

Contribution Details

The glutamyl chain length of the cofactor F420 in the methanogenic Archaea *Methanosarcina thermophila* and *Methanoculleus thermophilus*

110

Poster

Mathias Wunderer, Andreas O. Wagner, Rudolf Markt

Submitted by: [MSc Mathias Wunderer](#)

Keywords: Anaerobic digestion, Archaea, F420

Abstract

The methanogenic Archaea *Methanosarcina thermophila* and *Methanoculleus thermophilus* were batch-cultivated on different carbon sources, and their coenzyme F420 glutamyl tail-length variants (F420-2 to F420-6) have been assayed by reversed-phase ion-pair high-performance liquid chromatography with fluorometric detection. To avoid interfering substances and enable reproducible high-performance liquid chromatography analyses, an upstream solid-phase extraction of the F420 cofactor variants has been developed.

In *Methanoculleus thermophilus* cultivated on H₂/CO₂ (80:20) the most abundant F420 cofactors were F420-3 and F420-4 and the composition of the different F420 cofactor variants remained stable during batch growth. By contrast, in *Methanosarcina thermophila* cultivated on methanol, acetate, or a mixture of acetate and methanol, the most abundant cofactors were F420-5 and F420-4 and the composition of the different cofactor variants changed during batch cultivation on all three carbon sources. Over time F420-3 and F420-4 decreased while F420-5 and F420-6 increased in their relative proportions. A decrease of F420-3 was often accompanied by an increase of F420-5 and a decrease of F420-4 with an increase of F420-6 and vice versa. This indicates that in *Methanosarcina thermophila* an enzyme exists which might be able to coevally transfer two glutamates and can still change the length of the glutamyl chain even after the cofactor has been synthesized. It was also possible to differentiate the two methanogenic Archaea based on the glutamyl tail length of the cofactor F420. The cofactor F420-5 in concentrations > 2% could only be assigned to *Methanosarcina thermophila*.

Review Result of the Program Committee

The contribution has been accepted as poster

Actions

[Edit Contribution Details](#) · [Upload Contribution](#) · [Withdraw Submission](#) · [Assign Reviewers](#)