



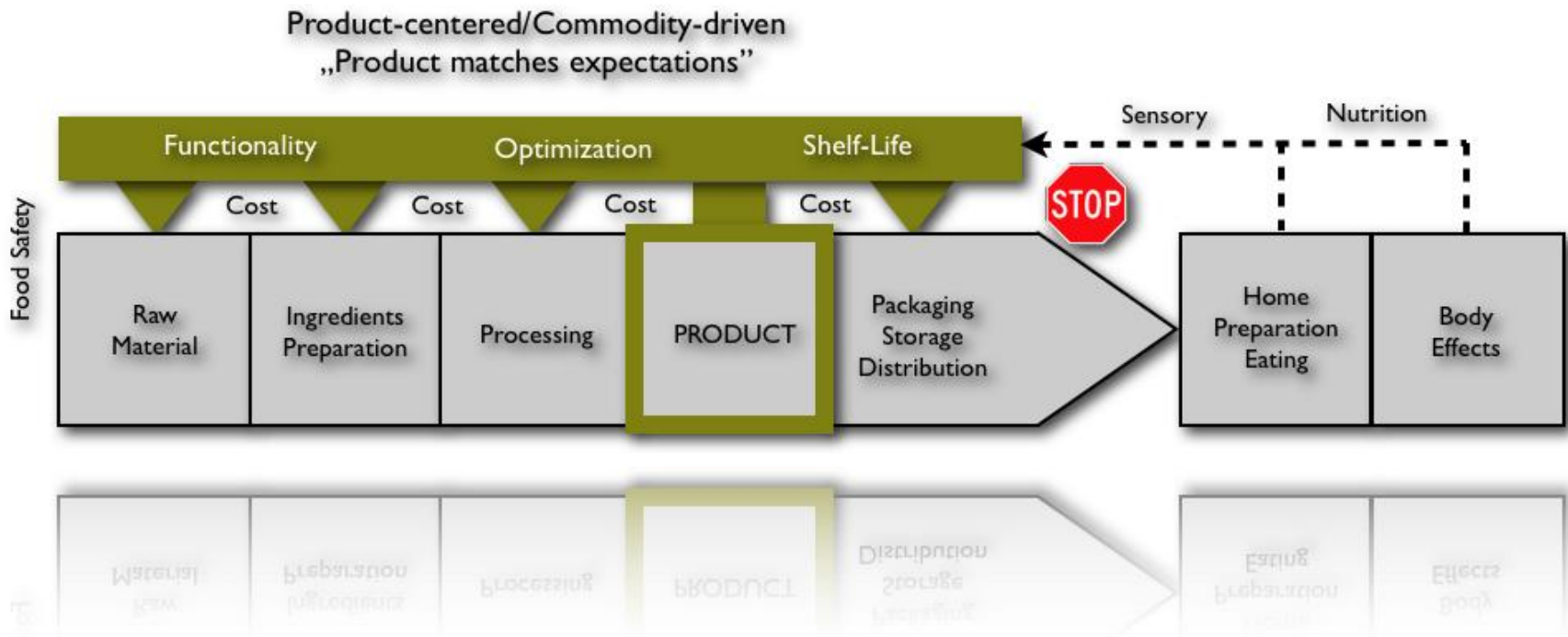
**Preservation of aronia and honey blueberry  
bioactive phytochemicals during sterilization  
with ENBIOJET Flow Pasteurizer**

