

SMP1968

Reefer transport of Mexican mangoes to European Union

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Reefer shipments

- Aim: develop protocols for shipment of mango to European Union in refrigerated containers over sea
- Collaboration between:
 - EMEX (Mexican mango exporters)
 - 80 traders; hundreds of farmers
 - ITESO, Universidad Jesuita de Guadalajara, Mexico (Research)
 - Wageningen University, Netherlands (Research)
 - Postharvest Quality team
 - Fruit importers/ripeners in Europe

Fruit importers

- Participating fruit importers/ripeners
 - Bakker Barendrecht (NL)
 - HillFresh (NL)
 - Total Produce (NL)
 - Special Fruit (Belgium)
 - Port International (Germany)

Previous contacts EMEX - Wageningen

- In 2017/2018 EMEX organized 4 shipments with Kent, Keitt and Ataulfo mangoes to Rotterdam
- Receiving parties: Special Fruit, Port International
- Quality of fruit was judged in Wageningen
- Shipments were **not very successful**, main reasons:
 - To much anthracnose, fruit not suitable for ripening
 - MRLs over the limits, fruit destroyed






























Planned activities SMP

- Site visit, inventory of harvesting/handling/packing activities in different packing houses
- Development of new protocol for sea shipment
- Pilot shipments arranged by EMEX/ITESO and Wageningen
- Ripening of fruit and quality evaluation by Wageningen and participating companies
- Further trading the fruit within Europe
- Visit Mexico for knowledge sharing and participation International mango symposium in Puerto Vallarte organized by EMEX to present results
- Establish trust and business relations between EMEX and Dutch fruit traders



Varieties over the season

	FEB	MAR	ABR	MAY	JUN	JUL	AGO	SEP
Ataulfo								
Haden								
Tommy								
Kent								
Kelt								

Mexican Mango exports



Mango export

- Currently most mango export is to USA and Canada
- Transport mostly by refrigerated truck
- Transport time: few days to 1 week
- Market is not very critical with respect to fruit quality
- Ambition of EMEX is to increasingly ship to Europe in reefer container, **that means:**
 - Boat trip takes about 21-25 days
 - At arrival fruit should be suitable for ripening and to be sold as "Ready to Eat" in supermarkets
 - Fruit should be spotless and tasty

Benchmark



Inventory 5 packhouses: current practice

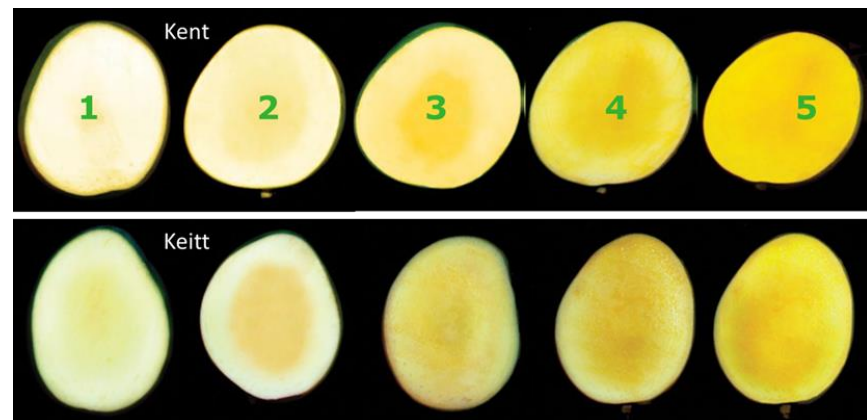
- Harvest flesh color 2.5-3; °Brix about 8-10
- Transport to packhouse
- Washing with chlorine (latex bleeding)
- Phytosanitary check (fruit fly larvae)
- Hot water treatments (20+ min at 46-47 C)
- Optional: treatment with wax and/or fungicide
- Sorting for size (weight)
- Packaging
- (Pre-cooling 10 °C) and Storage 10 °C (within?? 48 h)
- Transport in refrigerated truck to USA/Canada

Bottle necks for quality

- Application of “current practice” to sea shipment to Europe is not successful, **reasons**:
 - Fruit too mature at harvest
 - Poor anthracnose control
 - Latex bleeding insufficient
 - Hot water treatment shortens storage life
 - Postharvest fungicides give rise to unacceptable residue levels
- New protocol has been developed to better suit sea transport
- **2 pilot shipments** been done with new protocol

Improved protocol in pilot shipments (innovative solution)

