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Escherichia Coli

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Expression and Purification of HFB1 from the Bacterial host *Escherichia Coli*

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**Abstract**

Hydrophobins are a unique class of proteins which grow in fungi which demonstrate unique properties, such as self-assembly into two dimensional arrays at water/air or water/solid interfaces. A specific type of hydrophobins, HFB1, will be closely examined, expressed, and purified within an *E. coli* host. Most hydrophobins are used within the medical field and are harvested directly from the fungi, with little research done to express the protein within a bacterial host for large scale production. Our research will revolve around developing a method to clone, express, and purify the hydrophobin, HFB1, within the bacterial host, with tweaking of the methods as problems and solutions arrive. The HFB1 developed will be used as a novel nanomaterial, with some applications being the removal of oil from water, or tissue-culture cell growth.

**Research Question**

What changes must be made to express and purify the protein HFB1 in the most efficient way possible?

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**Importance**

- Hydrophobins’ unique properties of self-assembly.
- *E. coli* is used as a bacterial host to produce the HFB1 faster; within one day.

**Methods**

General cloning of the HFB1 into bacterial vector are as follows:

- Preparation of Vector DNA
- Cloning DNA that expresses HFB1
- Creation of circular plasmid DNA

**Scheme of Cloning**

![Scheme of Cloning](image)

**Implications and Applications**

- Faster and more efficient production of HFB1 outside of fungal host
- Use within nanotechnology as a coating
- Stabilization of poorly water soluble drugs
- Expanding use of hydrophobin production and implementation

**References**