**Agnieszka Bartoszek**



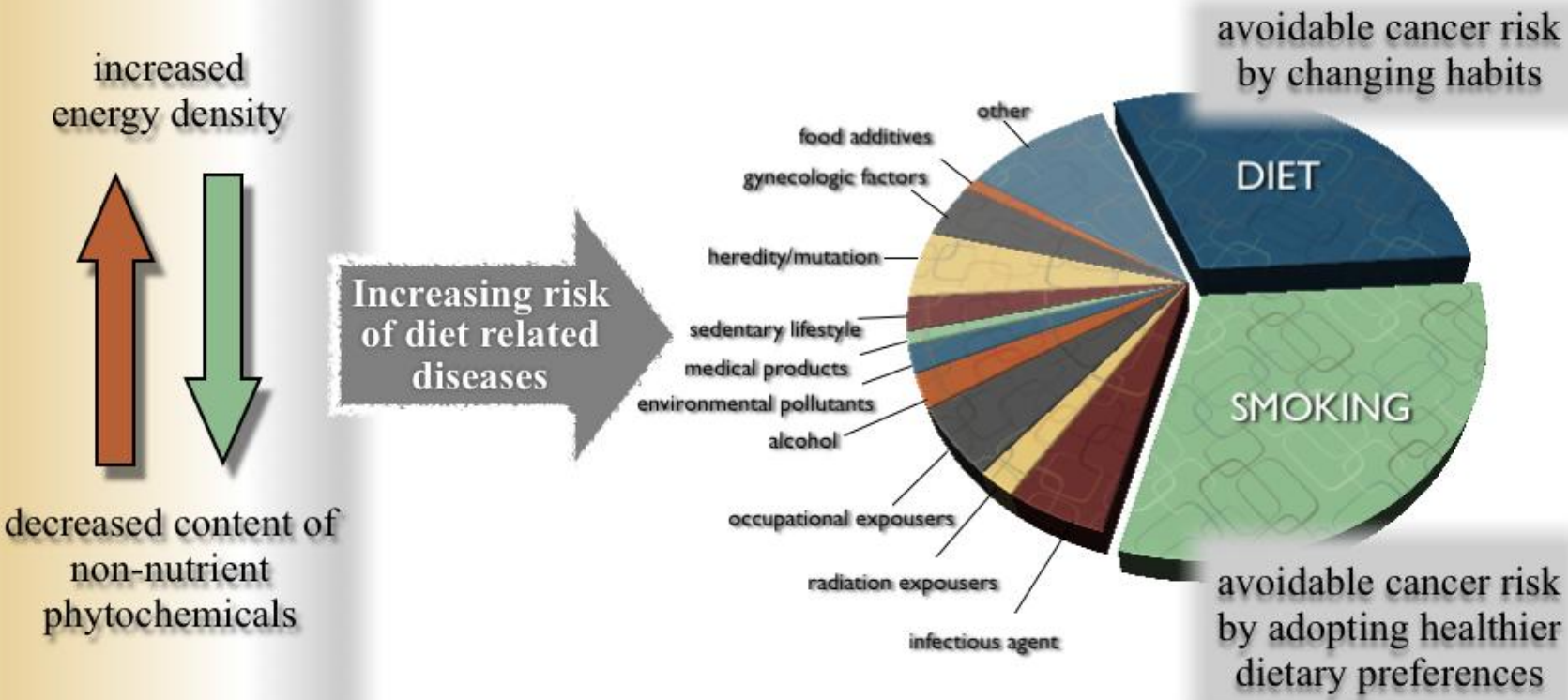
**Gdańsk University of Technology  
Chemical Faculty  
Department of Food Chemistry, Technology and Biotechnology**

# Current approach to food processing cost oriented



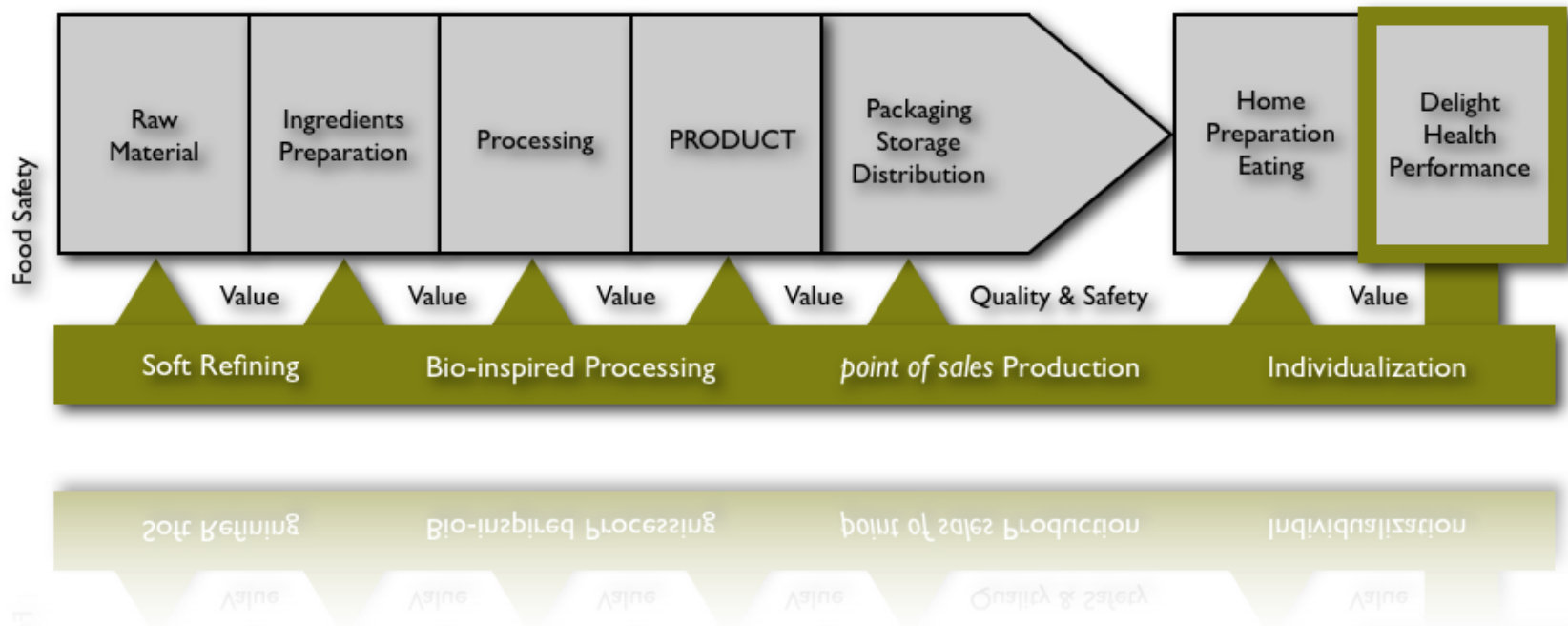
Sources: Kok, E., Bouwman, L., Desiere, F. Personalized Nutrition. Principles and Applications. CRC Press, 2008.

