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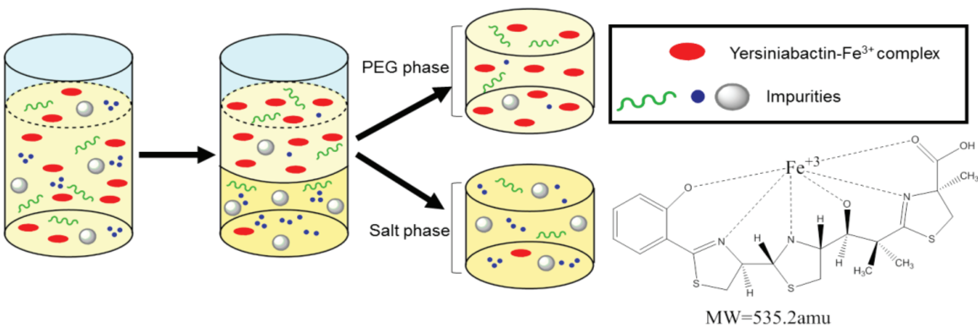
PRESS RELEASE

Pre-purification system allows heightened purity of a metal binding compound

September 1, 2015 — The use of an aqueous two phase system allowed the pre-purification of a complex natural product called yersiniabactin, which has an innate ability to bind iron. The research is part of a larger plan to efficiently produce and purify this compound for numerous applications associated with metal removal and retrieval.



A diagram of the aqueous two phase system (composed of poly(ethylene glycol) [PEG] and salt phases) used to pre-purify yersiniabactin from the crude extract of a cellular culture used to produce the compound. The compound, complexed to iron, is separated and concentrated into the PEG phase of the system and simplifies and improves subsequent steps at final purification.

A team of researchers from the State University of New York at Buffalo (University at Buffalo) have demonstrated a novel means of pre-purifying a natural product generated from a biosynthetic platform. The compound, termed yersiniabactin, has a unique ability to form strong complexes with metal ions, including iron and copper. As such, the compound has potential in a range of applications such as wastewater metal removal, physiological metal imbalance, and corrosion resistance. However, the compound is natively produced through a priority pathogen termed *Yersinia pestis* (causative agent of the plague). Engineers at the University at Buffalo have utilized an alternative approach to generating yersiniabactin by transplanting the biosynthetic process within a safe and technically-advanced surrogate host. Though this step avoids having to deal with the original production organism, there remain challenges of post-production access to the final compound.

To this end, the researchers implemented an aqueous two phase system that allowed the preferential partitioning of the final compound for the purpose of enhanced final separation and purification. The paper examined key parameters in optimizing the purification process and demonstrated a clear improvement in the recovered levels of the final compound. “This work paves the way for continued optimization of processes that will utilize this compound, especially those applications that would benefit from a purified form of yersiniabactin,” says Professor Blaine Pfeifer, Ph.D., of the University at Buffalo and Principal Investigator on the paper. Professor Pfeifer also highly recognized the implementation and testing of the idea by the study’s lead author, Mahmoud Kamal Ahmadi, a Ph.D. candidate in the Department of Chemical and Biological Engineering at the University at Buffalo.

The University at Buffalo team is now working on additional process engineering steps to scalably produce the yersiniabactin compound. Ultimate goals include a robust production process that provides the compound for numerous applications. The aqueous two phase system is a key component of this overall effort.

An additional co-author of the TECHNOLOGY paper is Samar Fawaz, also from the Chemical and Biological Engineering Department at the University at Buffalo. This work was funded by awards from the New York State Pollution Prevention Institute and the University at Buffalo eLab.

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