Etiolated seedlings of soft winter wheat (*Triticum aestivum* L.) of variety Doskonala, which were grown at the temperature of 22°C on the purified tap water, served as experimental object. Seedlings were incubated during 24 hours on 20 mM of sodium nitrate solution (optimum concentration was chosen in preliminary special experiments). In separate series of experiments the effects of 20 mM of sodium nitrate in combination with 5 mM of L-arginine, 5 mM of sodium tungstate (NR inhibitor) or 100 μM of PTIO (NO scavenger) were investigated. The content of NO and activity of NR were measured in roots of seedlings. After 24 h of incubation with the studied solutions the seedlings were exposed to the damaging heating (10 min at 46°C).

The treatment of seedlings with nitrate caused the transitional increase of NO generation and rise of NR activity with peak on 2-4 h after treatment starts. The resistance of seedlings to the damaging heating increased under the nitrate influence. All indicated effects were removed under the treatment of seedlings with NR inhibitor sodium tungstate. The positive influence of nitrate on the heat resistance of seedlings was leveled by the influence of PTIO. The effect of nitrate on the NR activity, nitric oxide content and resistance of seedlings to heat stress was substantially leveled under the influence of L-arginine, which also possesses an ability to raise the NO content in roots and to induce the development of heat resistance. The conclusion about the significant role of nitrate-dependent formation of NO in the induction of heat resistance of wheat seedlings and about the antagonistic effects of nitrate and L-arginine is made.

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CADMIUM AFFECTS *ARABIDOPSIS THALIANA* PROTEOME

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Because of human activity, cadmium (Cd) has become a widespread non-essential heavy metal, one of the most toxic to all living organisms. It is a dangerous environmental pollutant, with relative high mobility in the soil-plant system and ability to interfere with plant metabolism (Gzyl et al., 2015). Aim of our research is to study adaptation of *Arabidopsis thaliana* seedlings to cadmium ($CdCl_2$).

For this purpose three lines of *Arabidopsis* (Columbia, Oasis and Chernobyl 7) were grown on S MS containing 0,3 % (w/v) phytogel (Phytogel, Sigma, USA) and 0,5% (w/v) sucrose with and without addition of $CdCl_2$ salt (100 μM). The whole 10-day-old seedlings with roots and leaves were used for protein extraction, carried by phenol-based protocol. Protein concentration was determined using a protein assay from Bio-Rad (Hercules, CA), based upon the modified procedure of Bradford. Then the 2-D electrophoresis was performed. For the isoelectric focusing (IEF) 50 μg protein of samples was loaded on the IPG strips with pH 5-8 (7 cm, Bio-Rad, Hercules, CA) and placed into an isoelectric focusing (IEF) unit (Protean IEF Cell, Bio-Rad, Hercules, CA) for 16 h. After that strips were placed on the top of an acrylamide SDS-gel. Second dimension separation was carried out using a Protean II xi Cell (Bio-Rad, Hercules, CA) for 2 h (Hajduch et al., 2005). Protein 2-DE gels of each line of *Arabidopsis* were matched individually to the reference gel in biological triplicate using PDQuest software (BioRad, USA). Only 2-DE spot that were presented in both data sets (i.e., control and cadmium treatment), and in each data set, and at least in two biological replicates were included in the analysis (Valedor and Jorrin, 2011). In total, 193 2-DE spots for Columbia line, 204

for Chernobyl 7 line and 245 for Oasis line satisfied these thresholds. The volumes of all spots that satisfied these criteria were normalized and the p-value for each 2-DE spot in all lines was calculated in Excel to determine statistically significant difference in protein abundance profiles between control and cadmium treatment groups. Then spots with statistically significant difference were cut from gels and plugs were digested with Trypsine (Promega). Digested proteins spots were subjected to tandem mass spectrometry (MS/MS) based on the MSE method that uses alternate scans at low and high collision energies in order to provide a comprehensive dataset (Klubicova et al., 2012). Mass spectrometry provided the identity for 18 proteins of Columbia line and 21 proteins of Oasis line. Analysis of the proteins has shown their involvement in metabolic and signaling pathways suggesting Cd impact on above processes. There is a difference in protein abundance between control and Chernobyl lines. Currently, we continue to investigate pathways affected directly by Cd with the idea to get to know which of them promote plant adaptation to polluted environment.

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АКТИВОВАНІ САЛІЦИЛАТОМ ЗМІНИ ІНТЕНСИВНОСТІ ПЕРОКСИДАЦІЇ ЛІПІДІВ У РОСЛИНАХ ПШЕНИЦІ ТА КУКУРУДЗИ ЗА УМОВ ПОСУХИ

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Kobyletska M., Rybak O., Telegij M. SALICYLATE ACTIVATED CHANGES IN THE INTENSITY OF LIPID PEROXIDATION IN WHEAT AND CORN PLANTS IN DROUGHT CONDITION. The influence of calicylate of wheat *Triticum aestivum* L. and corn *Zea mays* L. plants on intensity of lipid peroxidation in drought condition was studid. Drought increased content of thiobarbituric acid reactive substances (TBARS), the content of these compounds was higher in wheat plants than in corn plants. Salicylic acid caused the decrease of TBARS in drought conditions in both investigated species of plants.

Підвищення стійкості рослин до несприятливих умов навколишнього середовища – одне з найактуальніших завдань сучасної фітофізіології. Відомо що посуха є поширеним фактором навколишнього середовища, який негативно впливає на ріст і розвиток рослин. Адаптація рослин до несприятливих чинників, зокрема посухи, пов'язана із змінами обміну речовин і структурними перебудовами рослинної клітини (Labudda, 2013). Стійкість рослин до посухи значною мірою гормональною системою. До гормоноподібних речовин, які впливають на підвищення стійкості рослин до різноманітних стресових чинників належить саліцилова кислота (СК). Оксидативний стрес у рослин може бути спричинений низкою факторів навколишнього середовища, включаючи посуху. Одними з основних клітинних компонентів, які пошкоджуються активними формами оксигену, є ліпіди, які змінюються внаслідок перекисного окислення ненасичених жирних кислот у біологічних мембранах. Аналіз вмісту ТБК-активних продуктів є відомим методом оцінки інтенсивності перекисного окислення ліпідів. Зважаючи на це, метою нашої роботи було визначити вміст ТБК-активних продуктів у органах рослин пшениці за умов посухи при попередній обробці насіння СК.