# Current cost oriented approach to food processing neglected non-nutritional food components



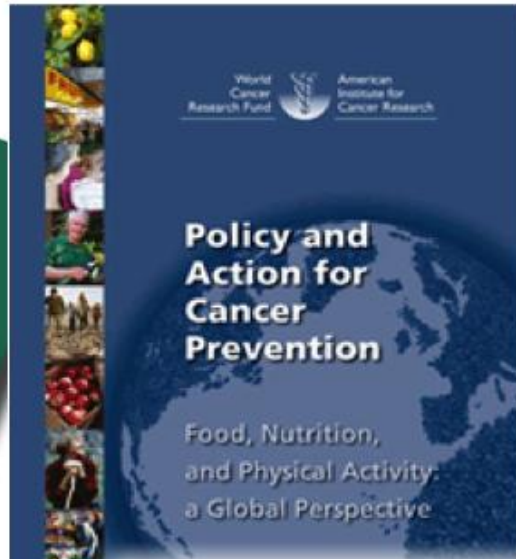
# Proposed approach to foods for the future consumers' individual health and well-being oriented

Consumer-centered/Benefit-driven  
„Food delivers benefits”



Sources: Kok, F., Bouwman, L., Desiere, F. Personalized Nutrition. Principles and Applications. CRC Press. 2008.

**Proposed approach to foods for the future  
consumers' individual health and well-being oriented  
is central also in WCRF/AICR recommendations for food industry**



Among the recommendations:

- **Governments** should require widespread **walking and cycling routes** to encourage physical activity.
- **Industry** should give a higher priority for goods and services that **encourage people to be active**, particularly young people.
- **The food and drinks industry** should make public health an explicit priority at all stages of production.
- **Schools** should actively encourage physical activity and provide healthy food for children.
- **Schools, workplaces and institutions** should not have unhealthy foods available in **vending machines**.
- **Health professionals** should take a lead in giving the public information about public health, including cancer prevention.
- **People** should use independent nutrition guides and food labels to make sure the food they buy for their family is healthy.

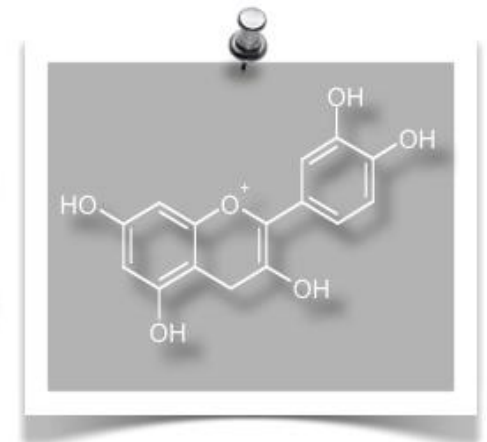
# Health-promoting phytochemicals

Laboratory-based evidence was provided for potential health effects against:

