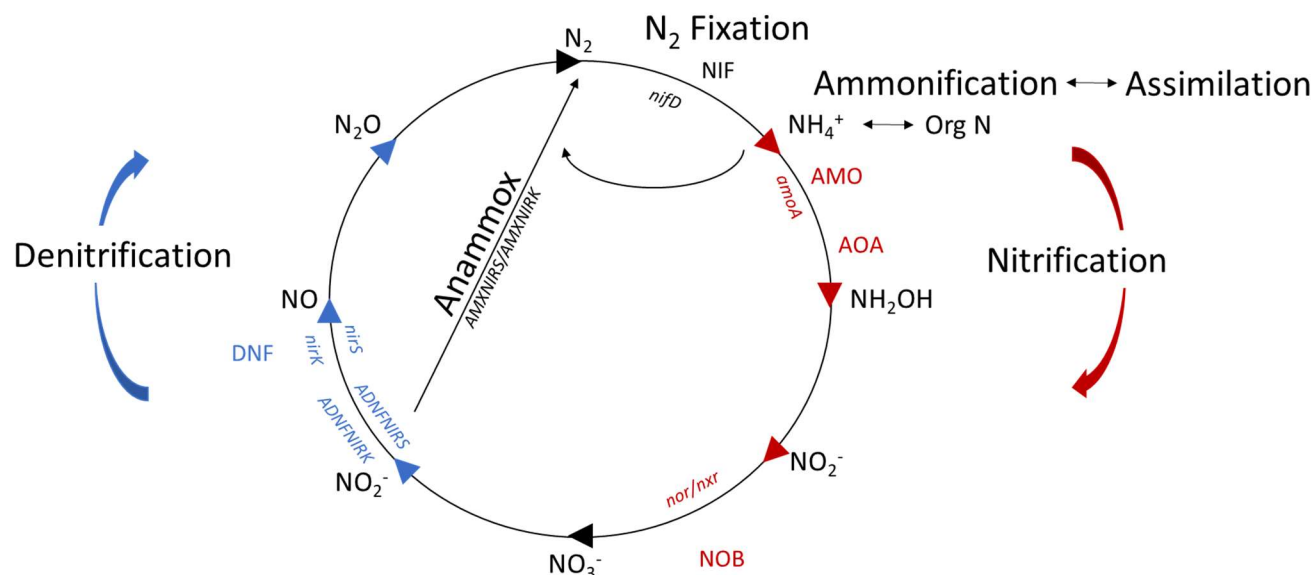


Closing the Nitrogen Cycle with Molecular Biological Tools



Microbial Insights can quantify microorganisms or functional genes responsible for processes in the nitrogen cycle including nitrification, denitrification, nitrogen fixation, and anaerobic ammonia oxidation (Anammox). Many of these organisms are difficult to grow in a laboratory, making the use of molecular biological tools (MBTs) for quantification highly preferred over cultivation approaches.

Quantifiable Gene Targets Related to the Nitrogen Cycle

Target	MI Code	Description
Ammonia Oxidizing Bacteria	AMO	The AMO assay targets the ammonia monooxygenase gene (<i>amoA</i>) that encodes the enzyme responsible for the initial oxidation of ammonia in the nitrification process.
Ammonia Oxidizing Archaea	AOA	Taxonomic gene for archaea that can oxidize ammonia to nitrite.
Nitrite Oxidizing Bacteria	NOB	Responsible for converting nitrite to nitrate.
Nitrite Oxidizing Bacteria	NOR/NXR	Targets the gene encoding the enzyme responsible for the last step in nitrification.
Denitrifying Bacteria	DNF	The assays target the genes encoding two types of nitrite reductase enzymes (<i>nirS</i> and <i>nirK</i>) for quantification of denitrifying bacteria.
Archaeal Nitrate Reducers	ADNFNIRK	Functional gene responsible for converting nitrite to nitric oxide in archaeal organisms.
Archaeal Nitrate Reducers	ADNFNIRS	Functional gene responsible for converting nitrite to nitric oxide in archaeal organisms.
Anaerobic Ammonia Oxidizing Bacteria	AMXNIRS	This assay targets a nitrite reductase gene involved in converting nitrite to nitric oxide.
Anaerobic Ammonia Oxidizing Bacteria	AMXNIRK	This assay targets a nitrite reductase gene involved in converting nitrite to nitric oxide.
Nitrogen Fixing Bacteria	NIF	Targets the gene <i>nifD</i> related to the conversion of nitrogen to ammonium which can be assimilated by organisms.