



FACULTY OF AGRICULTURAL SCIENCES

AARHUS UNIVERSITY

ISAFRUIT



PROJECT

ISAFRUIT



PROJECT

ISAFRUIT.

Fruit quality, health and environment

**Presented by
Ole Callesen, Coordinator
Department of Horticulture,
Aarhus University, Denmark**



**FOOD FOR THE 21ST CENTURY:
THE IMPACT OF EU RESEARCH UPON
EUROPEAN FOOD QUALITY AND SAFETY**

Brussels, 8 July 2010



**FOOD QUALITY
AND SAFETY**



**SEVENTH FRAMEWORK
PROGRAMME**



FACULTY OF AGRICULTURAL SCIENCES

AARHUS UNIVERSITY

ISAFRUIT is a research project with 40 University and 20 private partners.

ISAFRUIT has more than 200 scientists working on the project.

ISAFRUIT is funded out of FP6 and gets 13.8 mio. € from DG Research.

The project started 1. January 2006 and ends 30. September 2010.



FOOD FOR THE 21ST CENTURY:
THE IMPACT OF EU RESEARCH UPON
EUROPEAN FOOD QUALITY AND SAFETY

Brussels, 8 July 2010



FOOD QUALITY
AND SAFETY



SEVENTH FRAMEWORK
PROGRAMME

ISAFRUIT



PROJECT



FACULTY OF AGRICULTURAL SCIENCES
AARHUS UNIVERSITY

ISAFRUIT



PROJECT

ISAFRUIT overall goal and motto:

**A better and healthier life through
increased fruit consumption**



FOOD FOR THE 21ST CENTURY:
THE IMPACT OF EU RESEARCH UPON
EUROPEAN FOOD QUALITY AND SAFETY

Brussels, 8 July 2010



FOOD QUALITY
AND SAFETY



SEVENTH FRAMEWORK
PROGRAMME



FACULTY OF AGRICULTURAL SCIENCES

AARHUS UNIVERSITY

ISAFRUIT



PROJECT

Objectives for ISAFRUIT

- Increase the quality for fruit and fruit products.
- Increase fruit safety
- Convenience of fruit and fruit products
- Improve the availability of quality fruit
- Raise consciousness of consumers



FOOD FOR THE 21ST CENTURY:
THE IMPACT OF EU RESEARCH UPON
EUROPEAN FOOD QUALITY AND SAFETY

Brussels, 8 July 2010





FACULTY OF AGRICULTURAL SCIENCES

AARHUS UNIVERSITY

ISA FRUIT



PROJECT

Increase the quality of fruit and fruit products

Meeting the consumer preferences for fruit quality by finding out what the consumer preferences are and contribute with knowledge on selected quality attributes. Optimal taste, new cultivars as a long term goal.

Increase fruit safety.

By developing new production systems and technologies aiming at decreased levels of residues. Alternatives to pesticides, better spraying technology. Safe convenience fruit products.



FOOD FOR THE 21ST CENTURY:
THE IMPACT OF EU RESEARCH UPON
EUROPEAN FOOD QUALITY AND SAFETY

Brussels, 8 July 2010



FOOD QUALITY
AND SAFETY



SEVENTH FRAMEWORK
PROGRAMME



FACULTY OF AGRICULTURAL SCIENCES

AARHUS UNIVERSITY

ISA FRUIT



PROJECT

Increase the convenience

Contribute to fruit products with improved quality and stability of minimally processed fruits and by developing novel convenient processed products with snacks characteristics. Optimal fruit quality.

Improving availability of quality fruit

By research on post harvest handling and better cultivars. Available fresh fruit all year round, fruit based products is part of the diet.



FOOD FOR THE 21ST CENTURY:
THE IMPACT OF EU RESEARCH UPON
EUROPEAN FOOD QUALITY AND SAFETY

Brussels, 8 July 2010



FOOD QUALITY
AND SAFETY



SEVENTH FRAMEWORK
PROGRAMME



FACULTY OF AGRICULTURAL SCIENCES

AARHUS UNIVERSITY

ISAFRUIT



PROJECT

Raise consciousness of consumers

By generating and disseminating knowledge on short- and long-term beneficial effects of regular fruit consumption on human health. Research on health effects of fruit. Informing consumers.