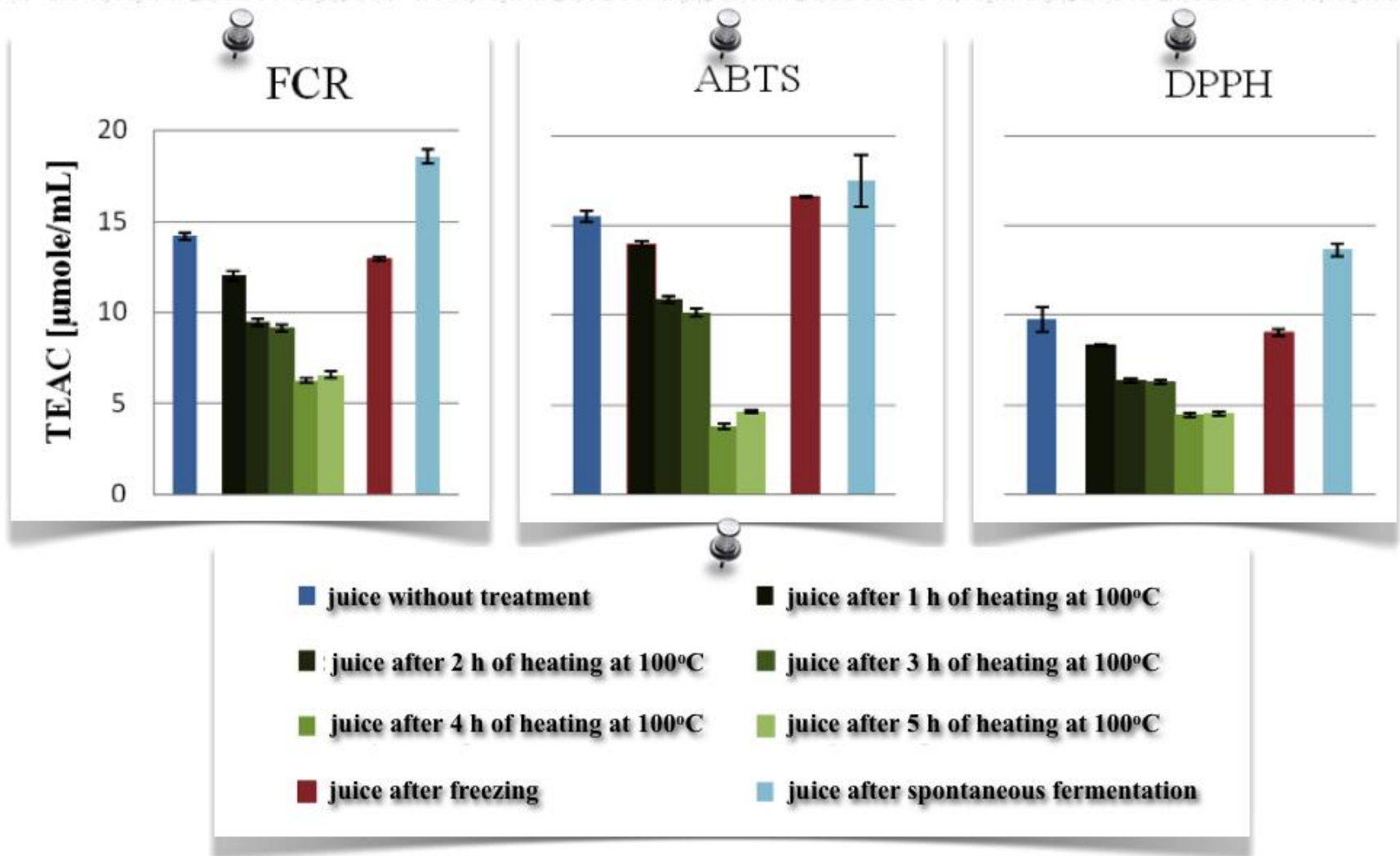
- € cancer
- € aging and neurological diseases
- € inflammation
- € diabetes
- € bacterial infections

Work on laboratory cancer models has shown that anthocyanins inhibit promotion and progression of tumor cells by:

- € stalling growth of pre-malignant cells
- € accelerating the rate of cell turnover, called apoptosis, effectively making the cancer cells die faster
- € reducing inflammatory mediators that initiate tumor onset
- € inhibiting growth of new blood vessels that nourish tumors, a process called angiogenesis
- € minimizing cancer-induced DNA damage.

