



## NJF Seminar 399

### **Beneficial health substances from berries and minor crops –**

- How to increase their concentration in cultivated species, eliminate losses in processing and enhance dietary use

**Piikkiö, Finland, 14-15 March 2007**

## Organic production: does it enhance the health-promoting compounds in berries?

*Anttonen, Mikko; Karjalainen, Reijo. Department of Biosciences, University of Kuopio, Kuopio, Finland and MTT Agrifood Research Finland, FI-31600 Jokioinen, Finland. Tel. +358 17 163 120 Fax: +358 17 163 148, reijo.karjalainen@mtt.fi*

Nearly 31 million hectares are currently certified according to organic standards. For 2006, the value of global markets for organic products will reach more than 30 billion eu. In Europe, since 1998 about 20 % of annual growth in the organic juice market has been recorded. The area of organically grown berries has also rapidly increased in Europe during the last 10 years, which is due to demand and support provided to growers by the European Union. In an extensive European study, it was found that the first criteria to make the purchase decision is based on the belief that organic food is beneficial for human health. Despite this general belief, there is no consistent scientific evidence supporting the better nutritional quality of organically produced food. Differences in production practices may lead to differences in quality parameters between organically and conventionally grown berries. In organic farming, the use of mineral fertilizers and synthetic plant protection agents are highly regulated. In theory, increasing disease pressure due to lack of plant protection may enhance the defence pathway leading to the accumulation of phenolic compounds, which also may have beneficial for human health. Slow mobilization of nitrogen from organic sources may also affect the phenolic compounds in berries.

We have analyzed phenolic compounds from organically and conventionally grown blackcurrants and strawberries to test the idea if organically grown berries contain a higher amount of health-promoting phenolic compounds. Blackcurrants were collected from commercial farms from Eastern Finland within a climatically similar area. Phenolic compounds were identified using UV/vis and mass spectroscopy techniques and quantified with HPLC. Several different conjugates of hydroxycinnamic acids, flavonols, and anthocyanins were quantified. Statistically significant differences between farms were found for almost all compounds. Principal component analysis effectively separated farms from each other but did not cluster them according to cultivation techniques. In strawberry, the impact of genotype and environment on the flavonol content was more important than the cultivation practice. The "health quality" from organically grown berries does not differ from those grown conventionally.