FOOD FOR THE 21ST CENTURY:
THE IMPACT OF EU RESEARCH UPON
EUROPEAN FOOD QUALITY AND SAFETY

Brussels, 8 July 2010



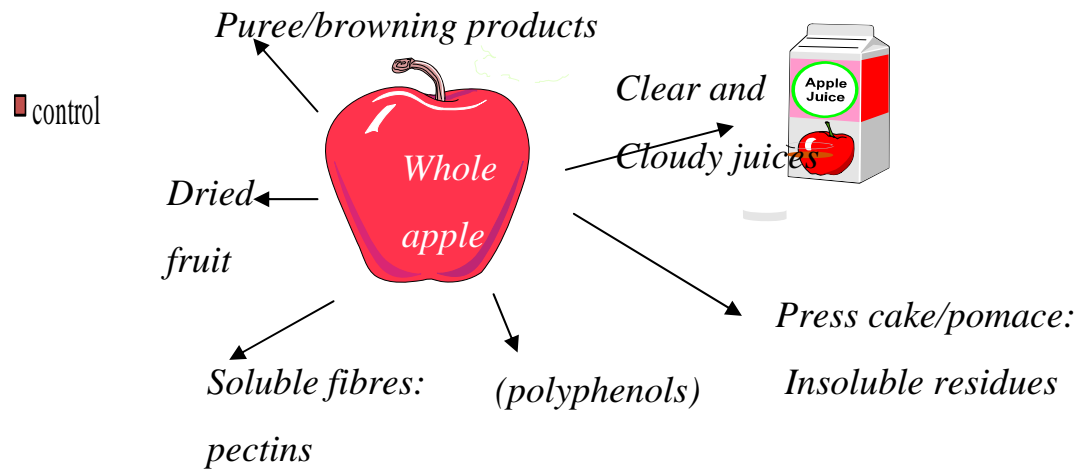
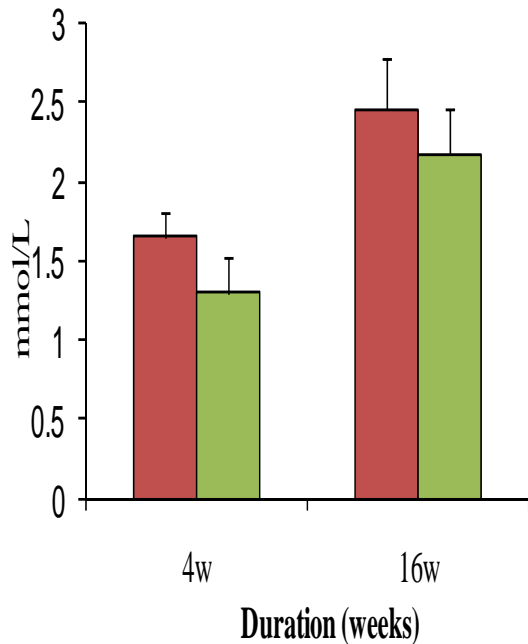
FOOD QUALITY
AND SAFETY



SEVENTH FRAMEWORK
PROGRAMME



Apples lower total cholesterol in rats



So what is it in apples that has the effect?