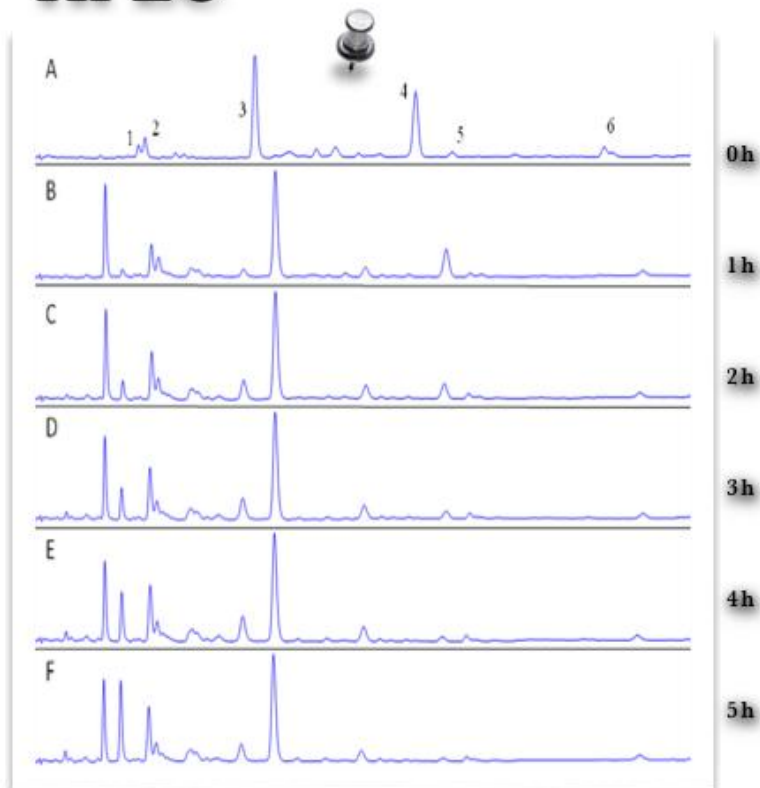


## The influence of thermal processing on antioxidative activity of honey blueberry juice



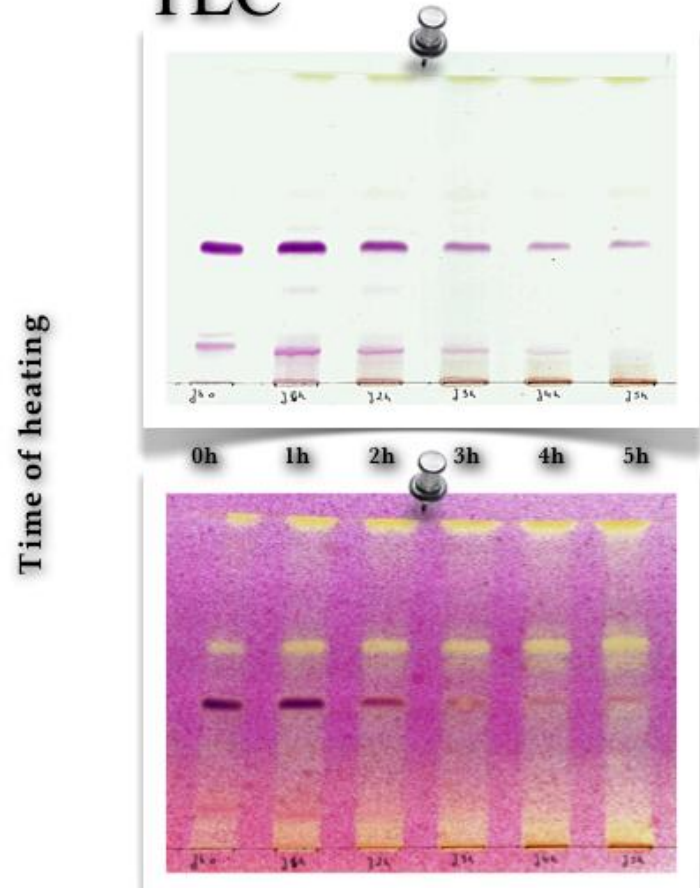
# The influence of thermal processing on chromatographic profiles of honey blueberry juice

## HPLC



1 – protocatechuic acid; 2 – chlorogenic acid derivative, 3 – chlorogenic acid, 4 – cyanidine-3-O-galactoside, 5- cyanidine-3-O-galactoside derivative, 6 – rutin

