N-DAMO process package

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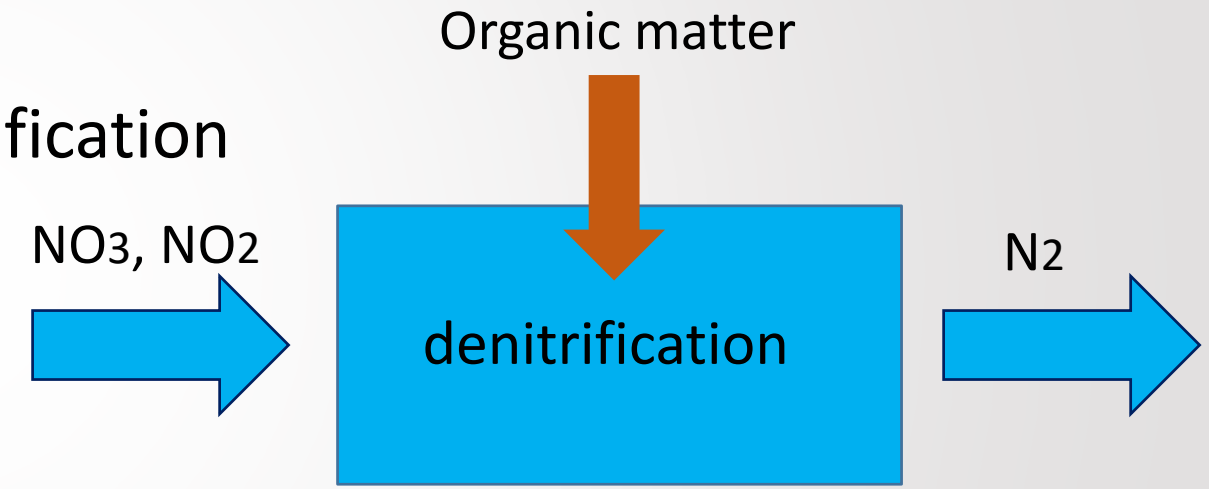
Background

- Problem for wastewater treatment plant

1. CH_4 emission
2. Insufficient organic matter in denitrification



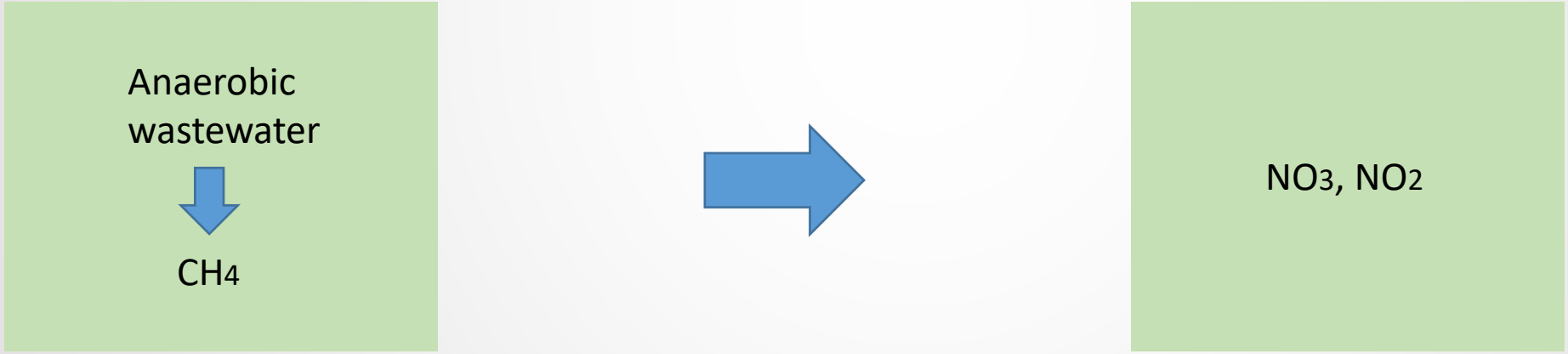
- N-DAMO process

$4NO_3^- + CH_4 \rightarrow 4NO_2^- + CO_2 + 2H_2O$ N-DAMO archaea

$8NO_2^- + 3CH_4 + 8H^+ \rightarrow 4N_2 + 3CO_2 + 10H_2O$ N-DAMO bacteria

Use case

- Engineer works in the wastewater treatment plant
- Evaluating if we can apply anaerobic wastewater (CH_4) to remove NO_3, NO_2
- Get preliminary result to see NO_3, NO_2 and reaction time



Preliminary decide if N-DAMO process exists

Determine the ratio of wastewater input

N-DAMO process reaction NO_3, NO_2 visualization

Design

- **First goal: Evaluate if N-DAMO process exists**

  Data input: excel file

  Functions:

  1. extracting BOD, temperature, salinity data for calculating dissolved CH_4

  2. select minimum dissolved CH_4 to compare with methane affinity value for determining existence of N-DAMO process

- **Second goal: Have preliminary understanding about NO_3, NO_2 concentration by N-DAMO process**

  Data input: the minimum dissolved CH_4

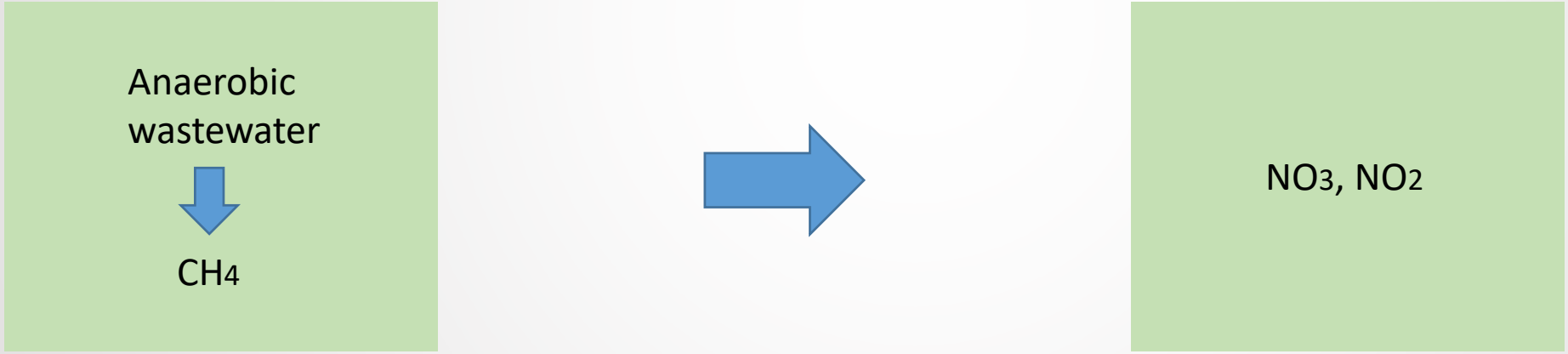
  Functions:

  1. Tellurium model to see concentration change of NO_3, NO_2

  → How long it takes for NO_3, NO_2 converting to N_2

Lessons learned and future work

- Lessons learned: be cautious to data type
- Future work: add a stop function if N-DAMO process does not exist



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N-DAMO process reaction NO_3, NO_2 visualization