- Improved anthracnose control in orchards
- Harvest at **max color 2; max °Brix 7**
- Improved washing to remove latex
- Short hot water treatments to suppress anthracnose
 - 50-52 °C during 4-5 min
- Fruit at target temperature within 12-24h after harvest
- Ethylene removal technology in reefer container



Experimental boxes

SAMPLES FOR WAGENINGEN UNIVERSITY & RESEARCH

DO NOT TOUCH

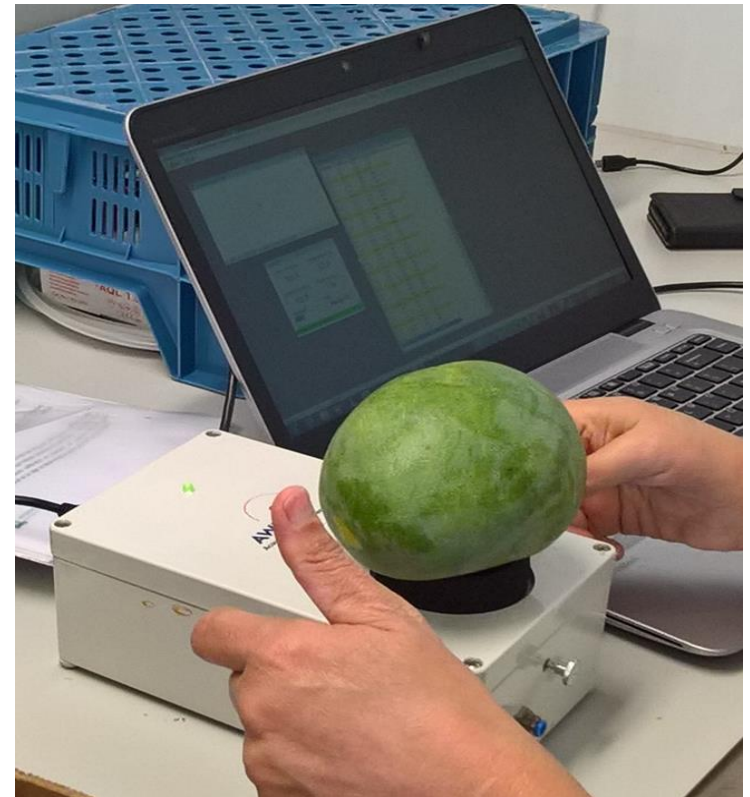
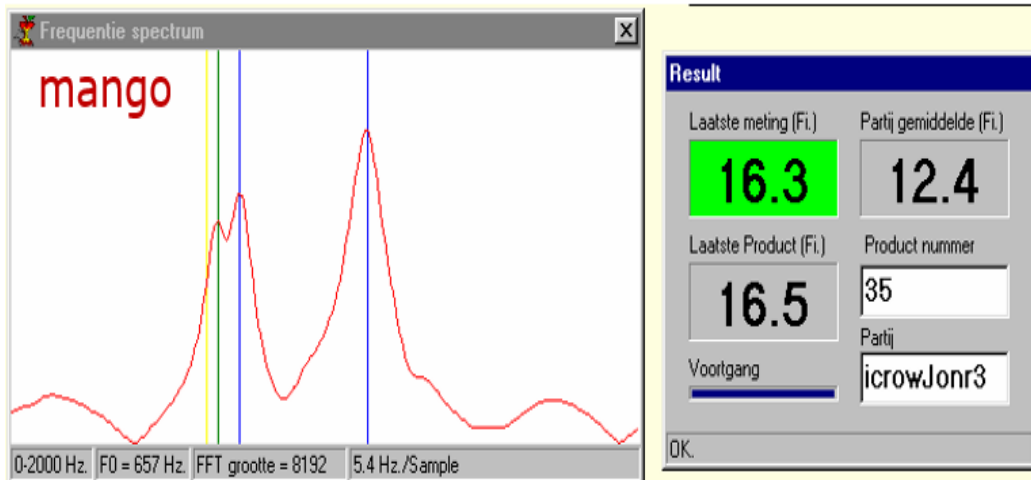
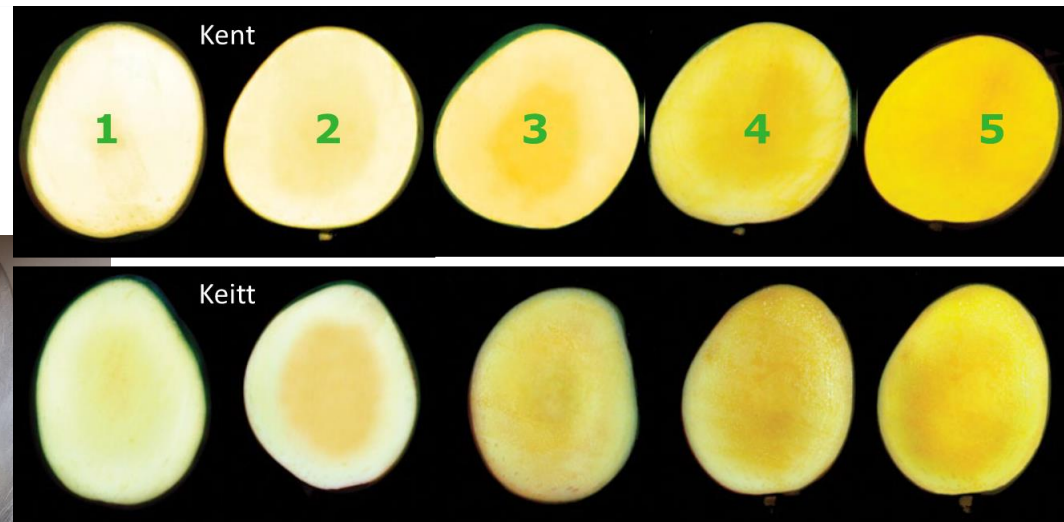
BORNSE WEILANDEN 9 6708 WG WAGENINGEN TEL: 0317-48-03-67

