MINISTRY OF EDUCATION

NATIONAL INSTITUTE OF RESEARCH DEVELOPMENT FOR MACHINES AND INSTALLATION DESIGNED TO AGRICULTURE AND FOOD INDUSTRY
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LETTER OF INTENT

1. BACKGROUND:

1.1. Short presentation of INMA

The National Institute of Research-Development for Machines and Installations designed to Agriculture and Food Industry-INMA, from Bucharest/Romania (www.inma.ro) has an experience of about 80 years and it is the unique Romanian institute in the field. The main activities performed within the institute are *research-development* and *scientific services*.

The research-development activities comprise in elaboration of diagnoses, prognoses and strategies in the domain of technologies and technical equipment designed to agriculture and food industry, research and development of the processes, technologies and technical equipment for agriculture and food industry, performing of experimental models and prototypes, testing in laboratory and operating conditions of the machines and installations designed for agriculture and food industry in compliance with the UE procedures, norms and directives, standardization in the domain of technical equipment and activities of professional training, specialization and staff certification in the domain of mechanization technologies.

The scientific services comprise in testing of technical equipment, certificating the product conformity, performing technical inspections for tractors, lorries, trailers and cars, technological transfer and innovative business through the accredited incubator INMA-ITA.

The main Research Directions are:

- Fundamental research of interaction phenomena of biological, soil and technological factors on the technical equipment in the processes of mechanization and automation of works in agriculture;
- Scientific substantiation of the processes in agriculture, food industry and creating of new innovative technologies, instruments and technical equipment designed to soil works, establishing, maintaining and harvesting agricultural crops, horticultural cultures, as well as, agricultural and livestock and agro-forestry works; in compliance with environment preserving and fighting against draught phenomena and desertification;
- Renewable power sources: biomass, bio-fuels, biogas (from animal dejections and vegetal wastes), technologies and technical equipment for their use in conditions of efficiency, life, health and environment protection;
- Rural development and raising of life quality by technological transfer and demonstrations of the research results performed by the Institute;
- Strengthening the research basis (human resources, logistics, research equipment) and performing some partnerships for connecting to ERA, including the integration within the technological platforms at the European level;
- Substantiating and achieving new mechanizing and automating technologies designed to agricultural and food industry processes, such as: conditioning, processing, stocking and storing primary agricultural products, non-agricultural products and aquaculture in conditions of efficiency, security and safety.

1.2. INMA achievements

Development of alternative biofuels production by using new non-biomass and non-fossile resources has represented one of the main concerns of INMA in order to promote new renewable energy resources, enhance rural sustainable growth, reduce fossile fuel consumption of agricultural farms and diminish greenhouse gas emissions effect.

At INMA Bucharest, within PN II the project „***Promoting a technology of extracting the vegetal oils as a clean source of preserving the environment and reducing greenhouse gas emissions after being used on agricultural farms*** „has been run**.**

Within the research project, we designed, performed and tested an installation for obtaining the vegetal oils. The tests were performed when the oil was extracted from the rape and camelina oil seeds. The oil obtained from rape seeds was used after degumming operation to specialized installations, as biofuel for Diesel engines instead of gas oil, and camelina oil was used to test aeroplanes engines instead of kerosen.

1.3. INMA infrastructure

INMA research infrastructure consists in: installation of obtaining oils out of oil seeds, made of 3 modules, namely preparing the seeds, extracting the oil, purifying the oil; testing laboratories accredited in compliance with EU norms and directives, endowed with needed equipment; suitable qualified personnel.

2. DIRECTION AND OBJECTIVES OF RESEARCH:

It is well known that when vegetal oils are used as biofuel, presence of „gums" determines a whole series of drawbacks among which are: reduction of cetane number and formation of gels, because of thermo-chemical balance lack during the crude oil pre-heating.

We are intending to continue our researches in order to automate the extraction process and remove phospholipides out of the composition of oils obtained. The automating system must assure the operation of the entire installation by inter-blocked system, automatically supply the presses with seeds, according to forces developed during pressing.

We intend to perform the elimination of phospholipides (gums) by one of the following methods: ***enzymatic degumming*** which consists in biodegradation of phospholipides by enzymatic hydrolisis; ***EDTA degumming***(which is the salt of ethylene diamino tetraacetic acid), by decomposing phospholipides under EDTA action.

We are open to any collaboration for reaching the objectives aimed, namely obtaining and capitalizing vegetal oils as biofuel instead of gas oil for compression engines and, respectively, kerosen for planes engines.

3. COLLABORATION PROPOSAL:

Programme: Horizon 2020
Pillar no. 3: Societal Challenges
Call: 10. Secure, clean and efficient energy
Topic: LCE 11 – 2014/2015: Developing next generation technologies for biofuels and sustainable alternative fuels

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