

Description of Additional Supplementary data Files

Supplementary Data 1:

The full list of genome information, flavoprotein sequences, putative precursor sequences, accession id of flavoproteins, strain names and strain kingdoms.

Supplementary Data 2:

Sequence logos of 67 precursor clusters shown in the SSN. The file name format denotes *cluster number_number of sequences_phyla_representative sequence*.

Supplementary Data 3:

Phylogenetic analysis of 32 ACP BGC families.

Supplementary Data 4:

The mass calculation table of *mat* BGC.

Supplementary Data 5:

Tandem mass calculation table of *mat* BGC.

Supplementary Data 6:

The mass calculation table of *sis* BGC (including tandem mass).

Supplementary Data 7:

The mass calculation table of *keb* BGC (including tandem mass).

Supplementary Data 8:

Protein sequence and accession ID of the BGC in this study.