FOOD FOR THE 21ST CENTURY:
THE IMPACT OF EU RESEARCH UPON
EUROPEAN FOOD QUALITY AND SAFETY

Brussels, 8 July 2010





FACULTY OF AGRICULTURAL SCIENCES

AARHUS UNIVERSITY

ISAFRUIT

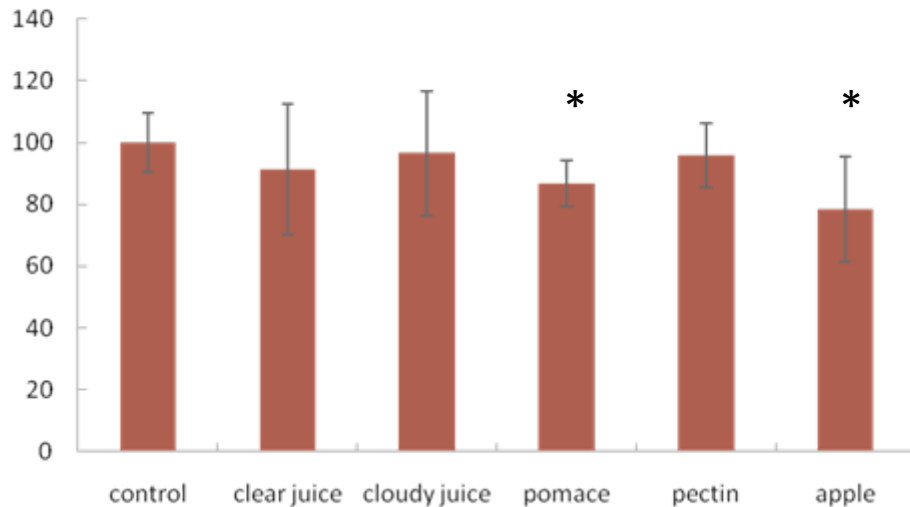


PROJECT

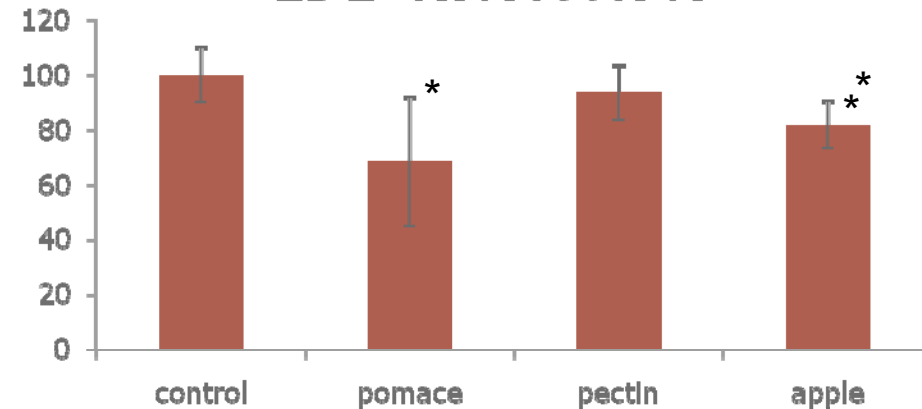
Effects of apple and apple products on specific lipoprotein cholesterol levels in the rats

% change

Total Cholesterol



LDL-Cholesterol



FOOD FOR THE 21ST CENTURY:
THE IMPACT OF EU RESEARCH UPON
EUROPEAN FOOD QUALITY AND SAFETY

Brussels, 8 July 2010





FACULTY OF AGRICULTURAL SCIENCES

AARHUS UNIVERSITY

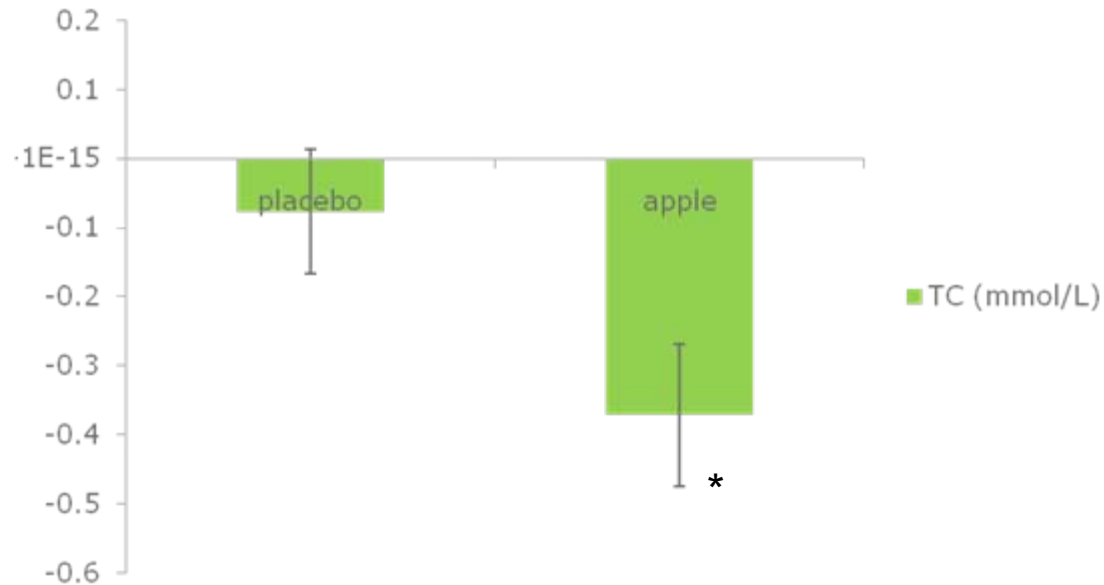
ISAFRUIT



PROJECT

And yes, apples also lower cholesterol in humans

Total Cholesterol change



FOOD FOR THE 21ST CENTURY:
THE IMPACT OF EU RESEARCH UPON
EUROPEAN FOOD QUALITY AND SAFETY

Brussels, 8 July 2010





FACULTY OF AGRICULTURAL SCIENCES

AARHUS UNIVERSITY

ISA FRUIT



PROJECT

Allergenicity and apples.

It is proven that gene silencing can remove Mal d1 protein in GMO apple trees.

New results on the complexity of the genetics of apple allergy.

Test of 60 apple cultivars showed differences in allergenicity.

Low allergenic cultivars found were:

