



Mango Agribusiness Research Program

Mango quality manual road test Country study – Pakistan

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Information
Markets
Biosecurity
Quality




Implementing Agency



Funding Agency



Overview

- 
- ▶ Introduction
 - ▶ Market overview
 - ▶ Methodology
 - ▶ Results
 - ▶ Conclusion
 - ▶ References



Introduction

- ▶ Test the draft quality assessment criteria in order to improve the mango fruit quality in supply chains.
- ▶ Develop capacity in the assessment of exportable quality mangos during the whole supply chains by developing common language, easy and brief quality criteria in Asian countries especially in the project partners (Cambodia, Indonesia, Pakistan, the Philippines and Vietnam).
- ▶ Conduct simulation studies on commercial cultivars (Sammar Bahisht Chaunsa (SB Chaunsa) and Sufaid Chaunsa) for potential export to China.



Market overview

Pakistan perspective

- ▶ Mango industry ranked 2nd after citrus with respect to area (169,483 ha) and production (1,784,089 tonnes).
- ▶ Pakistan exported 64,111.5 tonnes of mango worth USD36 million mainly to Middle East, UAE and UK (excluding Afghanistan / Iran).
- ▶ Overall mango export approximately 100,000 tonnes, annually.
- ▶ Sindhri, Sammar Bahisht Chaunsa (SB Chaunsa) and Sufaid Chaunsa are important exportable mango cultivars.



Sindhri



SB Chaunsa



Sufaid Chaunsa



Methodology

Quality assessment



Consignment number	Stages	Destination
C-1	<ol style="list-style-type: none"> 1. At arrival at VHT plant/before VHT 2. After VHT/Packing before dispatch 	Japan & Qatar
C-2	<ol style="list-style-type: none"> 1. At harvest in the field 2. At arrival at HWT plant/before HWT 3. After HWT/packing before dispatch 	China
C-3	<ol style="list-style-type: none"> 1. At harvest in the field 2. At arrival at HWT plant/before HWT 3. After HWT/packing before dispatch 	England
C-4	<ol style="list-style-type: none"> 1. At harvest in the field 2. At arrival at HWT plant/before HWT 3. After HWT/packing before dispatch 	England
C-5	<ol style="list-style-type: none"> 1. Local packaging at orchard 	Kabir wala (Pakistan)
C-6	<ol style="list-style-type: none"> 1. At wholesale fruit & veg. market 	Multan (Pakistan)
C-7	<ol style="list-style-type: none"> 1. At wholesale fruit & veg. market 	Kabir wala (Pakistan)
C-8	<ol style="list-style-type: none"> 1. At retail level (Roadside stand) 	Multan (Pakistan)
C-9	<ol style="list-style-type: none"> 1. At retail level (Superstore) 	Faisalabad (Pakistan)



Methodology

Simulation studies for export to China

- ▶ Aimed to evaluate the effect of HWT quarantine treatment on mango cultivars (SB Chaunsa, Sufaid Chaunsa).
- ▶ After standard processing and HWT (48°C for 60 min), fruit boxes were placed at $26 \pm 2^\circ\text{C}$ until they reached ripeness.
- ▶ Ethylene sachets were placed inside SB Chaunsa boxes for 48 hours, while Sufaid Chaunsa kept for naturally ripening.
- ▶ After ripening, fruit were subjected to physical (whole & cut fruit) and biochemical analysis.



