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Poster Abstract – F.19

EVALUATION OF MARKERS FOR THE TRACEABILITY OF POTATO TUBERS GROWN IN ORGANIC VS CONVENTIONAL REGIME

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In recent years, much attention has been raised towards organic as opposed to conventional farming. In fact, organic product market is valued at 23 billion USD (2002) worldwide. The sum of organically managed land (24 million ha worldwide) and areas devoted to "wild harvested plants" reaches 34.7 million ha. Italy ranks first in Europe with respect to organically managed agricultural land (1 million ha). This impressive diffusion has raised several debates with respect to ecological/economical aspects and nutritional/safety issues.

Identification of parameters discriminating organic and conventional products would help refraining misconducts and would provide a firm basis for comparative assessment of the two types of produce.

Ideally, such markers should exhibit wide applicability to all kinds of organic produce and thus should be poorly or not influenced by genetic background.

In this report, we compare selected biomarkers in organically vs conventionally grown tubers in four separate field trials. The cv Vivaldi was tested in 3 different sites and, to gain insights on possible genotypic influences, one additional field trial was conducted with the cv Hermes. Both type of tubers were subjected to the same pedoclimatic conditions as they were grown in adjacent plots. We analyzed the stable isotopes ^{15}N and ^{13}C as well further parameters (ascorbic acid, protein, dry matter) selected either on the basis of nutritional relevance and existing evidence, at least in some systems, of alterations as a consequence of agricultural technique employed. In all field trials, organic tubers exhibited a significant enrichment in ^{15}N when compared to their conventional counterparts, while no repeatable trend was found for ^{13}C values. Among other parameters, dry matter was found to be slightly increased in organic tubers but the pattern was not consistently reproducible in all field trials due year-to year variations. Similarly, little or no differences were detected with respect to amounts of ascorbic acid and total proteins. Our data thus indicate that ^{15}N enrichment appears as the most reliable parameter for assessment of agricultural regime of potato tubers: in fact, in all field trials and in both cv tested, irrespective of environment, the sum of all samples (organic vs conventional) showed statistically significant higher $\delta^{15}N‰$ for organic tubers. Furthermore, setting an arbitrary threshold value of + 4.5 $\delta^{15}N‰$ for assignment in the organic group, about 90% of the samples were correctly identified. We conclude that ^{15}N enrichment appear especially promising as a marker to differentiate the two types of potato tubers, while other parameters appear more prone to year-to-year fluctuations and thus less reliable.