Giang king orange
- Recent establishment of agricultural cooperatives to organize the production and distribution of products

Training Workshop on "Characterisation of fresh and processed fruit quality", July 23-25, 2012 8

School of Biotechnology and Food Technology - Hanoi University of Science and Technology

Challenges for fruit supply chains in Vietnam

- Cultivation**
Scattered fruit production area and small fruit farm causing difficulty to transfer technologies and to collect fruit products
Low yield, quantity and quality of fruit
50% of orchard farmers did not apply appropriate and/or advanced agricultural practices to the production
- Post harvest issues**
Simple techniques for storage and transportation
Low ratio of fruit being processed
Fruit losses are too high (about 25-30%)
- Market**
Difficulties for farmers to access to national and foreign markets
Limited quality of fresh fruits can meet the requirement of USA and European markets

Training Workshop on "Characterisation of fresh and processed fruit quality", July 23-25, 2012 11


School of Biotechnology and Food Technology - Hanoi University of Science and Technology

Factors influencing fruit quality and post-harvesting losses

Variety

Production factors

- Irrigation
- Nutrition
- Growing system
- Pest and disease management



Grading, Sorting and Packaging for Export of Longan

Training Workshop on "Characterisation of fresh and processed fruit quality", July 23-25, 2012 9

School of Biotechnology and Food Technology - Hanoi University of Science and Technology

Efforts to improve the fruit quality

- VietGAP (Vietnam Good Agricultural Practices) for fresh fruit, vegetable and tea) adopted in 2008
- Implementation of GlobalGAP and VietGAP standards for key fruits: dragon fruit, mango, longan, pumelo, litchi
- Law on food hygiene and safety adopted in 2010
- Overcome plant quarantine barriers with US, Japan, Australia, New Zealand
- Efforts in producing organic fruits started (dragon fruit)
- International co-operation projects with Australia, France, India, Japan, New Zealand, UK, US....

Training Workshop on "Characterisation of fresh and processed fruit quality", July 23-25, 2012 12

School of Biotechnology and Food Technology - Hanoi University of Science and Technology

Strategy to develop some key fruits in North Vietnam until 2020

Determination of priority of fruit varieties

- Key fruit groups: fresh and processed fruit for national consumption and export
 - + Citrus (pamelo, oranges, mandarines)
 - + Longan, litchi
 - + Banana and pineapple
- Auxiliary fruit groups: fresh and processed fruit for national consumption
 - + Mango, papaya
 - + Sub-tropical fruits (plum, peach and pear)

Training Workshop on "Characterisation of fresh and processed fruit quality", July 23-25, 2012 13

School of Biotechnology and Food Technology - Hanoi University of Science and Technology

Strategy to develop some key fruit in North Vietnam until 2020

Storage and processing

Development and improvement for techniques for harvesting, storage and processing of fruit to increase added value and decrease losses

Planning for concentrated plantation zones of key fruits

Training Workshop on "Characterisation of fresh and processed fruit quality", July 23-25, 2012 16

School of Biotechnology and Food Technology - Hanoi University of Science and Technology

Strategy to develop some key fruits in North Vietnam until 2020

Selection and creation of new fruit varieties

Citrus

- + Pamelos: Increased yield, quality, forms for special varieties of pamelos Dien, Phuc Trach, Doan Hung and Thanh Tra.
- + Oranges: selection of non-seed varieties.

Longan

Selection for longan varieties with high yield, good quality and increased duration of harvesting until 3 months: early and late longan ripening.


Litchi

Selection for varieties with early ripening and small seed

Training Workshop on "Characterisation of fresh and processed fruit quality", July 23-25, 2012 14

School of Biotechnology and Food Technology - Hanoi University of Science and Technology

An example on litchi production, storage and processing



Training Workshop on "Characterisation of fresh and processed fruit quality", July 23-25, 2012 17

School of Biotechnology and Food Technology - Hanoi University of Science and Technology

Strategy to develop some key fruits in North Vietnam until 2020

Banana

Selection for Cavendish varieties for fresh fruit export

Pineapple

Selection for varieties for fresh consumption and for export of processed pineapple

Improved plantation techniques

- Application of VietGAP and global GAP for key fruits
- Improved intensive plantation techniques (density, fertilizers, irrigation and chemical treatment...)

Training Workshop on "Characterisation of fresh and processed fruit quality", July 23-25, 2012 15

School of Biotechnology and Food Technology - Hanoi University of Science and Technology

Area and production for litchi

Year	Area (ha)	Production (tons)
1998	16,369	10.000
2000	24,200	29.000
2002	32,474	59.800
2004	34,923	158.800
2006	40,000	170.300
2008	35,000	213.900
2009	35,000	123.000
2011	35,000	200.000
2012	35,000	80,000

(Bac Giang department of Science and Technology)

Training Workshop on "Characterisation of fresh and processed fruit quality", July 23-25, 2012 18

School of Biotechnology and Food Technology - Hanoi University of Science and Technology

Nutrition composition of litchi (per 100 g)

