

Summary of the context and overall objectives of the project (For the final period, include the conclusions of the action)

This section should include information on:

- What is the problem/issue being addressed?

The European Union targets to reduce the application of chemical pesticides, however due to the climate change and increased transportation, the problems related to pest invasions are increasing. It is estimated that about 35% potential crop yield is still lost due to pests worldwide and total crop losses from insect damage have nearly doubled from 7 to 13 % in Europe, despite the development of synthetic pesticides. Moreover, in the European Union, the use of effective pesticides, like highly toxic phosphines, is becoming prohibited due to environmental and public health issues. Several consumers allow only the use of non-contacting pesticides, the efficiency of which is very poor. Development of pesticide resistance in pests is also reducing the overall effectiveness of chemical pest control. Pest species are becoming resistant to pesticides at an increasing rate, partly because the availability of pesticide products that can be used in rotation against pests is decreasing. Introducing environment- and consumer-safe pesticides with novel mode of actions is needed as much as ever.

- Why is it important for society?

Two-third of stored grain commodities are estimated to be chemically treated twice per season. Due to global climate change and increased international trading, the incidence of insect contaminations will expectedly increase. Chemical regulations allow the use of less active ingredient per treatment which leads to the increased number of necessary treatments which have greater environmental impact on a long term. The wide spreading of our method will reduce the possible food and feed contamination of chemical pesticide, which will be beneficial for the whole society.

- What are the overall objectives?

Our objective is to commercialise PestiSi as a diatomaceous-earth-based insecticide additive applied during long-term grain storage, to develop the commercialisation strategy (including pricing) and distribution channels in Europe as well as to scale-up and standardise our production. This phase 1 project was executed with the aim to carry out technical and commercial feasibility assessment and to confirm our preliminary business assumptions.

Work performed from the beginning of the project to the end of the period covered by the report and main results achieved so far (For the final period please include an overview of the results and their exploitation and dissemination)

During the technological feasibility, PestiSi was tested and verified by a certified laboratory ensuring it is completely harmless on humans and other mammals. Our technology tests included the identification of the minimum amount of PestiSi necessary to be mixed into the grain for the effective storage treatment. Results showed that the amount necessary is below the threshold set for inorganic dust traces by the Hungarian Wheat Standard Regulations. This means that PestiSi can harmlessly remain in the grain after the end of the storage period. We examined the PestiSi method regarding the best application for wheat treatment at industrial scale. A standardized methodology has been developed that considers the different storing and handling techniques and associated equipment. A detailed market assessment was carried out describing target users and storage control trends. As a part of market validation and also as dissemination, we contacted our warehouse operator partners, collaborating farmers, agrochemical distributor companies as well as the Hungarian Grain and Feed Association (HGFA). The observed growing market for bio-pesticide gives a solid business growth potential. We reviewed the competition including chemical control techniques and natural solutions of bio-products on the market, and other commercially available silica-based products. Contingency

plans have been drafted addressing all important risks. Our IPR strategy was further defined. The company strategy was further developed. Furthermore, we developed the work plan for a Phase 2 project application outlining the overall work structure and timing. As a conclusion, we updated our business plan and defined the activities needed to commercialise PestiSi product.

Progress beyond the state of the art, expected results until the end of the project and potential impacts (including the socio-economic impact and the wider societal implications of the project so far)

The key novelty of our innovation, compared to traditional insecticides, that it is natural, contains no artificial chemicals, it has no effect on mammals and humans, and it can be applied under organic circumstances. The novelty is given by the nature, the size and shape of the diatomite crystals making our product superior to other, less effective, silica compounds. The main results of this project are an updated business plan and an action plan for commercialising PestiSi. This plan targets technical and business-related activities, such as optimisation studies, standardisation, demonstration, packing and formulation development, obtaining permissions and certifications, collaborating with distributors as well as IPR protection. The success of our project would have large market impact, as it would make possible safer long-term storage, thus helping small traders to adopt easier to market trends and thus facilitate world-wide grain trading.

Address (URL) of the project's public website

www.dunagabona.hu

Images attached to the Summary for publication