Test Number: *Control*

Date	D <i>25</i> M <i>05</i> Y <i>2018</i>											
Orchard												
Variety	KEMT			KEITT		HADEN			ATAULFO		TOMMY	
Maturity level	1			2		3			4			
Size	5	6	7	8	9	10	11	12				
Temperature at packing house	Temperature <i>32</i> °C				Time: Hours Minutes							
	Temperature <i>50</i> °C				Time: Hours <i>5</i> Minutes							
Hydrothermal treatment	YES				NO							
Organic treatment												
Fruit weight per box	Kilograms											
Box number	OF											



Quality measurements

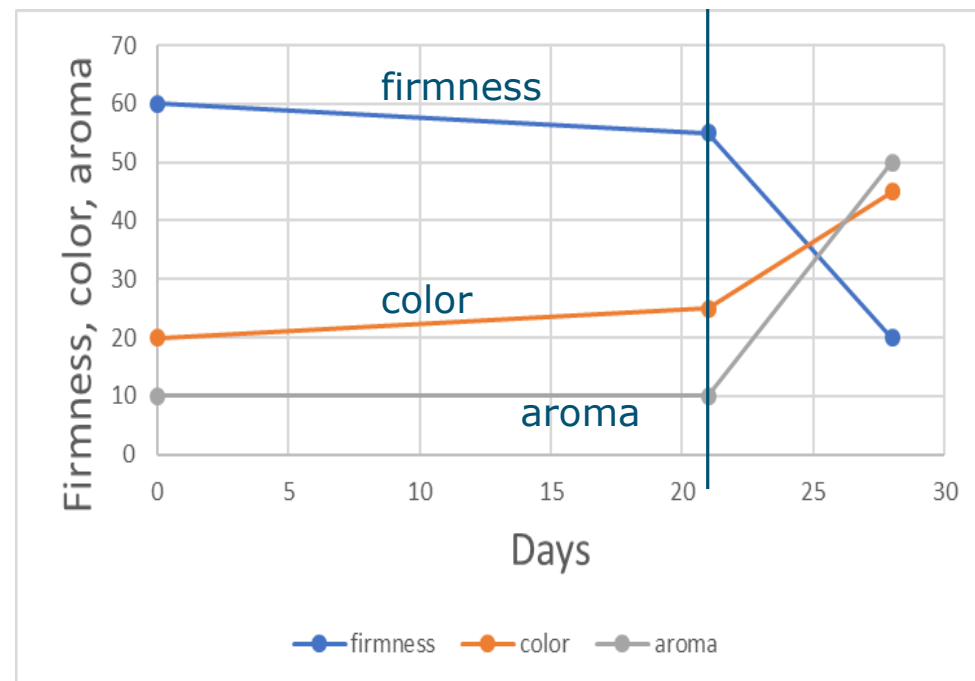
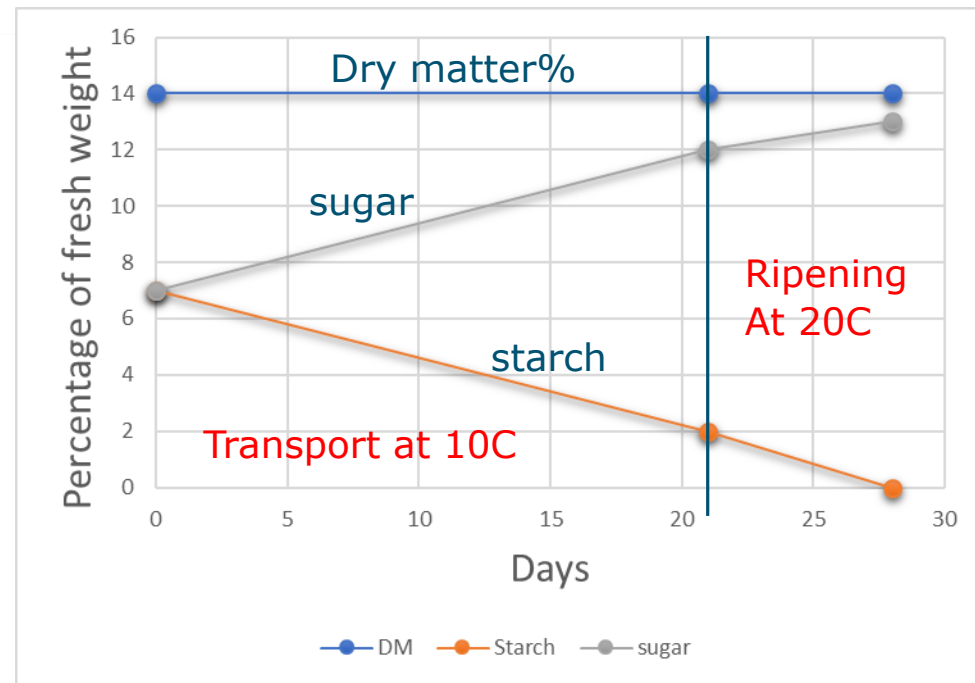


