CONTENTS OF CHLOROPHYLL, EPIDERMAL FLAVONOLS AND ANTHOCYANINS IN FIELD GROWN BUCKWHEAT CULTIVARS DURING DIFFERENT DEVELOPMENTAL STAGES

Gordana Racić[1], *Emilija Svirčev*[2], *Biljana Bajić*[3], *Danijela Žunić*[4], *Vladimir Sabadoš*[4], *Dejana Panković*[1], *Neda-Mimica Dukić*[2]

[1]Faculty of Ecological Agriculture, Educons University, [2]Department of Chemistry, Biochemistry and Environmental Protection, Faculty of Sciences, University of Novi Sad, [3]ABioTechLab,Sremska Kamenica [4]Agricultural Extension Service, Sombor

*gordana.racic@educons.edu.rs

Acknowledgement: Ministry of Education, Science and Technological Development, Serbia, Grant No. 451-03-9/2021-14/200125

Introduction

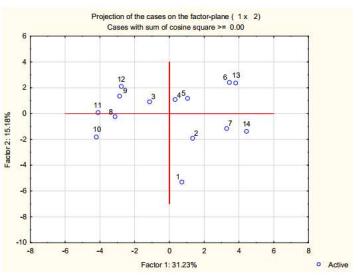
Common buckwheat (*Fagopyrum esculentum* Moench) is a fast-growing pseudo cereal rich in flavonoids which are partially responsible for its biological activity. Due to increasing demands for food supply rich in biologically beneficial compounds, use of non-destructive methods for a fast pre-screening of plants is of high interest in sustainable agriculture. These methods allow screening of plants for the relative contents of secondary metabolites, photosynthetic pigments, presence of biotic or abiotic stress.

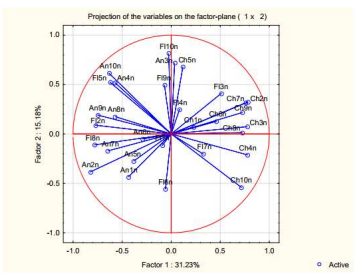
Method / Design

Experiment was conducted at experimental open field at Nenadic (Sombor). Fourteen different cultivars (1-Oberon, 2-B. Petrovac exp 1., 3-Darja 1, 4-Populacija B.T., 5-Novosadska plus, 6-Češka, 7-Bamby, 8-Novosadska, 9-B. Petrovac exp 2., 10-B. Petrovac exp 3., 11-K-11, 12-Bily, 13-Ajda and 14-Darja 2) were sown in 3 m long rows with 25 cm of inter-row spacing and 15 cm spacing between plants in the row. The standard growing technique was applied. Indices of chlorophyll (Chl), epidermal flavonols (Flav) and ther ratio, NBI as well as antocyanines (Anth) were measured *in vivo* non-destructively with Dualex sensor (Force-A, Orsay, France). Measurements were done on 28 uniform, fully developed and sunexposed leaves of the buckwheat plants, each foutheenth day starting from sowing in soil (DAS). Difference of measured plant parameters were visualized by performing PCA was performed on a correlation matrix of measured plant parameters for each experimental point separately (0,14,28,42,56,70, 84, 98, 112, 126 days after DAS) (Statistica v 13.5).

Results

Relative index of Chl, Flav and ther ratio, NBI as well as antocyanin (Anth) content measured with Dualex sensor showed similar trend for each cultivar during plant growth and development. In the all examined cultivars, Chl content did not change significantly among cultivars nor during different developmental stages. Highest values for Chl were measured for cultivars Bamby, Ajda and Darja 2. These results are consistent with PCA analysis, where Češka, Ajda, Bamby and Darja2 are separated in the right upper and down square togehter with Chl (Fig 2). However, PCA analysis for Flav and Anth was difficult to use for distinguishing examined buckwheat cultivars. Content of Flav ranged from 1.705 to 2.096 for all examined cultivars, whereas its content was highest in the 2nd, 3rd and 4th week of measurement. Anth. content was the highest in the first and in the last week of measurement forming the U shaped curve, with minimal values in 5th and 6th week of measurement i.e. about 14th week after sowing of plants (Fig1).





Fifure 2. (left) Principal component analysis from the variation of measured plant paramters on 14 different buckwheat cultivars

Objectives

The purpose of this study was to investigate contents of chlorophyll, epidermal flavonols and anthocyanins in field grown buckwheat (*Fagopyrum esculentum* Moench) cultivars from different origin during different developmental stages using non-destructive measurement with Dualex® Scientific.

Conclusion

Pre-screening of biologically active compounds and pigments with sensors can be used for a prediction of their content in plants during their development. Our results might help in choosing optimal time of the harvest for buckwheat plants due to its uneven maturation, as well as for flavonoid content estimation facilitating selection of cultivars with high flavonoid content.

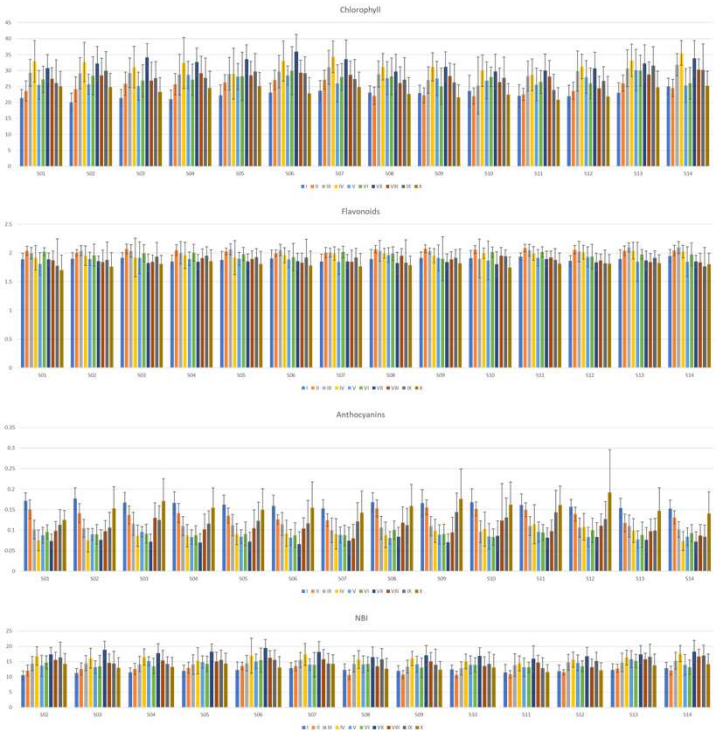


Figure 1. Contents of chlorophyll, epidermal flavonols and anthocyanins in field grown buckwheat cultivars during different developmental stages