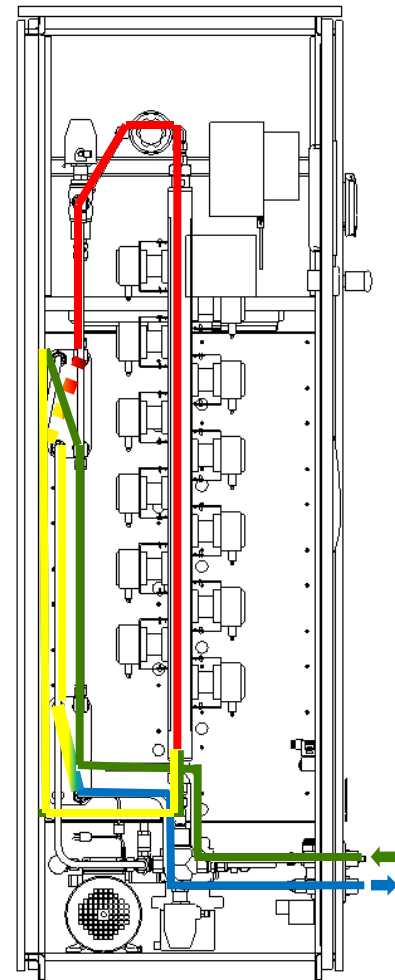
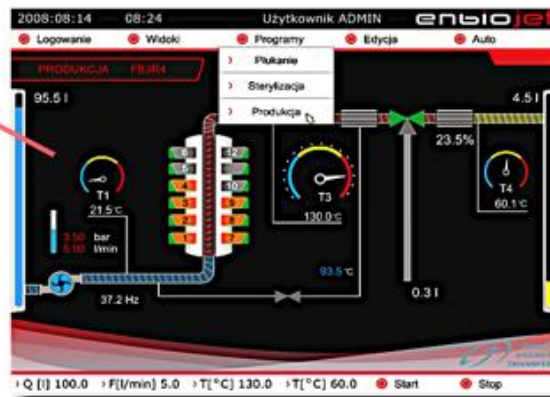
## TLC



