P2.2

Macronutrients in grass plants and its effect on seed yield

Grzegorz Żurek[1]; Kamil Prokopiuk[1]; Danuta Martyniak[1]; Eugeniusz Paszkowski[2]; Urszula Woźna – Pawlak[3]; Maciej Jurkowski[4]

[1]Instytut Hodowli i Aklimatyzacji Roślin, Państwowy Instytut Badawczy, Radzików, 05-870 Błonie
[2]DANKO Hodowla Roślin sp. z o.o., 64 – 000 Kościan
[3]Poznańska Hodowla Roślin, sp. z o.o., 63 – 004 Tulce
[4]Małopolska Hodowla Roślin, sp. z o.o., 30 – 002 Kraków

Relations between macronutrients contents (N, P, K, Mg and Ca) in plants and seed yield were examined during two-years field studies located in four locations in Poland. Fifteen grass genotypes from three fescue species: tall fescue (Festuca arundinacea Schreb.), meadow fescue (F. pratensis Huds.) and red fescue (F. rubra L.) were used, including commercial varieties, breeding lines and ecotypes. Despite of phenological observations (heading and flowering start dates), biometrical measurements (plant height, leaf dimension, number of generative stems etc.) seed yield of single panicle (SI), seed yield of plant (SY) and seed yield from plot (SP) were measured. Also, chlorophyll contents index was measured at the onset of heading phase and after that, some (ca. 5 – 10) plants per genotype were harvested and prepared for chemical analysis. Contents of macronutrients (i.e. N total, P, K, Mg and Ca) were determined in plants at the full development phase (after seed set but before seed maturity).
Species of relatively high macronutrients contents was meadow fescue, with significantly higher contents of N, P and Ca among other tested species. Contents of Mg was the highest in case of tall fescue.
Seed yield of single panicle (SI) was positively correlated with N and K contents in red and meadow fescue, but not in case of tall fescue. Positive correlations between SI and K contents were associated with negative and significant correlations between SY and SP for red and meadow fescue. This is most probably the result of negative correlation between SI and SY and SP.
Results of multiple linear egression performed on 18 parameters measured (incl. macronutrients contents) were different in case of each tested species. Macronutrients were not among the significant predictors of SI (exc. Ca in case of tall fescue). Quite different relation were calculated for SY where P was significant predictor for tall fescue, and N and Mg – for red fescue.
Conclusions: the chemical composition of plants plays a very important role in shaping the plant and its basic life functions. Also seed yields depends on the content of macronutrients, however mentioned relation is not the same in case of different Festuca species.

Session 3 Materials for biomedical applications

LECTURES

L3.1

Biopolymers-based composites: synthesis, characterization and application in tissue engineering

Patrycja Domalik-Pyzik[1]; Martyna Hunger[1]; Karolina Kosowska[1]; Jan Chłopek[1]

[1]AGH University of Science and Technology, Faculty of Materials Science and Ceramics, Depertment of Biomaterials and Composites, Kraków, Poland

The growing level of environmental awareness was one of the reasons for recent increase of biopolymers popularity in many applications, including those for biomedical purposes. Apart from being eco-friendly, naturally-derived materials have also other advantages that favor their use over synthetic materials. The main features of biopolymers include their abundance, biocompatibility and unique properties. Chitosan (CS), derivative of chitin found in exoskeletons of crustaceans, fungi, and insects, is known for its antibacterial, antifungal, mucoadhesive, analgesic, and hemostatic properties, as well as its structural similarity to glycosaminoglycans (GAGs). Hyaluronic acid (HA) is an important component of the extracellular matrix (ECM); as a biomaterial it is non-toxic, non-immunogenic, and non-inflammatory, and similarly to CS, biodegradable, biocompatible and very versatile. Both HA and CS, can be used as building blocks to further create blends and biocomposites for specific applications. We have designed, synthesized, and characterized variety of chitosan and hyaluronic acid based systems for use in tissue engineering. Our studies show that careful selection of the solvents, crosslinking agents, and modifying phases allows to obtain materials of desired properties, and reduce the use of toxic components.
This research was funded by the National Center for Research and Development, Poland (BioMiStem grant No. STRATEGMED3/303570/7/NCBR/2017).

L3.2

Assessment of Mussel-Inspired Carrageenan Hydrogels

Ercan Hatice

INTRODUCTION. A tissue adhesive can be described as a glue, a patch, a sealent or a hemostatic agent, facilitating wound healing, holding tissues together, preventing formation of blood clots or fluid/air leakages [1,2]. The term bioadhesion can be defined as the adherence of natural or synthetic materials to biological surfaces [3]. One of the main classes of bioadhesives is inspired by naturally-occurring adhesive proteins produced by mussels. Mussels can strongly adhere to structures under wet conditions in virtue of the presence of catechol containing amino acid, L-3,4-dihydroxyphenylalanine (L-DOPA) [4]. Carrageenans (CRG) are naturally-occurring sulphated polysaccharides. Strong water absorption and favorable physiochemical properties make CRG a promising candidate for applications, such as tissue engineering, regenerative medicine and drug delivery [5]. In this study, our aim was to develop a mussel-inspired tissue adhesive by modification of CRG with dopamine.
METHODS. Dopamine was grafted onto CRG via EDC/NHS coupling chemistry. CRG (2%) was solubilized in distilled water at 55-60 oC. EDC and NHS were added into the solution