











**Figure S1.** Box plots of relative abundance of C16, Arctiin, Gingerglycolipid A, Microcystin-LR, Halistanol Sulfonic Acid F, Lilopristone, Lilopristone, 1-(2-Methoxy-13-Methyl-6z-Tetradecenyl)-Sn-Glycero-, MGMG(18:2(9Z,12)/0:0), Mytilin A, PS(16:0/0:0), Photinus Luciferin, Relamorelin, Disodium Phosphate, Beta-D-Fructose 2,6-Bisphosphate, Fosfomycin, L-Oxalylalbizziine, Cis-3-Chloro-2-Propene-1-ol, C16 Sphingosine, Dibutyl Phthalate, Dodecanamide.

**Table S1.** PCR primer sequences used in the experiment.

Gene name	Primer sequence	Biomarker
<i>16S rRNA</i>	FORWARD GGACGGGTGAGTAACGCGTA REVERSE CCCATTGCGGAAAATTCCCC	/
<i>psaB</i>	FORWARD CGGTGACTGGGGTGTGTATG REVERSE ACTCGGTTTGGGGATGGA	photosystem I
<i>ftsH</i>	FORWARD CCTCATTGACGAGGTTGGCT REVERSE TGGATCGTCCCGATTTAGCG	cell division
<i>rbcL</i>	FORWARD TCGGTGACGATTCCTGCTT REVERSE AGGACTCCAACGGCAAGC	photosystem II
<i>mcyA</i>	FORWARD GCCGATGTTTGGCTGTAAAT REVERSE ATCCAGCAGTTGACCAAGC	synthesis of microcystin
<i>mcyD</i>	FORWARD TTACCCCTTTCGGCTCGTTC REVERSE GAAAAATCCCCCGCCCTGTA	synthesis of microcystin
<i>mcyH</i>	FORWARD ACAACCCGTGAAATGACCGA REVERSE TCCAAGGAACTTCCGCATC	transport of microcystin
<i>psbB</i>	FORWARD CGGTGACTGGGGTGTGTATG REVERSE ACTCGGTTTGGGGATGGA	photosystem II
<i>bchL</i>	FORWARD TCGGTGACGATTCCTGCTT REVERSE AGGACTCCAACGGCAAGC	negative regulatory factors of cell death
<i>pgk</i>	FORWARD CAATAGTTGGTAGTGCCGCC REVERSE ACAGAGGCTGATTTAGCGGG	glycolysis
<i>pckA</i>	FORWARD TGCCGAATACGAACCCCAAA REVERSE CGTCCATCATCGTAGTCGGG	TCA cycle

**Table S2.** Detailed information of circoS diagram.

Id	Classification level	Term
mar02010	Environmental Information Processing	ABC transporters
mar02020	Environmental Information Processing	Two-component system
mar00998	Metabolism	Biosynthesis of various antibiotics
mar00790	Metabolism	Folate biosynthesis
mar00910	Metabolism	Nitrogen metabolism
mar00710	Metabolism	Carbon fixation in photosynthetic organisms
mar00660	Metabolism	C5-Branched dibasic acid metabolism
mar00625	Metabolism	Chloroalkane and chloroalkene degradation
mar00650	Metabolism	Butanoate metabolism
mar00970	Genetic Information Processing	Aminoacyl-tRNA biosynthesis
mar02024	Cellular Processes	Quorum sensing
mar00630	Metabolism	Glyoxylate and dicarboxylate metabolism
mar00680	Metabolism	Methane metabolism
mar00860	Metabolism	Porphyrin metabolism