

Title Chlorophyll α fluorescence measurements to evaluate quality of cut flowers
Author Michalczuk B., Borkowska B., Treder J. and Goszczynska D.
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Abstract

The aim of the study presented was to evaluate the usefulness of chlorophyll a (Ch) fluorescence measurements in estimating quality of alstroemeria cut flowers and their potential storage life. This non-invasive, instrumental technique allows to evaluate the efficiency of primary photosynthetic reactions and, indirectly, the physiological status of a plant. The experiments were done on alstroemeria plants cvs 'Juanita' and 'Faustyna' grown in a greenhouse in substrate irrigated either optimally (26% substrate water content, SWC) or under water stress conditions (16% SWC). Rows were cut just before reaching the best decorative value. The measurements of Ch fluorescence were done with MINI-PAM Photosynthesis Yield Analyzer (Walz, Germany) directly after harvest, after transportation for several hours and after 7 days of simulated vase life. Three leaves were taken for measurements: 1. the uppermost; 2. leaf growing directly below the verticil; 3. leaf from the middle part of the shoot. At harvest, values of Ch fluorescence parameters were similar in all the leaves measured, irrespective of their position on the stem. Decrease of the values of all Ch fluorescence parameters began in the oldest leaves, situated in the lower part of the stem, whereas in the uppermost leaves they remained unchanged for a longer time. Among several parameters of chlorophyll fluorescence, the most suitable for assessing quality of alstroemeria seems to be: F_0 (initial fluorescence), showing the effectiveness of light harvesting in antennas; ETR (rate of electron transport) and qP (photochemical quenching), Advanced senescence of the plants during vase life or prolonged transport can be estimated by the other parameters as: F_v/F_m (maximal photochemical activity); Yield (actual photochemical activity) and coefficients of non-photochemical quenching (q_N and NPQ). Thus, the estimation of actual and predicted quality of flowers could be based on differences in values of F_0 , ETR and qP between the uppermost leaf and the leaf situated in the middle part of the shoot. We propose to use the uppermost leaves as the "reference leaves" in estimating the physiological condition of flowers.

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