

To: **Tempus Public Foundation**

From: **Dr. Tarek Ali Ahmed Alshaal**

Date: **18.06.2021**

Subject: **Report on *long-term postdoctoral research*** (the time period 01.09.2020 to 31.05.2021)

First of all, I would like to thank all the members of the Board of Trustees of Tempus Public Foundation (TPF) for giving me this chance to come to Hungary and collaborate with such experts in the field of Plant Biotechnology at the Department of Agricultural Botany, Plant Physiology and Biotechnology, University of Debrecen.

I had won 9 months scholarship (Type: D_hosszú posztdoktori tanút) under the supervision of **Assistant professor Dr. Eva Domoks-Szabolcsy**.

I had started with my colleagues to prepare for our experiment related to production of green biomass of alfalfa. The main aim besides investigating the development of alfalfa plants under different concentrations of Se is to study the isolation of leaf protein concentrate and its by-products, especially brown juice (BJ). We have started our field experiment at the Demonstration garden of University of Debrecen in spring 2020. We had 4 consecutive harvests and alfalfa plants were fertilized with different forms and concentrations of selenium. Directly, after the harvest, we started to extract the BJ and analyze it. Consequently, we designed a pot experiment and germination test under lab conditions to study the influence of BJ of the germination and development of French Marigold (*Tagetes patula* L.) plants. Our results were very promising and we published it within Q1 journal in May 2021.

In May 2021, we have started a field experiment with different plant species to investigate the efficiency of BJ as a fertilizer/ conditioner under field conditions since our lab results were very interesting.

However, in parallel I had start writing manuscripts of research articles and submitting them to international recognized journals (Q1 and Q2), as well as Book chapter is published by Springer.

Of course, I acknowledged TPF for their co-financial support and I will send the accepted manuscripts later to TPF.

Published articles:

- 1- Bákonyi N, Kisvarga Sz, Barna D, Tóth I, El-Ramady H, Abdalla N, Kovács Sz, Rozbach M, Fehér Cs, Elhawat N, **Alshaal T**, Fári M (2019) Chemical traits of fermented alfalfa brown

- juice: Its implications on physiological, biochemical, anatomical and growth parameters of Celosia. *Agronomy* 2020, 10(2), 247; <https://doi.org/10.3390/agronomy10020247>
- 2- Kaszása L, Alshaal T, Kovácsa Z, Koroknaia J, Elhawat N, Nagy É, El-Ramady H, Fári M, Domokos-Szabolcsy É (2020) Refining a high-quality leaf protein and valuable co-products from green biomass of different Jerusalem artichoke cultivars for sustainable protein supply. *Biomass Conv. Bioref.* (2020). <https://doi.org/10.1007/s13399-020-00696-z>
 - 3- Kaszása L, Alshaal T, El-Ramady H, Kovácsa Z, Koroknaia J, Elhawat N, Nagy É, Cziáky Z, Fári M, Domokos-Szabolcsy É (2019) Identification of Bioactive Phytochemicals in Leaf Protein Concentrate of Jerusalem Artichoke (*Helianthus tuberosus* L.) (2020) *Plants* 2020, 9, 889; doi:10.3390/plants9070889
 - 4- Kátai J, Zsuposné ÁO, Tállai M, Alshaal T (2020) Would fertilization history render the soil microbial communities and their activities more resistant to rainfall fluctuations? *Ecotoxicol Environ Saf.*;201:110803. doi: 10.1016/j.ecoenv.2020.110803.
 - 5- Sofy M., Elhawat N., **Alshaal T.** (2020) Glycine betaine counters salinity stress by maintaining high K⁺/Na⁺ ratio and antioxidant defense via limiting Na⁺ uptake in common bean (*Phaseolus vulgaris* L.) *Ecotoxicology and Environmental Safety* 200 (2020) 110732. <https://doi.org/10.1016/j.ecoenv.2020.110732>
 - 6- Kisvarga Sz, Barna D, Kovács Sz, Tóth IO, Fári M, Makleit P, Veres Sz, **Alshaal T**, Bákonyi N (2020) Fermented Alfalfa Brown Juice Significantly Stimulates the Growth and Development of Sweet Basil (*Ocimum basilicum* L.) *Plants*. *Agronomy* 2020, 10(5), 657; <https://doi.org/10.3390/agronomy10050657>
 - 7- Barna D., Kisvarga Sz., Kovács Sz., Csatári G., Tóth I.O., Fári M.G., Alshaal T., Bákonyi N. (2021) Raw and Fermented Alfalfa Brown Juice Induces Changes in the Germination and Development of French Marigold (*Tagetes patula* L.) *Plants*. *Plants* 2021, 10(6), 1076; <https://doi.org/10.3390/plants10061076>
 - 8- Kovács Z., Soós Á., Kovács B., Kaszás L., Elhawat N., Bákonyi N., Razem M., Fári MG., Prokisch J., Domokos-Szabolcsy É., Alshaal T. (2021) Uptake Dynamics of Ionic and Elemental Selenium Forms and Their Metabolism in Multiple-harvested Alfalfa (*Medicago sativa* L.). *Plants* (17th June 2021).

Book chapter under processing:

- 1- Alsaeedi A H, Alshaal T., N Elhawat (2021). Silicon and Nano-Silicon Mediated Drought and waterlogging Stress Tolerance in Plants. In: Hossain M. et al. (eds.), *Silicon and nano-silicon in environmental stress management and crop quality improvement: recent progress and future prospects*, Springer Nature Switzerland AG

Manuscripts submitted to Journals:

- 1- El-Nahrawy S., Alshaal T., Badawy S.A., Hafez E.M. (2021) Dual application of biochar and PGPB boosts physiology and yield of maize (*Zea mays* L.) irrigated with saline water in sodic-saline soil by improving soil properties and nutrient uptake. *Agricultural Water Management* (under review)

Now, we are almost done with the analysis of samples from pot experiment and later I am going to acknowledge TPF thanking them for their financial support.

Sincerely,

Tarek Alshaal