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- Enzyme activities and total amino acid content in rhizomania susceptible, tolerant and partially resistant sugar beet varieties at different nitrogen levels.

Rhizomania is one of Italy's most virulent diseases of sugar beet (*Beta vulgaris* L.), causing proliferation of shorter roots and reduced sucrose content. One rhizomania susceptible cultivar (NZ type), one tolerant (NZ-Z type), and one partially resistant (EN type) grown at different nitrogen levels (0, 80, 160 kg/ha) in a soil affected by rhizomania were compared. The effect of nitrogen fertilization on beet technological quality by means of enzyme activities and total amino acid content was evaluated. Samples of beet roots harvested at three different times were analyzed. Acid and neutral invertase, sucrose synthetase, and aminopeptidase specific activities were determined on the cold extraction juice of the "brei," whereas total amino acid content was carried out on the hot extraction juice. The values of enzyme activities versus sugar beet varieties, harvest time, and nitrogen fertilization, measured by a three-way analysis of variance and Tukey test, showed significant differences ($P < 0.05$). The tolerant cultivar displayed acid and neutral invertase and reducing sugars (% polarization) significantly lower than the susceptible and partially resistant cultivars. Harvest time X N, harvest time X cultivar, and N X cultivar interactions on the enzymatic activities also were found. The partially resistant sugar beet generally revealed higher levels of enzyme and total amino acid content, the latter increasing with nitrogen supply.