Ecolette, Elise, Granny Smith, McIntosh, Modi, Pink Lady and Santana



FOOD FOR THE 21ST CENTURY:
THE IMPACT OF EU RESEARCH UPON
EUROPEAN FOOD QUALITY AND SAFETY

Brussels, 8 July 2010



FOOD QUALITY
AND SAFETY

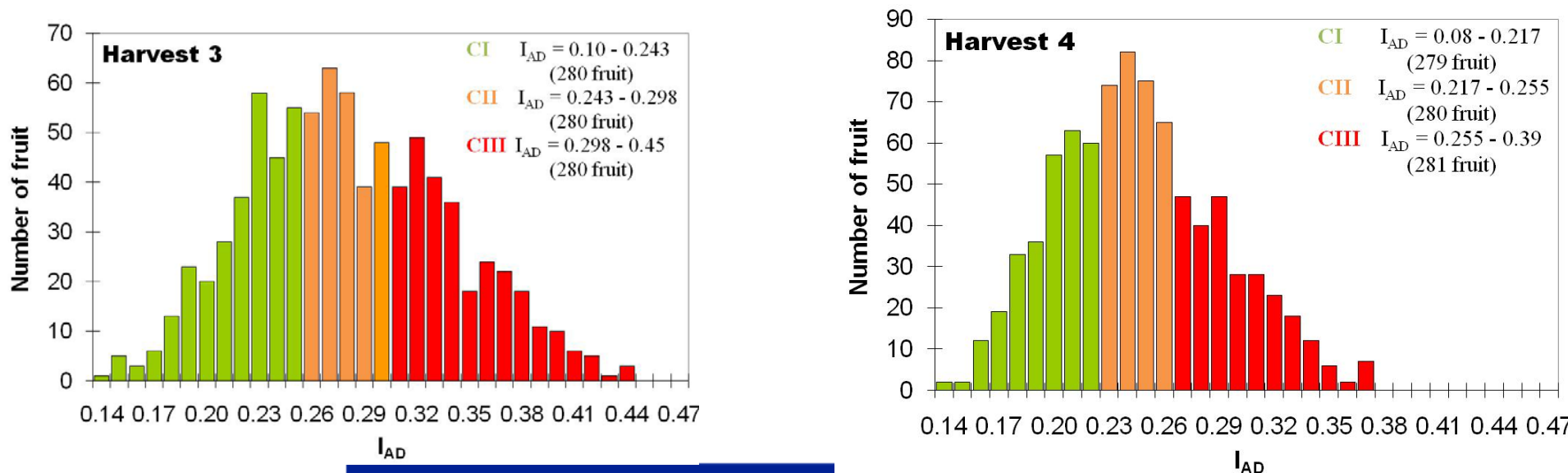


SEVENTH FRAMEWORK
PROGRAMME



Ripeness of fruit - peaches

Figure 1. I_{AD} distribution for 'Rich Lady' peaches at harvest in 2008 (data IRTA).





FACULTY OF AGRICULTURAL SCIENCES

AARHUS UNIVERSITY

ISAFRUIT



PROJECT

Fruits of cv. Big Top grouped on the basis of I_{DA} in 3 classes of maturation. (G. Costa, Bologna)



Class 1

Class 2

Class 3



FOOD FOR THE 21ST CENTURY:
THE IMPACT OF EU RESEARCH UPON
EUROPEAN FOOD QUALITY AND SAFETY

Brussels, 8 July 2010



FOOD QUALITY
AND SAFETY

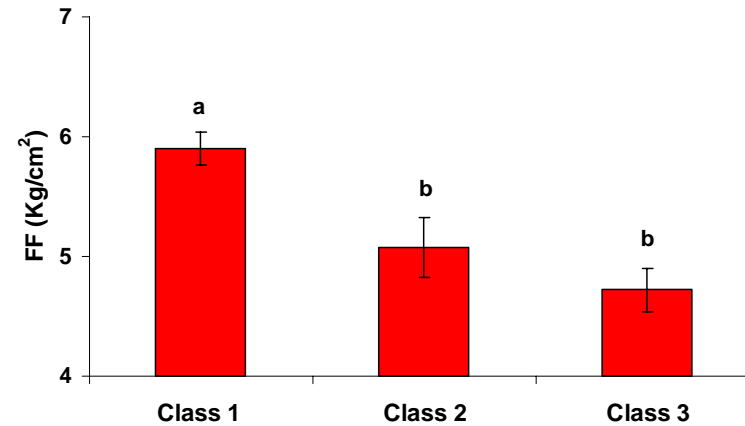


SEVENTH FRAMEWORK
PROGRAMME



FACULTY OF AGRICULTURAL SCIENCES
AARHUS UNIVERSITY

Fruit firmness in classes and consumer preference



ISAFRUIT



PROJECT

Consumer rating

	Class 1 I_{DA}	Class 2 I_{DA}	Class 3 I_{DA}
Colour	3.8 a	3.7 a	4.1 a
Firmness	3.1 a	3.3 a	3.7 b
Sweetness	2.7 a	3.0 a	3.5 b
Taste	2.9 a	3.2 a	3.6 b
Overall	2.8 a	3.1 a	3.6 b



