CZECH UNIVERSITY OF LIFE SCIENCES PRAGUE

Faculty of Environmental Sciences

Evaluation of the Diploma Thesis by Opponent

Thesis Title	**Nanoparticles as sorbents of metals/metalloids: implications for plant physiology**
Name of the student	**Didac Barroso**
Thesis supervisor	**Domingo Martínez-Fernández**
Opponent	**Mercedes García Sánchez**

	1	2	3	4
Téma práce a její význam	**1**	2	3	4
Formulace cílů práce	**1**	2	3	4
Metodika zpracování	**1**	2	3	4
Práce s daty a informacemi	1	**2**	3	4
Celkový postup řešení	**1**	2	3	4
Teoretické zázemí autora	**1**	2	3	4
Členění práce (kapitoly, podkapitoly, odstavce)	**1**	2	3	4
Práce s odbornou literaturou (citace, norma)	**1**	2	3	4
Úroveň jazykového zpracování	**1**	2	3	4
Přesnost formulací a práce s odborným jazykem	**1**	2	3	4
Formální zpracování – celkový dojem	1	**2**	3	4
Splnění cílů práce	**1**	2	3	4
Závěry práce a jejich formulace	**1**	2	3	4
Odborný přínos práce a její praktické využití	**1**	2	3	4
Souhrn a klíčová slova odpovídají obsahu práce	1	**2**	3	4

Evaluation of the work by grade (1, 2, 3, 4)	**1**

Evaluation: 1 = the best

Date   18. 05. 2015

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Signature of Opponent

Other comments or suggestions:

The study of the effect of nano-particles on plant physiology has not been studied to this date thus, the topic presented in this diploma thesis seem to be novel and interesting. However, from my point of view, I think the tittle of this thesis has not been appropiate since it has not been tested the capacity of nanoparticles for immobilizing metals. Likewise, I think the introduction was more focus on describing aspect of metal soil pollution and it is missing some section in the introduction in which is describing aspects related to physiological effect of nanoparticles and/or similar materials in plants since this is the topic of this project. In addition, I found some mistake in Image 7, the ascorbate cycle is usually known as ascorbate-gluthathione cycle and/or Halliwell-Asada-Foyer cycle and the reference is missing.

Questions for thesis defence (min. 2 questions):

1. 1. Can be considered the nanoparticles as inorganic amendments?.

   2. In the introduction, you have explained the risk of nanoparticles for plants and human, but what about soil microorganism? Is there some approach about the interaction bewteen nanoparticles and soil microorganisms?.

   3. Do you think the hydroponic system is more appropriate to perform this types of experiment than pot system?.

   4. In material and methods, it is well-explained and justify why did you use sunflower as model plant. But do you think could be more appropriate to use other type of plant with higher sensibility to abiotic stress?.

   5. Why did you stablish 50 and 100 mg L as doses of application?.

   6. Why the experiment was only running for 7 days?. I think in this study is missing taking samples at different time of exposure to nanoparticles in order to evaluate the effect of them after short and long-term of exposure. In that way, differences in plant biomass could be expected. What do you think?

   7. The content in proline and ascorbate were tested in roots and/or leaves?. And the material used was fresh (previously freezer) or liophilized?.

   8. In your opinion, if the exposure of nanoparticles are reducing the root hydraulic conductivity, what kind of physiological effects in plants could be expected after long-term of exposure?.

   9. Do you have some approach about the role of nanoparticles and its interactions in plants grown in soil polluted and no-polluted by metals. These parameters: L0, RWC, SLA, proline, ascorbate... are seriously affected?.

   10. According to your findings, nanoparticles were not taken up by plants due to its size, and they have been accumulated in roots producing an adherence, so the higher concentration in Fe observed in roots was because of that. However, you said that there is a little amount of Fe which is absorbed from Hoagland, do you have some evidence of that? Maybe it could be convenient to set up a control without any source of Fe (only nanoparticles)?.

   11. Did you detect some sympton of chlorosis in the leaf of sunflower?. Do you think that it could be interesting analyze the effiency of photosystem II?.

   12. Do you think that the exposure to nanoparticles are inducing an stress?. Which will be the role of proline confering protection to plants against nanoparticles?.

   13. Is there some evidence nanoparticles induce an oxidative stress?. Why did you consider interesting to analyze the ascorbate?.

   14. Do you think changes in proline and ascorbate content could be expected after short and long-term exposure?.

   15. In your opinion, what other types of parameter could be used as stress markers?. Do you have an idea?

2.

Date   18. 05. 2015

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