No	Composition	Unit	Values
1	Protein	g	0.83
2	Fat	g	0.44
3	Carbohydrates	g	16.53
4	Total sugar	g	15.23
5	Fibre	g	1.3
6	Moisture	g	81.76
7	Energy	kcal	66
8	Calcium	mg	5
10	Magnesium	mg	10
11	Phosphorus	mg	31
12	Potassium	mg	171
13	Vitamin C	mg	71.5
14	Vitamin B3	mg	0.603

Training Workshop on "Characterisation of fresh and processed fruit quality", July 23-25, 2012 19

School of Biotechnology and Food Technology - Hanoi University of Science and Technology

Litchi storage

```

    graph TD
      LF[Litchi fruit] --> S[Selection]
      S --> W[Washing]
      W --> P[Peeling]
      P --> TC[Treated with CaCl2]
      TC --> F[Freezing]
      F --> PS[Packaging]
      PS --> FS[Freezed store 8-12 months]
      FS --> PR[Products]
      LF --> TR[Refrigeration]
      TR --> CS[Cold storage]
      CS --> SA[Storage about 20 days]
      SA --> T[Treatment]
      T --> LF
  
```

(HUST, 2012)

Training Workshop on "Characterisation of fresh and processed fruit quality", July 23-25, 2012 22

School of Biotechnology and Food Technology - Hanoi University of Science and Technology

Medicinal uses of litchi

- Cancer: flavonoids in the pulp
- Heart diseases: vitamin C and oligonol
- Gastro-intestinal troubles: polyphenol in the seed
- Infection: Herbal tea made by boiling the peel or bark of litchi
- Skin protection
- Pain

(www.fruitsinfo.com)

Training Workshop on "Characterisation of fresh and processed fruit quality", July 23-25, 2012 20

School of Biotechnology and Food Technology - Hanoi University of Science and Technology

Heat pump drying combined with microwave

Working temperature: 20°C
-60°C
Minimal moisture: 9%

(HUST, 2012)

Training Workshop on "Characterisation of fresh and processed fruit quality", July 23-25, 2012 23

School of Biotechnology and Food Technology - Hanoi University of Science and Technology

Litchi postharvest handling

```

    graph TD
      LF[Litchi fruit] --> EF[EXCISE FRUITS]
      EF --> PC[PRE-COOLING]
      PC --> SG[SORTING, GRADING]
      SG --> FD[FUNGICIDE DIPPING]
      FD --> SC[SHIN COLORE RETAINING]
      SC --> SD[SURFACE DRYING]
      SD --> PK[PACKAGING]
      PK --> TR[TRANSPORTATION]
      TR --> ST[STORAGE]
      ST --> MB[MARKETING]
  
```

(FAVRI, 2010)

Training Workshop on "Characterisation of fresh and processed fruit quality", July 23-25, 2012 21

School of Biotechnology and Food Technology - Hanoi University of Science and Technology

Litchi wine and brandy making process

```

    graph TD
      LP[Litchi pulp] --> P[Pressing]
      P --> T[Treatment]
      T --> F[Fermentation]
      F --> A[Aging]
      A --> LW[Litchi wine]
      LW --> M[Mixture]
      M --> D[Distillation]
      D --> LB[Litchi brandy]
      LS[Litchi seed] --> S[Selection]
      S --> E[Extraction]
      E --> LA[Litchi aroma]
      LA --> M
  
```

(HUST, 2005)

Training Workshop on "Characterisation of fresh and processed fruit quality", July 23-25, 2012 24

School of Biotechnology and Food Technology - Hanoi University of Science and Technology

Conclusion

- The current development of fresh and processed fruits in North Vietnam still remains limited
- The variety and the quality of the fruits in Vietnam are of great potential to be explored and developed.
- Effort are undertaken to improve quality, quantity, storage and processing of fruits

Training Workshop on "Characterisation of fresh and processed fruit quality", July 23-25, 2012 25

School of Biotechnology and Food Technology - Hanoi University of Science and Technology

Thank you for your time!

Training Workshop on "Characterisation of fresh and processed fruit quality", July 23-25, 2012 28

School of Biotechnology and Food Technology - Hanoi University of Science and Technology

Future Prospects

- Exchange fruit germplasm to select suitable varieties or to use as breeding materials
- Set up co-operation programs of fruit development between neighbouring countries
- Development of appropriate postharvest technology, especially in term of storage and processing
- Share information in region and international fruit market
- Exchange national and overseas experts and researchers to share experience in fruit R&D

Training Workshop on "Characterisation of fresh and processed fruit quality", July 23-25, 2012 26

School of Biotechnology and Food Technology - Hanoi University of Science and Technology

Contact:

School of Biotechnology and Food Technology
Hanoi University of Science and Technology

Room 202 - building C4
1, Dai Co Viet, Hai Ba Trung, Hanoi, Vietnam
Phone/Fax: +84-4 3868 2470
Email: biofotech@mail.hut.edu.vn
Website: <http://sbft.hut.edu.vn>



Training Workshop on "Characterisation of fresh and processed fruit quality", July 23-25, 2012 27