FOOD FOR THE 21ST CENTURY:
THE IMPACT OF EU RESEARCH UPON
EUROPEAN FOOD QUALITY AND SAFETY

Brussels, 8 July 2010





FACULTY OF AGRICULTURAL SCIENCES

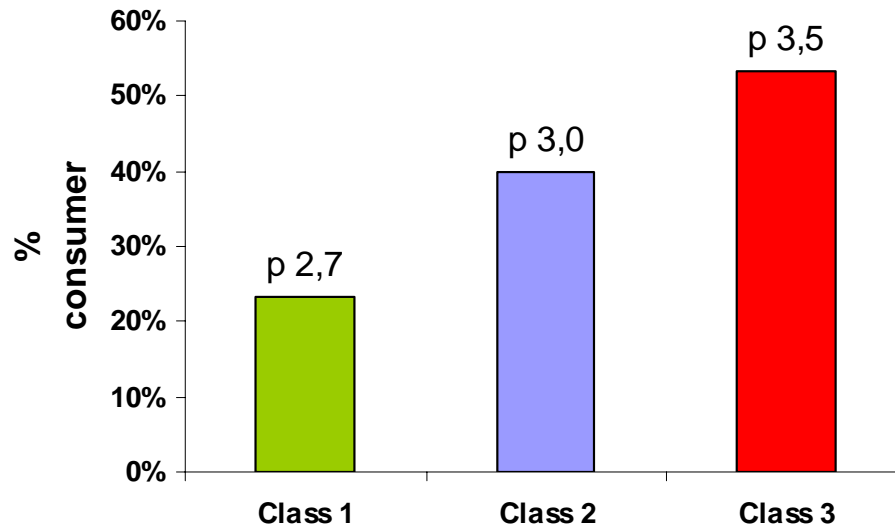
AARHUS UNIVERSITY

ISAFRUIT



PROJECT

Mean score (scale 1 to 5) and percentage of consumers expressing a positive evaluation (score 4 and 5) to the question: Are you willing to consume this product again?



FOOD FOR THE 21ST CENTURY:
THE IMPACT OF EU RESEARCH UPON
EUROPEAN FOOD QUALITY AND SAFETY

Brussels, 8 July 2010





FACULTY OF AGRICULTURAL SCIENCES

AARHUS UNIVERSITY

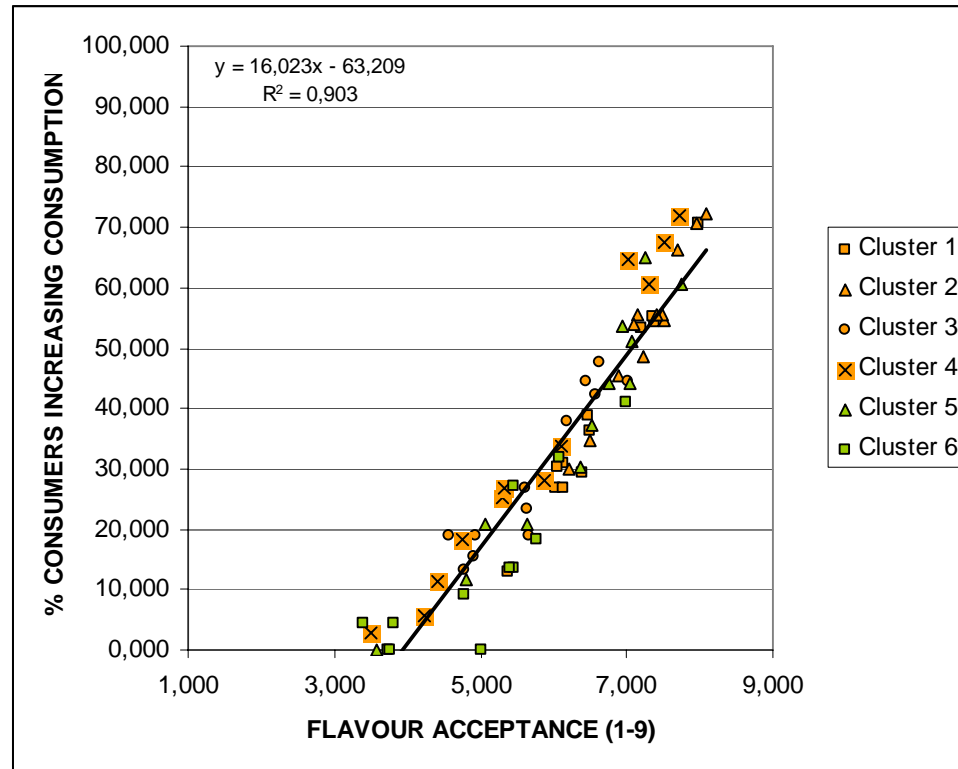
ISAFRUIT



PROJECT

Relationship between % of Consumers increasing consumption with Flavour Acceptance Score (0-10).

Each point corresponds to a variety in a consumer cluster.



