

Endophytes isolated from *Chelidonium majus L.* and their abilities for biosurfactant production

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Introduction

Endophytes, which have been found in every plant species, are currently considered to be a wellspring of novel secondary metabolites. In view that some plants generating bioactive natural products have associated endophytes that produce the same natural substances, the endophytes has become an interesting alternative for functional substances production in a wide variety of medical, agricultural, and industrial areas. *Chelidonium majus L.* (greater celandine), is a plant occurring naturally in Europe, Asia and South America. Although the herb is toxic, it produces valuable bioactive substances. The preparations of celandine, ie. tinctures, infusions contains alkaloids which inhibit the growth of fungi, bacteria, viruses, protozoans. It has many therapeutic uses and also anticancer properties. Biosurfactants, which are bioactive compounds well known as remediation agents also have potential for medicine. The presence of these compounds in *Ch. majus* has not been previously studied.

Objectives

The main aim of the study was isolation of endophytic microorganisms from *Chelidonium majus* and evaluation of their ability to biosurfactant production.

Materials and methods

In this study endophytic microbes were isolated from *Chelidonium majus L.* originated from three different localization in Poland. The plant material was carefully dug up with a spade and transported to the laboratory.

Endophytes isolation

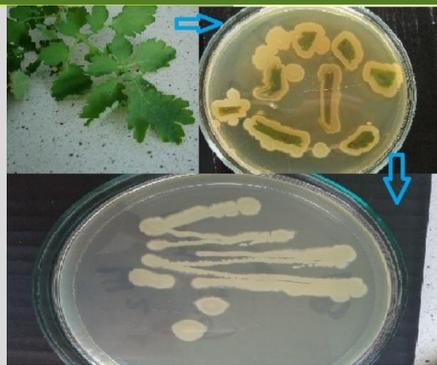
The samples of *Ch. majus* were washed up under the tap water from soil remains and dirt. Then samples were surface sterilized with 70% ethanol for 3 minutes, sodium hypochloride for 12 minutes, 70% ethanol for 30 seconds. Last phase was fivefold wash in sterile water. Surface-sterile plant samples were cut with sterile scalpel and put on the sterile Czapek-dox and Luria-Betani (LB) media, dedicated to fungi and bacteria, respectively. Then microorganisms were isolated to acquire pure cultures by streaking technique.

Emulsifying activity

The emulsifying activity was evaluated by adding 3 ml of each supernatant into tubes containing 1 ml of ON and 1 ml of 0.1 M phosphate buffer of pH 7. The mixture was homogenized for 30 sec at 18000 rpm in Yellow Line DI 18 basic homogenizer and immediately after, 0.1 ml of homogenized mixture was added to 1 ml of 0.1% sodium dodecylsulphate (SDS). Subsequently, the absorbance at 500 nm wavelength against water as a control sample was measured on the UV/VIS T80+ spectrophotometer.

Endophytic bacteria

Symbol of endophyte	Photograph of endophytes
1	
3	
2A	
9	
EN1	
EN6	
EN18	



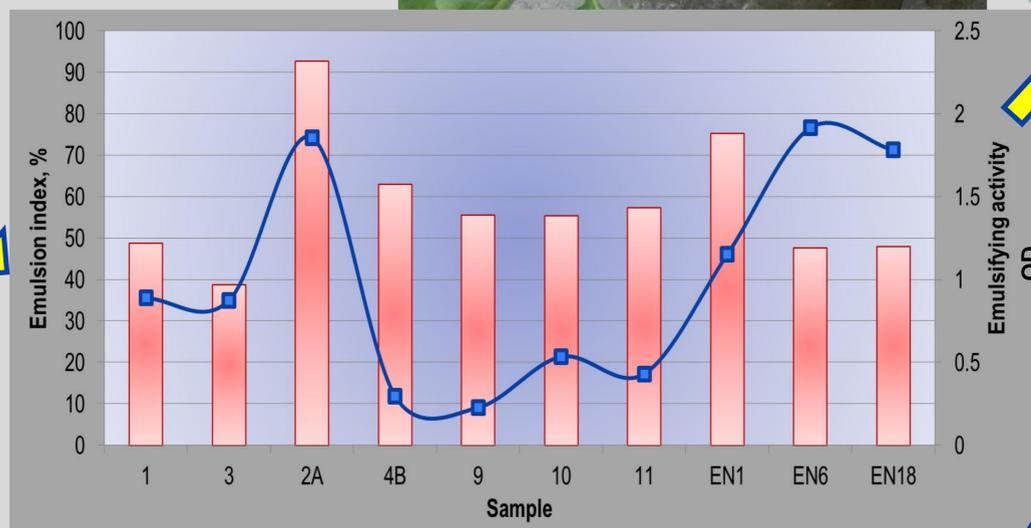
Chelidonium majus L.

Endophytic fungi

Symbol of endophyte	Photograph of endophyte
3	
8	
9B	
9R	
10	
11	

Low Emulsifying Activity!

Endophyte symbol	Emulsifying activity OD ₅₀₀			
	Biosurfactant synthesis [day]			
	5	8	12	15
EN1	0.75±0,04	0.83±0,04	0.72±0,03	0.78±0,04
2A	0.79±0,04	0.81±0,04	0.79±0,04	0.76±0,04
EN6	0.63±0,03	0.8±0,04	0.77±0,04	0.75±0,04
EN18	0.83±0,04	0.8±0,04	0.74±0,04	0.82±0,04



Conclusions

Obtained results strongly suggest that the endophytic microorganisms isolated from *Chelidonium majus* show good emulsification properties which is crucial for biosurfactants production. This is the first report showing the ability for biosurfactant production by *Ch. majus* endophytes.

References

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EN 18 endophyte - the best biosurfactant producer