

A pilot-plant research facility in Stockholm – Possibilities to test new treatment processes as magnesium salt addition to meet requirements for the future

Wastewater reuse, nutrient removal/recovery, energy savings/production – Can use of magnesium compounds provide a sustainable solution?



E. Levlin*, R. Hassanzadeh, M. Liang, M.S. Suleaman, M. Löwén, R.A. Soh, B. Hultman, J. Trela and E. Plaza
 Department of Land and Water Resources Engineering,
 Royal Institute of Technology KTH, S-100 44 Stockholm, Sweden
 (*E-mail: levlin@kth.se)

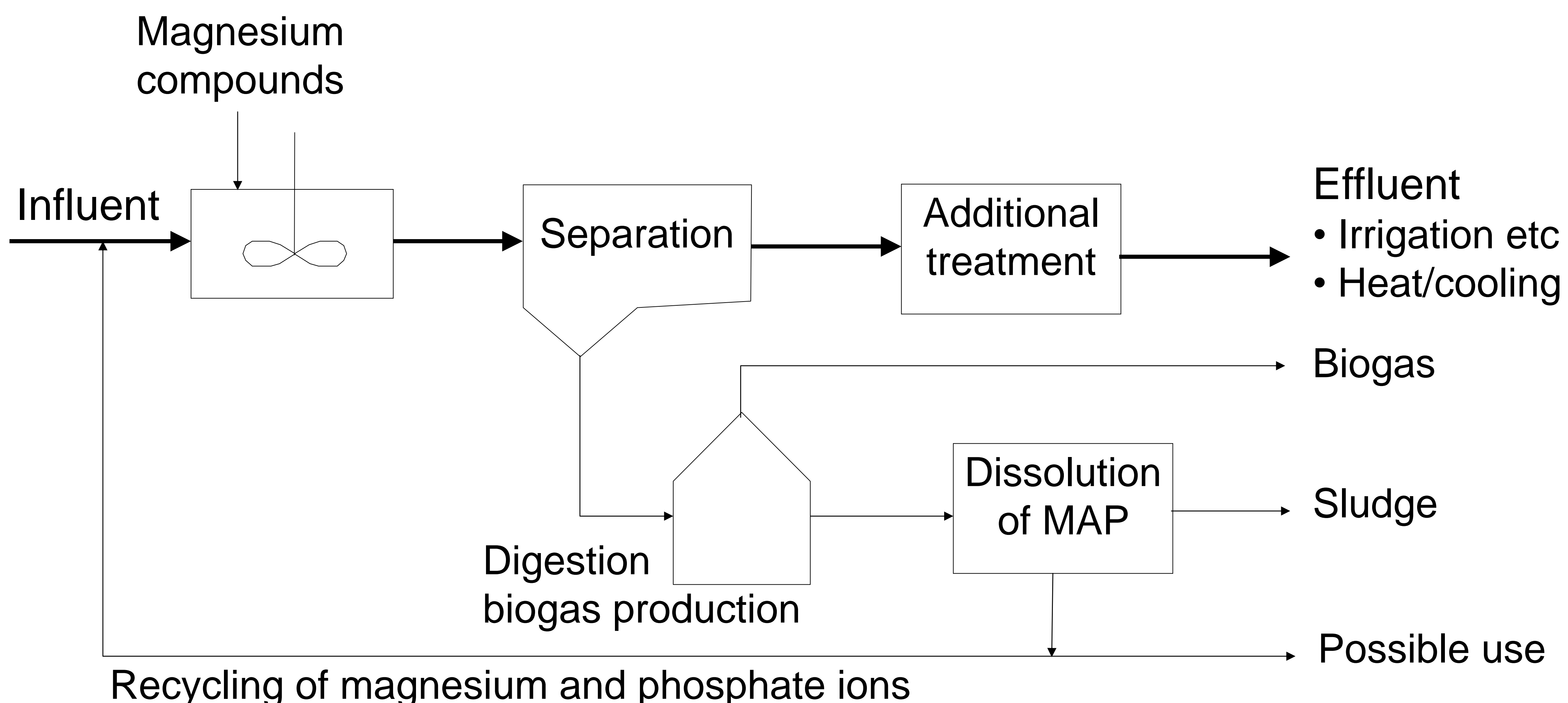


Introduction

Studies at KTH has led to the hypothesis that MAPDIDEAMMON (MAP precipitation, Digestion and recovery by DEAMMONification bacteria) may provide a new system technology for meeting different wastewater treatment goals. So far only theoretical and experimental works (based on master thesis works) have been performed.

Concept of MAPDIDEAMMON

- Use of cheap magnesium compounds as raw material and possible upgrading (brine from desalting, dolomite, different wastes)
- Recycling of enough magnesium- and phosphate ions to the influent to provide conditions for significant MAP precipitation
- Transfer of precipitated sludge to digester for biogas production
- Dissolution of part of MAP by deammonification (nitrification and/or anammox) bacteria for recycling back to influent



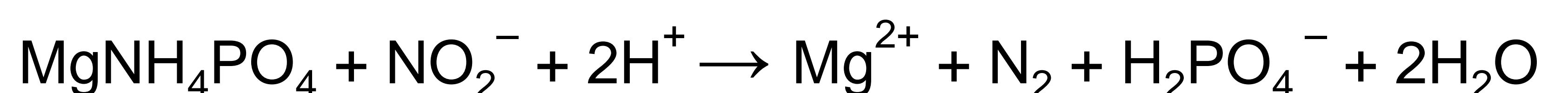
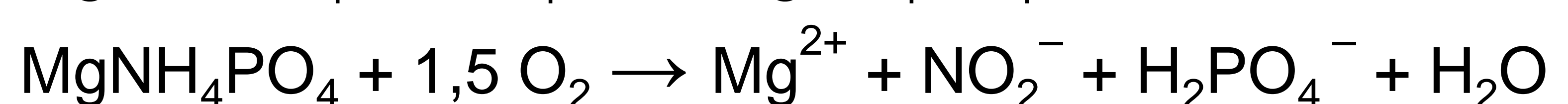
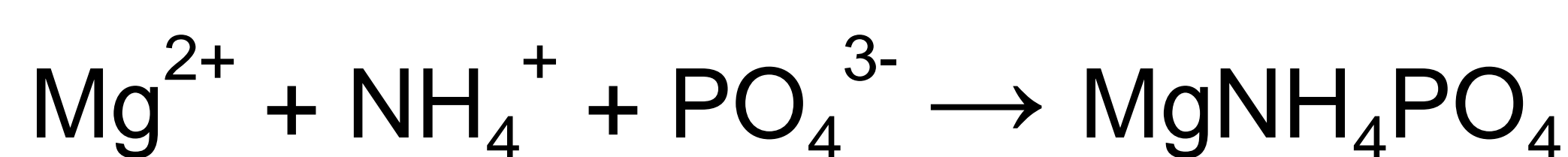
General process scheme of MAPDIDEAMMON

Preliminary results

- High removal efficiency of influent COD, SS and total P (up to 90 %).
- Partial removal of ammonium (up to at least 50%).
- Dissolution of MAP by nitration and anammox bacteria is possible based on theory and introductory experiments.

Research needs

- Upgrading of raw materials of magnesium compounds
- Necessary degree of recycling for the reactions:



- Biodegradability of precipitated sludge related to biogas production
- Mechanisms and kinetics of bacterial dissolution of MAP
- Risk of clogging
- System function related to resources needs, costs and product use