Abstract

Adenine derivatives called cytokinins (CK) are a group of plant hormones, which in cooperation with other plant hormones orchestrates almost every aspect of plant growth and development. Despite the rapid progress in plant hormone research, there are still many aspects we may shed light on due to the metabolic and signalling pathways redundancy and the network complexity with crosstalk hubs. CK *N*-glucosides (in this case *trans*-zeatin-7-glucoside, *tZ*7G, and *trans*-zeatin-9-glucoside, *tZ*9G) have been traditionally viewed as irreversibly deactivated products of CK active form metabolism (in this regard *trans*-zeatin, *tZ*). Nevertheless, the *tZ*9G antisenescent activity was shown in oat leaf senescence bioassays (*Avena sativa* cv. Abel) and the possibility of metabolic conversion to O-glucosides was hypothesized. The aim of this work was to test the hypothesis on the close model of oat (*Avena sativa* cv. Patrik) and to examine also the metabolic conversion of related substances – N^6-(Δ^2-isopentenyl)adenine (iP) and its *N7*- and *N9*- glucosides (iP7G and iP9G). While the senescence retardation caused by exogenous *tZ*9G application was confirmed in the *Avena sativa* cv. Patrik, metabolic conversions to *O*-glucosides remain to be verified. Besides the effects of above-mentioned substances on the oat leaf segments, we decided to examine their influence on phenotype and genes expression effects also on Arabidopsis thaliana (L.) Heynh roots. Although our previous hypothesis has not been fully confirmed, the obtained results on both monocot and dicot plant models question a general notion of CK *N*-glucosides, at least those glycosylated at *N9*-position, as inactive and irreversible CK forms and suggest their higher importance for plants than previously considered.

Keywords: cytokinin, glucoside, senescence bioassay, root bioassay