Improved protocol

- The new protocol was applied to Keitt and Kent mangoes
- In general fruit were acceptable
 - Arrived firm/unripe
 - Developed good quality after ripening (coloration, softening, flavour)
 - Low (< 5% of fruit) anthracnose incidence
 - MRLs were within limits stated by main supermarkets in Europe

Physiology: What happens during transport and ripening?

- Sugar (sweetness) increases (starch goes down)
- Firmness goes down
- Internal color changes to orange
- Typical mango aroma volatiles are produced



Quality assessments commercial traders

- **Bakker Barendrecht**: promising results > Interested to discuss business with EMEX
- **Hillfresh**: Not perfect, but acceptable
- **Special Fruit**: Continue doing business with EMEX
- **Total Produce**: Fruit quality was good, lets discuss opportunities with EMEX
- Other comments:
 - Social compliances required for future deliveries: SMETA, BSCI (Global Gap plus is not sufficient)
 - BRC certification for packhouse is required
 - MRLs in compliance with European law (supermarkets may have more strict rules!!)
 - Currently there is mainly interest in Kent and Keitt

Challenges

- We have shown that it is feasible to deliver good quality fruit by sea shipments but some challenges remain:
 - Demand in Europe is relatively low at the time Mexico has highest production
 - Lots of competition, quality should be excellent
 - Make sure all required food safety and social compliances are in place
 - **New EU Phyto requirements** concerning treatment against non-European fruit fly

Opportunities

- We also tested varieties Tommy Atkins and Ataulfo but outcome was not always good.
- Ataulfo is available at the time there is high mango demand. **Explore Ataulfo market opportunities**
- Explore sea transport Ataulfo. Need to develop good protocols
- Explore the use of “ Express route”: shorter transport time (10-14 days) will improve quality at arrival

Deliverables & follow up

2.2 Outputs & deliverables

- New protocol for harvesting, handling, packing and (pre)cooling mangos for sea shipments
 - sustainable (non-pesticide) technology for anthracnose inactivation
 - Proof of principle from test shipments
 - New business relations between EMEX and Dutch importers
 - Report and presentation for Topsector representatives (dec 2019)
- The expectation is that EMEX will develop business with Dutch importers for regular shipments in 2020
 - Exploring Express –route
 - Bi-lateral contracts with Wageningen to solve remaining issues (fruit fly, anthracnose)

Thanks for your
attention

