**ESTABLISHMENT :** JUNIA

**Laboratory(ies) of affiliation :** UMR-t 1158 BioEcoAgro

**Scientific field, Speciality: the speciality of the thesis must be one of those of the thesis (co)-director**

**DS2 Dense media, materials and components**

**DS2 | Diluted media and fundamental optics**

**DS3 | Earth and Universe Sciences**

**DS3 | Earth, fluid envelopes**

**DS4 | Theoretical, Physical and Analytical Chemistry**

**DS4 | Organic, Inorganic and Industrial Chemistry**

**DS4 | Materials chemistry**

**DS5 | Molecular and Cellular Aspects of Biology**

**DS8 | Energy, heat, combustion**

**DS8 | Mechanics of solids, materials, structures and surfaces**

**DS10 | Food Biotechnology, Food Science, Physiology**

**DS10 | Biology of the environment, organisms, populations, ecology**

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**Affiliate programme(s):** Regional Council

**Planned (co)-funding :** University of Liège

**Title of the thesis : Characterization of the direct and indirect modes of action of an essential oil and its major compounds on the wheat-*Zymoseptoria* tritici pathosystem**

THESIS SUBJECT (about 1/2 page)

Septoria tritici blotch, caused by the hemibiotrophic fungus *Zymoseptoria tritici*, is one of the most major diseases on wheat crops, responsible for yield losses of up to 50%. The control of this disease relies mainly on the use of pesticides. However, due to the resistance developed by the pathogen to these compounds and a growing social demand to limit the use of chemical inputs in agriculture, agroecological alternatives, such as biocontrol, must be developed. The objective of this PhD project is in this context and aims at identifying biocontrol compounds based on biosourced essential oils, effective on the wheat-*Z.tritici* pathosystem, and to characterize their modes of action.

Based on promising preliminary works in the laboratory, six essential oils were selected for their strong antifungal bioactivity *in vitro*. The objective of this PhD project therefore is (i) to screen these six essential oils for their direct (antifungal against the pathogen) and indirect (stimulation of the plant defenses) activities on wheat against *Z. tritici*, (ii) to characterize the indirect mode of action of the most effective essential oil by targeted and non-targeted transcriptomic and metabolomic approaches, and (iii) to evaluate the direct effect on the cytoplasmic membranes of the fungus by biophysics and *in silico* modeling approaches.

**Expected date of recruitment :**

**Contact (e-mail address) :**

**Additional remarks/comments:**