

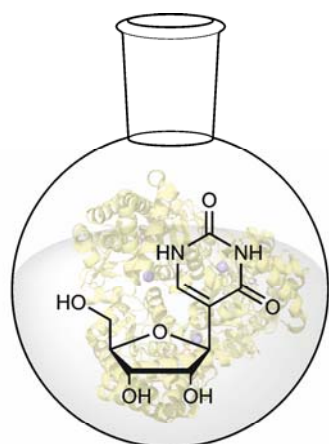
Synthesis of C-nucleosides or C-nucleotides

The technology provides an atom-efficient, highly selective biocatalytic route for the synthesis of C-nucleosides and C-nucleotides. The system allows for the full conversion of high substrate loads (>200 g/L) to product in one pot without any side-reactions. C-nucleosides and C-nucleotides are of high interest for the pharmaceutical industry, e.g. as building blocks in mRNA technology.

BACKGROUND

C-nucleosides and C-nucleotides are in increasing demand in the pharmaceutical industry, where they are high-value building blocks for anti-viral and anti-tumor agents as well as for mRNA vaccines. Pseudouridine, for example, serves as a precursor for the synthesis of mRNA vaccines with decreased immunogenicity. So far, however, C-nucleosides and their derivatives have not been easily accessible: Chemical synthetic routes generally suffer from poor selectivity and low yields, while biocatalytic routes require expensive cofactors whose regeneration poses major technological challenges. Our technology circumvents these problems and thus opens an opportunity for the cheap and efficient industrial production of this substance class.

TECHNOLOGY



productivity 36 g/L/h
product titer = 240 g/L
E-factor = 3
> 90% isolated yield
> 95% purity

One-pot biocatalytic cascade reaction

For the exemplary substrate pseudouridine the biocatalytic cascade proceeds to full conversion within 24 h with a productivity of 36 g/L/h and a final product titer of 240 g/L. No by-products are formed and pseudouridine is isolated in > 90% yield with > 95% purity. Due to the high atom efficiency and the effective isolation minimal amounts of waste are generated and the overall conversion offers an extremely small E factor of just 3.

ADVANTAGES

- One pot – no intermediate purification
- High product titer (240 g/L)
- Efficient: > 90% isolated yield, > 95% high purity
- 100% selective
- Sustainable (E factor = 3)

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KEYWORDS:

pseudouridine
mRNA
C-nucleotide
C-nucleoside
enzyme cascade
biocatalysis

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COOPERATION OPTIONS:

License Agreement
Transfer of Rights
R&D Agreement

DEVELOPMENT STATUS:

TRL 4
Synthesis performed in lab
scale: 100 mL, 24 g.
STATUS OF PATENTS:
EP Application filed

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