

Search for bioactivity of ambrein, a major constituent of ambergris

【Key words】

Perfume	Traditional Chinese medicine	Aphrodisiac	Pharmaceutical	Cosmetics
---------	------------------------------	-------------	----------------	-----------

■ Overview

Ambergris is a metabolic product of the sperm that accumulates as concretions in the gut of the animal, and is one of the most valuable scents in fine perfumery. It is still not known exactly how it is formed. Nowadays, sperm whales are a protected species under the Convention on International Trade in Endangered Species of Wild Fauna and Flora, and the supply of ambergris from nature has become very limited. Tricyclic triterpene, ambrein, is a chief source of the volatile compounds in ambergris. 31 volatiles from ambrein have been identified to date. Ambrox has been used as a substitute for ambergris, but is only one component (2%) obtained from ambergris. Thus, the supply of ambrein would be needed to enjoy the scents of ambergris. However, yield of chemical synthesis of ambrein was low (1.3-3.8%), and industrialization of ambrein has never been achieved.

In addition, ambergris has been used traditional medicine to cure migraine headaches, common colds, constipation, rheumatism and as an aphrodisiac. These bioactivity of ambrein has also been insufficiently investigated.

Recently, we succeeded to synthesize ambrein from inexpensive squalene by using one or two enzymes. Currently, we are looking for collaborative research to explore the bioactivity of ambrein.

■ Contact address

Niigata University, Institute for Social Innovation and Cooperation
 TEL: 025-262-7554 FAX: 025-262-7513 E-mail: onestop@adm.niigata-u.ac.jp

Ambrein

- 1) Ambrein is a major constituent (< 97%) of ambergris.
- 2) Ambergris (Ambrein) is found from gut of 1% of Sperm whale.
- 3) Ambergris (Ambrein) is one of the most valuable animal perfumes.
- 4) Ambergris (Ambrein) has been used traditional medicine to cure headaches, rheumatism and as an aphrodisiac.

Nowadays, the supply of ambergris has become very limited due to international agreements to avoid whaling.

Ambrein is now very expensive, and has not been studied the bioactivity in detail.

Enzymatic synthesis of ambrein

Two enzymes

Total yield 3%

One enzyme

Patent 2016 : Total yield 26%

Patent 2017 : Total yield 45%

We are conducting research aiming at further higher production.

· PCT/JP2014/071333
 · Ueda, D., Hoshino, T., Sato, T., J. Am. Chem. Soc., 135, 18335-18338, 2013.

Promotion of perfume / medicine development and new basic research centered on ambrein

Biosynthesis of ambrein (Sato) and Production mechanism of ambrein in Sperm whale (Collaboration between Sato and the National Science Museum) lead to Ambrein.

Ambrein is used for:

- Fragrance: Conversion of ambrein to the aroma component (Sato)
- New bioactivity: Collaborative research within the Niigata University

The effect of fragrance for brain (Niigata University) leads to Perfume, Aphrodisiac, and Traditional medicine.

Medicine leads to New basic research.