# ENBIO Jet Microwave Sterilizer



control panel



## The collection of samples



The juice sample (ca 30 L) is poured into the tank



The system is prepared for sterilization cycle



The parameters of the process are programmed

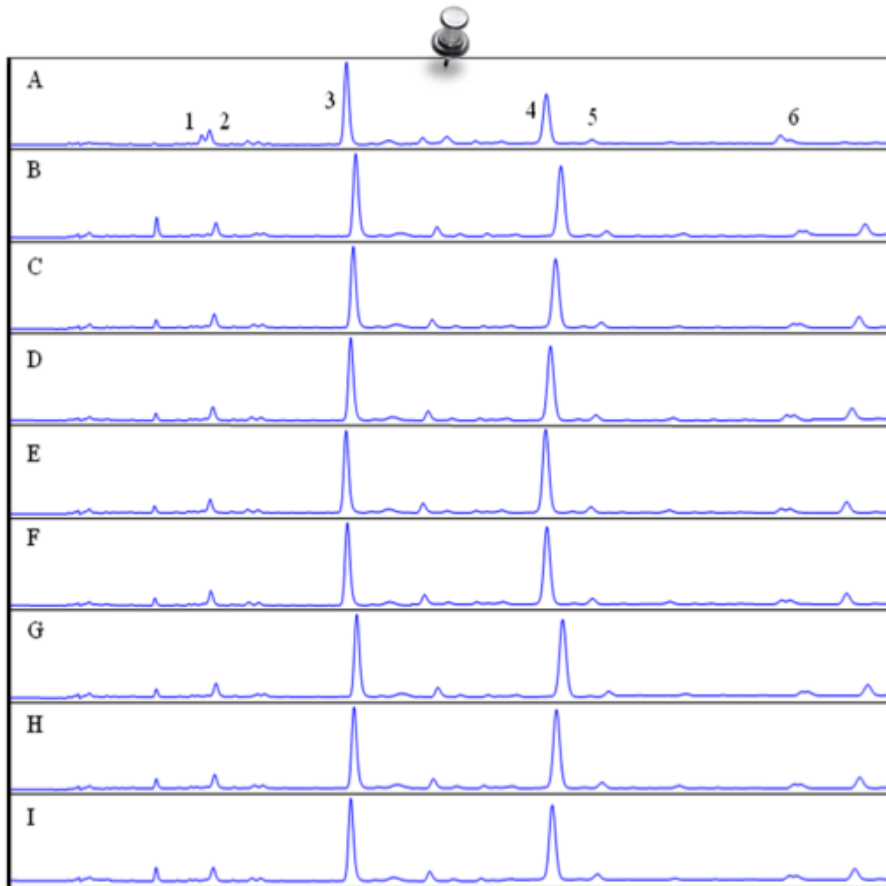


Collection of samples



Sterile bottles wait under the lamina flow

## The influence of sterilization with ENBIO Jet on HPLC profiles of honey blueberry juice

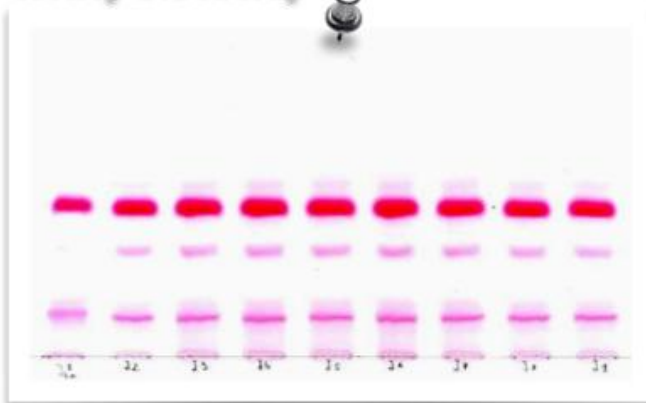


**A - juice without treatment**  
**B - juice after heating at 70°C**  
**C - juice after heating at 80°C**  
**D - juice after heating at 90°C**  
**E - juice after heating at 100°C**  
**F - juice after heating at 110°C**  
**G - juice after heating at 120°C**  
**H - juice after heating at 130°C**  
**I - juice after heating at 135°C**

*1 - protcatechuic acid;*  
*2 - chlorogenic acid derivative,*  
*3 - chlorogenic acid,*  
*4 - cyanidine-3-O-galactoside,*  
*5- cyanidine-3-O-galactoside derivative,*  
*6 - rutin*

# The influence of sterilization with ENBIO Jet on TLC profiles of honey blueberry and aronia juices

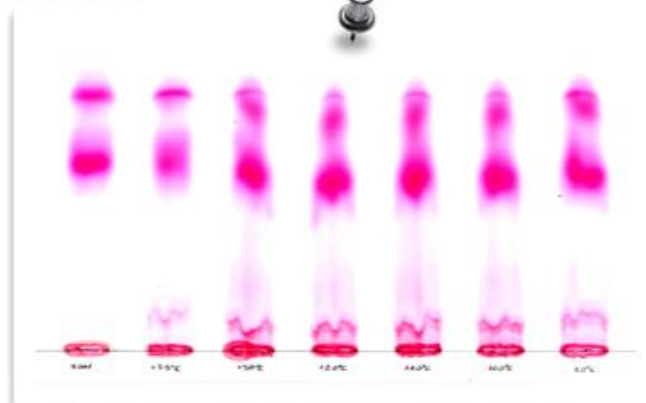
## Honey blueberry



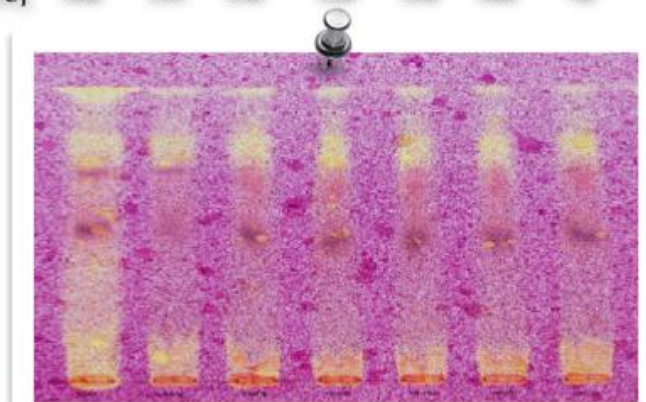
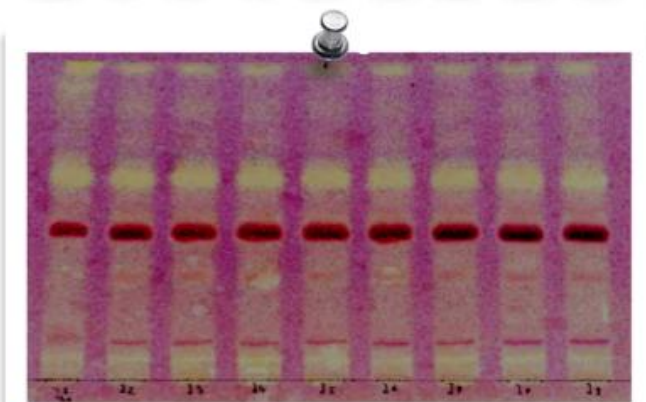
con 70 80 90 100 110 120 130 135

temperature  
of sterilization [°C]