FOOD FOR THE 21ST CENTURY:
THE IMPACT OF EU RESEARCH UPON
EUROPEAN FOOD QUALITY AND SAFETY

Brussels, 8 July 2010





FACULTY OF AGRICULTURAL SCIENCES

AARHUS UNIVERSITY

GENETIC BASIS OF FRUIT QUALITY

ISAFRUIT



PROJECT

PEACH and APRICOT (2 populations each analyzed for 2 years)

43 CHARACTERS

- 9 **Agronomic** (maturation, flesh and skin color, acidity, sol. Solid contents, etc.)
- 14 **chemical composition** (organic acids, sugars, aminoacids)
- 20 major **polyphenolic** compounds

59 consistent **major QTLs mapped** (explaining >20% of the variability of the character) affecting 35 of the characters studied

132 Candidate genes for fruit quality mapped in the *Prunus* genome : many (>20) co-localizations with QTLs



FOOD FOR THE 21ST CENTURY:
THE IMPACT OF EU RESEARCH UPON
EUROPEAN FOOD QUALITY AND SAFETY

Brussels, 8 July 2010



FOOD QUALITY
AND SAFETY



SEVENTH FRAMEWORK
PROGRAMME



FACULTY OF AGRICULTURAL SCIENCES

AARHUS UNIVERSITY

ISA FRUIT



PROJECT

New products



- properties,
- purification
- source,
- usage

***Sous vide* processed ready-dessert (Bramley apple puree) with custard and added apple pomace**



Fibres - pomace



FOOD FOR THE 21ST CENTURY:
THE IMPACT OF EU RESEARCH UPON
EUROPEAN FOOD QUALITY AND SAFETY

Brussels, 8 July 2010





FACULTY OF AGRICULTURAL SCIENCES
AARHUS UNIVERSITY

New products

Apple slices+prebiotic (Beneo – dietary fibre & sweetner);
Apple slices+probiotic (*Lactobacillus rhamnosus*);
Apple slices+Aquamin (algal calcium);
Apple slices+chocolate or alginates coatings;
Apple slices+honey;

ISA FRUIT



PROJECT



FOOD FOR THE 21ST CENTURY:
THE IMPACT OF EU RESEARCH UPON
EUROPEAN FOOD QUALITY AND SAFETY

Brussels, 8 July 2010



FOOD QUALITY
AND SAFETY



SEVENTH FRAMEWORK
PROGRAMME



FACULTY OF AGRICULTURAL SCIENCES

AARHUS UNIVERSITY

ISA FRUIT



PROJECT



new products

crunchy fruit bar

Product made of freeze-dried fruit
Microbiologically stable
Excellent sensory properties
Highly appreciated by consumers
Technology confidential



FOOD FOR THE 21ST CENTURY:
THE IMPACT OF EU RESEARCH UPON
EUROPEAN FOOD QUALITY AND SAFETY

Brussels, 8 July 2010



FOOD QUALITY
AND SAFETY



SEVENTH FRAMEWORK
PROGRAMME



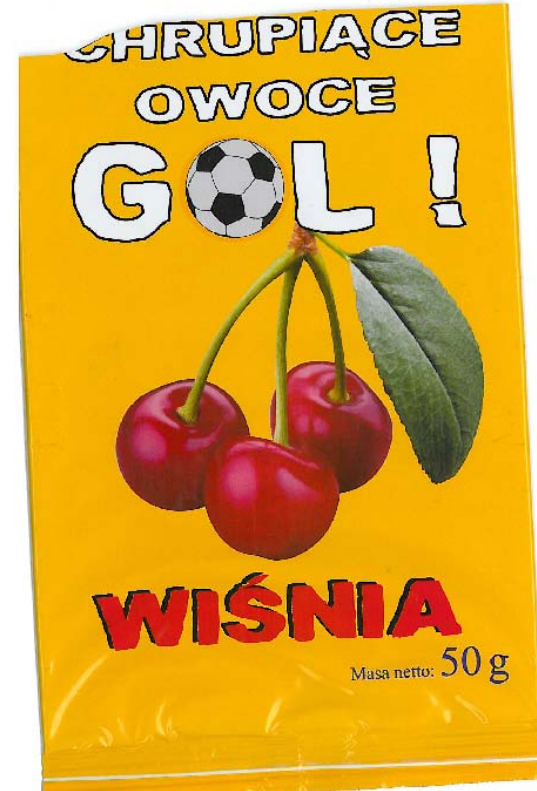
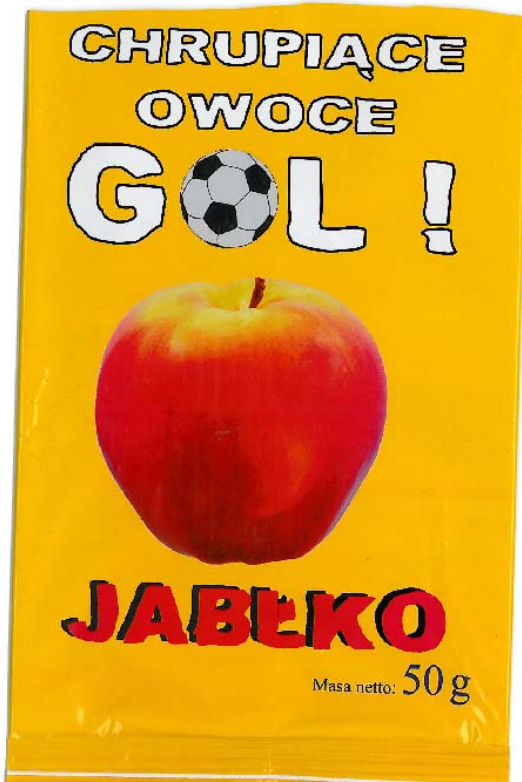
FACULTY OF AGRICULTURAL SCIENCES

