Chemo-enzymatic route to alkaloids

The reliable production of alkaloids, including the pain medication precursors (*R*)-reticuline and salutaridine promorphian, is absolutely critical for the pharmaceutical industry. However, traditional methods rely on plant extraction, leading to supply chain vulnerabilities. acib offers solutions: groundbreaking chemo-enzymatic or biotechnological synthesis processes to produce high-value alkaloids and in particular crucial opioid precursors. These new platform technologies offer the option to use renewable feedstocks and potentially outperform state-of-the-art synthetic technologies.

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DEVELOPMENT STATUS:
TRL 3 (proof of concept)

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ESR (ALL CLAIMS NEW & INVENTIVE) AVAILABLE;
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BACKGROUND

Currently, morphine-related alkaloids are extracted from plants, a method susceptible to factors like climate change and political instability. A more reliable and cost-efficient synthetic platform could solve this problem and also allow for the production of various opioid derivatives additionally to morphine.

TECHNOLOGY

First, acib's innovative chemo-enzymatic approach combines efficient organic synthesis with advanced biocatalysis to produce high-value alkaloids and in particular crucial opioid precursors. Examples are (*R*)-reticuline and salutaridine promorphian, which are key building blocks for important pain medications. The technology offers the option to use renewable feedstocks, e.g. eugenol, and exploits the use of defined enzymes/biocatalysts to introduce the desired chirality and make the C-C bond in the final steps.
Alternatively, the small molecules can be produced in submers culture using cells of their native production hosts, i.e. plants.

Advantages:

- Combines organic synthesis and biocatalytic methods for efficiency
- Optimized enzyme allow maximized productivity
- Optimized set-up for proteins, which are otherwise difficult to handle.

OFFER

acib seeks collaboration with companies or investors to further develop this platform technology. This partnership will establish a robust platform for commercially high-value alkaloids for the medical and pharmaceutical industries.