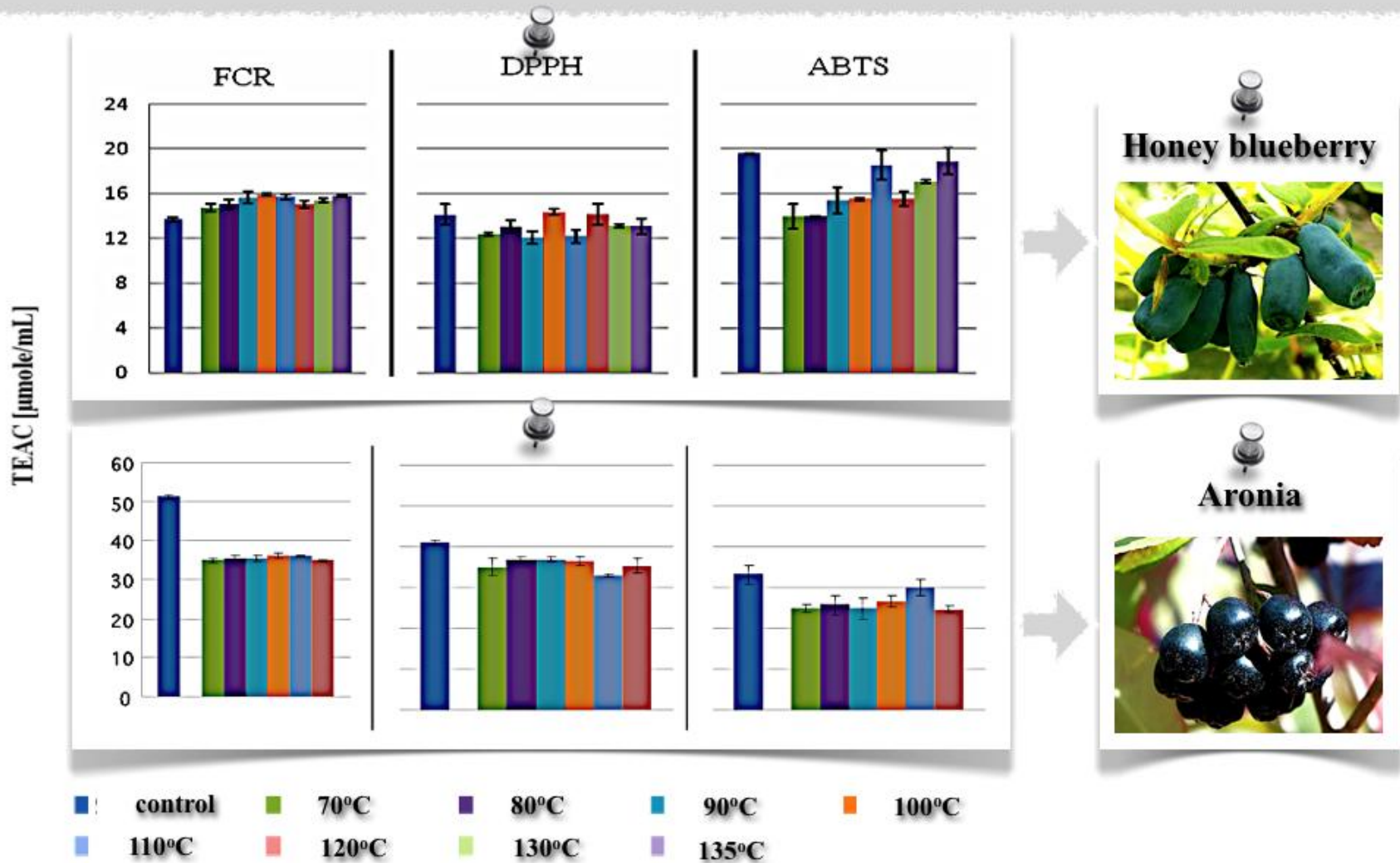
## Aronia



con 135 130 120 110 100 90



# The influence of sterilization with ENBIO Jet on antioxidative activity of honey blueberry and aronia juices



## CONCLUSIONS

- ☛ In contrast to thermal treatment, ENBIO Jet Microwave Sterilizer does not cause any decrease in antioxidative activity of any of the fruit juices studied as determined by standard colorimetric tests
- ☛ HPLC and TLC profiles demonstrate that ENBIO Jet Microwave Sterilizer preserves the composition of phytochemicals including those relatively unstable as anthocyanins

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ENBIO Technology staff headed by **Marek Krajczyński**



**Thank You**