AARHUS UNIVERSITY

ISA FRUIT



PROJECT



FOOD FOR THE 21ST CENTURY:
THE IMPACT OF EU RESEARCH UPON
EUROPEAN FOOD QUALITY AND SAFETY

Brussels, 8 July 2010





FACULTY OF AGRICULTURAL SCIENCES
AARHUS UNIVERSITY

Fruit based ingredients

- A process to prepare concentrated extracts of anthocyanins from black currant pomace was developed from the laboratory to the industrial scale
- The extracts had high antioxidant properties and could impart a pink to purple colour
- Soluble dietary fibres could also be prepared
- Some extracts need to be formulated carefully as they contain high contents of tannins



ISAFRUIT



PROJECT



FOOD FOR THE 21ST CENTURY:
THE IMPACT OF EU RESEARCH UPON
EUROPEAN FOOD QUALITY AND SAFETY

Brussels, 8 July 2010





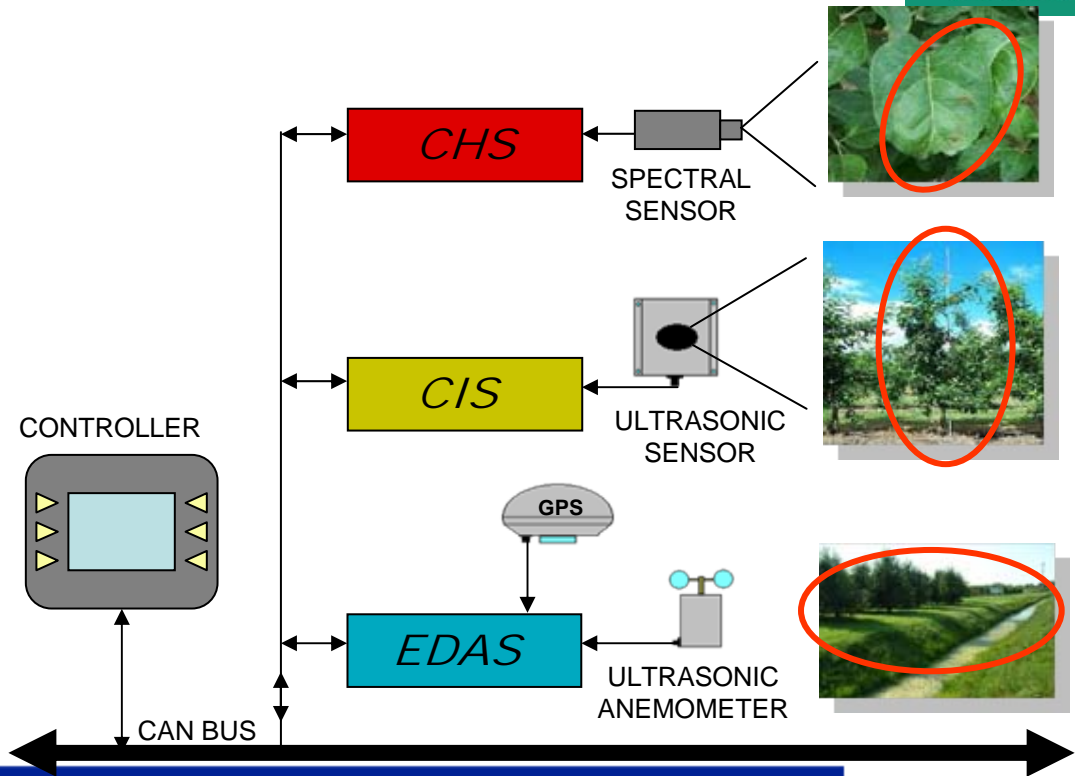
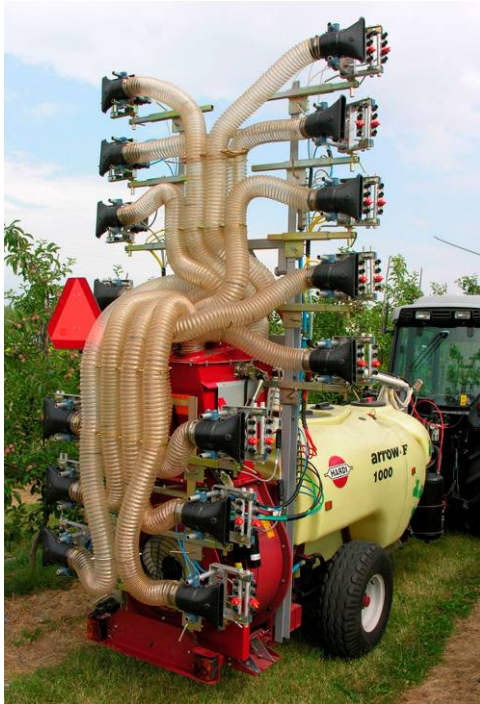
FACULTY OF AGRICULTURAL SCIENCES
AARHUS UNIVERSITY

