

Factors affecting linolenic acid content in low-linolenic rapeseed varieties

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Rapeseed oil is recommended for human health, partly for its α -linolenic acid (C18:3, Omega-3) content. However, oil rich in C18:3 is easily oxidized and therefore not suitable for deep frying. According to Everard (2004), the typical unpleasant "room odour" of heated rapeseed oil appears above a threshold content of 2.5 % α -linolenic acid, while its content varies around 8 to 10 % in usually grown double-low varieties. Low-linolenic varieties with lower than 3.5% C18:3 content have been selected by breeders. Nonetheless, a large variability has been observed, and the target content of 2.5 % is not always met, depending on oilseed rape growth conditions. For this reason it is important to identify factors affecting the fatty acid profile of oilseed rape.

The low-linolenic character can be genetically influenced i) by nearby fields of conventional oilseed rape, ii) by volunteers of conventional rapeseed in a low-linolenic field, iii) by conventional volunteers and ferals growing in nearby fields and on uncultivated land. In this case, crop management practices as crop rotation, weed control, and soil tillage might be decisive.

A field experiment carried out at the experimental station in Changins, Switzerland, in 2004, showed that beyond 50 meters of distance, a field of classical rapeseed caused only a minor increase in C18:3 content of a neighbouring low-linolenic rapeseed field.

The negative effect of volunteers has been evaluated with the GeneSys model (Colbach *et al.* 2001a,b), which takes into account i) genetic characteristics of varieties, ii) spatial crop distribution, iii) crop rotation, iv) crop management practices. According to simulations run with the model, the presence of volunteers can have a decisive influence on oil quality, but can be easily controlled by adequate tillage and crop rotation.

Nitrogen nutrition may also play a role as it influences both oil content and composition. It was shown that nitrogen fertilisation increases linolenic acid and decreases oleic acid content.

It is concluded, that α -linolenic acid content in oilseed rape depends mostly on the variety. To produce rapeseed oil with low linolenic acid content, it is also important to adapt crop management practices as soil tillage, crop rotation, and nitrogen fertilisation.

Literature cited

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