D5.15. First Set of Practice Abstracts
novIGRain

First Set of Practice Abstracts	
Lead beneficiary:	**United Experts**
Main authors:	**Egor Moshkin**
Issued Date:	**25/04/2023**
Due date:	**30/04/2023**

Version	Date	Contributors	Reviewers
1	**25/04/2023**	**Egor Moshkin (United Experts)**	**Frédéric Verwilghen (MAXILINE)**
2	**24/05/2024**	**Egor Moshkin (United Experts)**	**Frédéric Verwilghen (MAXILINE)**

Dissemination Level	
X	**PU = Public**
	PP = Restricted to other programme participants (including the EC)
	RE = Restricted to a group specified by the consortium (including the EC)
	CO = Confidential, only for members of the consortium (including the EC)

This project has received funding from the European Union's Horizon 2020 research and innovation programme, under grant agreement No 101000663.

Table of Contents

Table of Contents 2
1 Introduction 3
1.1 Purpose of Practice Abstracts 3
2 Practice Abstracts 3
2.1 Development of Formulation for New Sustainable Plant Protection Product 3
2.1.1 Introduction 3
2.1.2 Research focus 3
2.2 Versatile Application Technology – Nebulisation for Sustainable Storage of Grains 4
2.2.1 Introduction 4
2.2.2 Research focus 4
2.3 Initial Survey of Insect Pest Resistance to Insecticides in Agro-Commodity Storages in Europe 4
2.3.1 Introduction 4
2.3.2 Research focus 4
2.4 Social and Environmental Impact Assessment for New Innovative Plant Protection Product 4
2.4.1 Introduction 4
2.4.2 Research focus 4
2.5 Assessment of Market Potential for New Innovative Plant Protection Product 5
2.5.1 Introduction 5
2.5.2 Research focus 5
3 Way Forward 5

1 Introduction

The novIGRain project aims to address a number of challenges in grain storage management. In particular it focuses on the development innovative products, technologies and utilises circular approaches to assess the impacts of these innovations. The work includes the following:

- The development of a novel product that can be applied as a ULV (ultra-low volume);
- The development of a novel application technology that should make it feasible to apply multiple insecticides at the same time;
- The development of tools and manuals for doing proper grain storage management taking into account the possible resistance of insects to substances applied. These will be based on research on insect resistance done within the novIGRain project (in combination with literature studies).
- The assessment of social and environmental impact associated with newly developed products and technologies along with market analysis, economic, legal and business potential assessment.

1.1 Purpose of Practice Abstracts

The practice abstracts are short summaries of various aspects of the work done in the novIGRain project. Their primary aim is to communicate the complex ideas and approaches involved in the project in a clear and concise way to a broader audience.

Based on the above-described facets of the work, several topics have been selected and written in a format that provides a short introduction to each topic, followed by the approach chosen by the project partners.

2 Practice Abstracts

2.1 Development of Formulation for New Sustainable Plant Protection Product

2.1.1 Introduction

European regulations are tightening controls on plant protection products (PPPs), banning certain insecticides. With fewer approved options, resistance to grain protectants is likely to rise, reducing PPP availability and increasing resistance risks. Our project aims to create a sustainable, plant oil-based ULV formulation with S-methoprene for indoor use on stored cereals, offering long-term prevention of insect infestations.

2.1.2 Research focus

We will study how the new formulation interacts with living organisms and the environment, predicting its impact on both. This includes examining its effects on target and non-target organisms. We'll analyse its physical and chemical properties, metabolism, toxicity, and environmental impact. Additionally, we'll test its effectiveness in both laboratory and real-world settings. The formulation works as a larvicide, disrupting the insect life cycle. When used with an adulticide, it can provide more reliable grain protection, potentially preventing up to 30% of grain losses and increasing income for farmers.

2.2 Versatile Application Technology – Nebulisation for Sustainable Storage of Grains

2.2.1 Introduction

European grain storage operators face challenges with current management methods and technologies. To address this, SOJAM is developing an innovative technique using two plant protection products (PPPs) at different doses. This method aims to enhance grain coverage and improve precision in PPP application, marking significant progress in grain insecticide treatment.

2.2.2 Research focus

We are developing a versatile dual-channel spraying system that can apply larvicides and adulticides simultaneously for better and longer-lasting control. This system uses separate nozzles for each product, so there's no need to mix different formulations in a single tank. This ensures accurate dosing, effective penetration, and avoids problems related to mixing. The portable device is designed for easy installation and operation in various systems, featuring adjustable nozzles and simple cleaning.

2.3 Initial Survey of Insect Pest Resistance to Insecticides in Agro-Commodity Storages in Europe

2.3.1 Introduction

To ensure grain storage across Europe is sustainable, we need to gather and present research and field data in a simple, practical way. Right now, there's a lack of clear information to assess the risk of insect resistance to Grain Storage Plant Protection Products (PPPs). This makes silo operators rely on cheaper options instead of effective ones, without knowing the results they might get.

2.3.2 Research focus

Our research aims to gather and present information on PPP resistance in a user-friendly tool or model. We looked at how resistance to PPPs works alongside other storage management techniques. Our results show that many EU storage facilities have pests resistant to common insecticides like deltamethrin, pirimiphos-methyl, and phosphine. By using quick resistance tests on pests, operators can take targeted actions, leading to better results and less insecticide residue. These benefits increase when combined with alternative, non-neurotoxic products.

2.4 Social and Environmental Impact Assessment for New Innovative Plant Protection Product

2.4.1 Introduction

Introducing new products and techniques requires thorough impact analysis to ensure environmental sustainability and consider social consequences throughout their life cycle. To do this accurately, we need a reference scenario for comparison, taking into account market specifics and feedback from stakeholders involved in the novIGRain project.

2.4.2 Research focus

We will compare the environmental impact of the new product with current practices and other alternatives. This involves assessing both local and global environmental impacts throughout the product's life cycle. We will also examine social impacts, including health and safety, fair competition, supplier relations, job creation, fair salaries, and gender equality. This comprehensive assessment will highlight the benefits of the new product and its application technique, helping guide the grain storage and plant protection industries towards more sustainable practices.

2.5 Assessment of Market Potential for New Innovative Plant Protection Product

2.5.1 Introduction

Assessing market potential and economic impact is essential for developing innovative plant protection products. Market knowledge and understanding legal constraints significantly influence the development process. Therefore, conducting market studies and legal reviews is vital to inform product development and ensure its economic viability.

2.5.2 Research focus

Our market study gathers general and specific data on stored grains, invasive species, large-scale storage, potential users, and available alternatives. We also evaluate the impact of EU legal frameworks on grain storage management, identifying thresholds and opportunities within EU policies and comparing them to global standards. Additionally, cost-benefit analyses will provide insights into costs, operational expenses, and benefits. These findings will help determine the new product's competitive advantages and explore business models and opportunities needed to bring the product and technology to market.

3 Way Forward

The first set of practice abstracts have been published at EIP-Agri website for broad dissemination, Before the end of the project, a second set of practice abstracts will be compiled. Those practice abstracts are currently expected to focus on the project’s progress and more concrete outcomes of the work done by the partners.