Effect of Tobamovirus Infection on Thermoluminescence Characteristics of Chloroplasts from Infected Plants

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Changes of thermoluminescence characteristics as well as the O_2-evolving capacity was analysed in chloroplasts isolated from *Nicotiana benthamiana* infected with pepper and paprika mild mottle viruses and their chimeric hybrids. The electron transport activity in thylakoids of virus-infected plants was inhibited and could be restored by adding DPC or Ca^{2+} which indicated that the virus infection altered the oxygen-evolving complex. In thermoluminescence characteristics of plants infected with either viruses, the first well defined response was a shift in the peak position of the B band from 20 °C to 35 °C corresponding to $S_3(S_2)Q_B^-$ and $S_2Q_B^-$ charge recombinations, respectively, which showed an inhibition in the formation of higher S states in the water splitting system. Simultaneously, a new band appeared around 70 °C due to chemiluminescence of lipid peroxidation. Further progress of the viral infection dramatically decreased the intensity of bands originated from charge recombinations with a concomitant increase of the band at 70 °C indicating the general oxidative breakdown of injured thylakoids.