Results

Draft criteria assessment

Quality assessment of export consignments

		Visual Quality	Skin Detects	Skin Colour	Firmness	Smell	Flesh Defects	Flesh Colour	Flesh Smell	TSS (Brix %)
C-1	Before VHT	4.33	4.33	1	1	3	4.9	3.04	2.09	8.84
	After VHT Packaging	3.85	3.8	3.09	4.8	4	3.9	3.71	4	*17.04
C-2	At harvest	4.80	4.80	1	1	3	4.85	2.6	3.14	8.06
	Before HWT At arrival	4.95	4.90	1	1	3	4.95	2.90	3.95	8.52
	After HWT Packaging	4.90	4.90	1	1	3	4.04	3.80	3.23	9.02
C-3	At harvest	4.42	4.42	1.04	1	2.0	4.95	2.47	4.04	9.69
	Before HWT At arrival	4.42	4.42	1.04	1	2	4.90	2.33	4.09	10.58
	After HWT Packaging	4.38	4.38	2.95	2.47	3	4.6	2.90	3.47	*20.7
C-4	At harvest	4.42	4.47	1	1	2	5	2.38	4.33	8.26
	Before HWT At arrival	4.28	4.28	1	1	2	4.95	2.19	4.04	9.7
	After HWT Packaging	4.28	4.28	3.33	3	3.23	4.85	2.95	4.09	*20.80

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Results

Draft criteria assessment

Quality assessment of domestic consignments

	Visual Quality	Skin Detects	Colour	Firmness	Smell	Flesh Defects	Flesh Colour	Flesh Smell	TSS (Brix %)
C-5	4.28	4.33	1	1	3	5	1.85	3.09	*11.03
C-6	3.38	3.38	4.85	3.85	4.95	4.90	3.61	5	24.34
C-7	3	3.14	4.76	4.19	4.90	4.80	3.61	5	24.44
C-8	3.04	3.04	4.85	4	5	4.85	3.71	5	24.29
C-9	3.94	3.94	4.94	3.77	4	3.61	3.88	4.05	25.2
C-10	3.88	3.52	5	4	4.55	4.55	3.61	3.88	25.53

* Difference between TSS (Brix°) because assessment was done at orchard during packing for local market



Results

Simulation studies

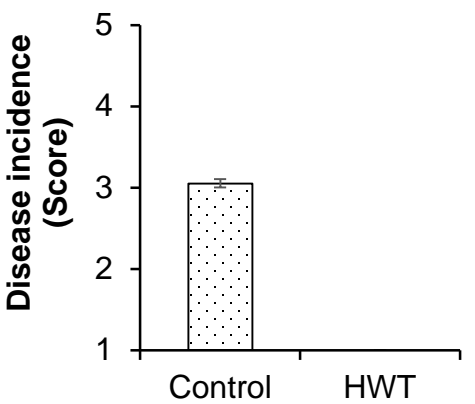
- ▶ Non-significant differences were observed in physical (whole & fresh-cut) and biochemical attributes of treated and non-treated mangoes.
- ▶ Disease incidence were significantly reduced in HWT mangoes cv. Sufaid Chaunsa followed by SB Chaunsa.
- ▶ Skin shriveling was observed in SB Chaunsa.



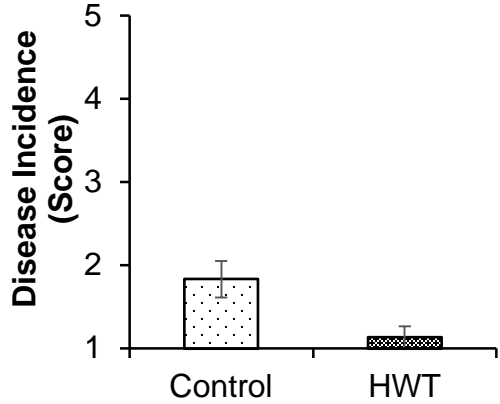
HWT



Non-HWT



Sufaid Chaunsa



SB Chaunsa

Conclusion

- ▶ Mango maturity assessment should be compulsory in field.
- ▶ Fruit quality should be assessed using standard criteria (draft used) throughout supply chain.
- ▶ The draft criteria should be further simplified.
- ▶ Sample size should be decreased to reduce assessment time
- ▶ Pulp temperature record should be included (where appropriate etc.).
- ▶ Quarantine treatment if appropriately used can help also to reduce disease incidence (response varied with cultivar).
- ▶ Disease assessment is an important criteria, especially at the import end/terminal part of mango supply chain to assist in proper feedback about fruit losses/rejection.

References

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- ▶ MNFS&R 2016-2017, Government of Pakistan, Ministry of Food and Agriculture (Economic Wing) Islamabad, www.minfa.gov.pk