The system will be able to control a precision sprayer in real time and perform precise and safe crop adapted spray application

ISAFRUIT



PROJECT



FOOD FOR THE 21ST CENTURY:
THE IMPACT OF EU RESEARCH UPON
EUROPEAN FOOD QUALITY AND SAFETY

Brussels, 8 July 2010





FACULTY OF AGRICULTURAL SCIENCES

AARHUS UNIVERSITY

ISA FRUIT



PROJECT

Alternatives to pesticides suggested

1) Hot Water Treatment

- Removes and/or kills fruit rot agents (Brown rot in peaches; *Nectria* and *Gloeosporium* rot in apples)
- Removes and/or kills human pathogens on various fruit and veg (e.g *Escherichia coli*, *Salmonella* sp. *Listeria* sp.)
- Energy saving by heating water with hot gas from cooling plants (work in progress)



FOOD FOR THE 21ST CENTURY:
THE IMPACT OF EU RESEARCH UPON
EUROPEAN FOOD QUALITY AND SAFETY

Brussels, 8 July 2010





FACULTY OF AGRICULTURAL SCIENCES

AARHUS UNIVERSITY

ISA FRUIT



PROJECT

Brown rot in peaches

It looks like a problem



FOOD FOR THE 21ST CENTURY:
THE IMPACT OF EU RESEARCH UPON
EUROPEAN FOOD QUALITY AND SAFETY

Brussels, 8 July 2010





FACULTY OF AGRICULTURAL SCIENCES
AARHUS UNIVERSITY

Treating conditions for **peaches**

- dipping in water at 60°C for 20''

Side effects

- no significant influence on ripening and quality
- no significant effect on storability and shelf life

Efficacy

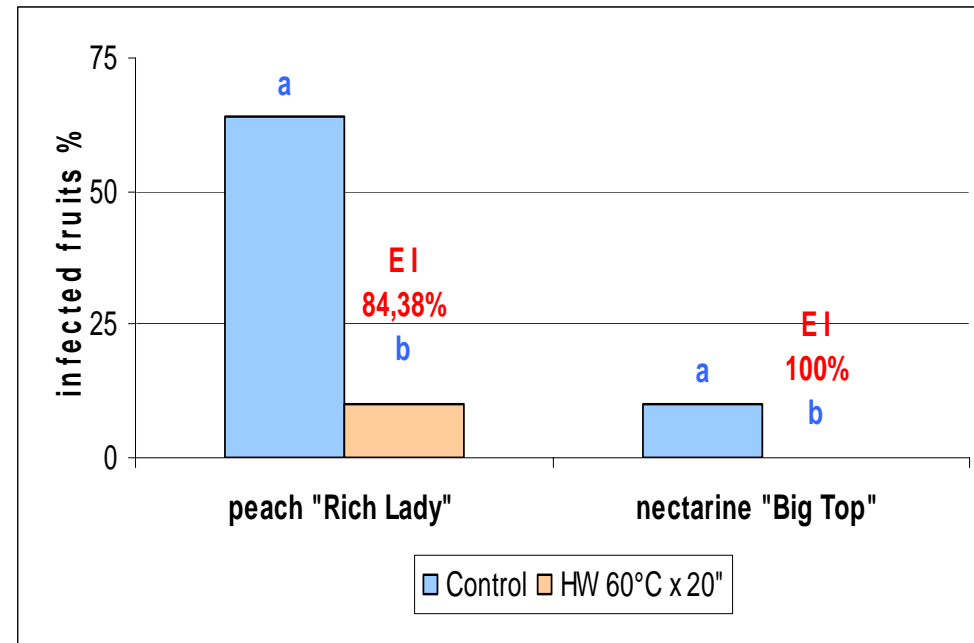
> 80 % reduction
of Brown rot (main peach rot)

ISA FRUIT



PROJECT

Hot water treatment



FOOD FOR THE 21ST CENTURY:
THE IMPACT OF EU RESEARCH UPON
EUROPEAN FOOD QUALITY AND SAFETY

Brussels, 8 July 2010





FACULTY OF AGRICULTURAL SCIENCES

AARHUS UNIVERSITY

ISAFRUIT



PROJECT

WWW.ISAFRUIT.EU



FOOD FOR THE 21ST CENTURY:
THE IMPACT OF EU RESEARCH UPON
EUROPEAN FOOD QUALITY AND SAFETY

Brussels, 8 July 2010



FOOD QUALITY
AND SAFETY



SEVENTH FRAMEWORK
PROGRAMME