**Optimal integrated facility for waste processing**

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We greatly appreciate the comments of the reviewers to improve the quality and the clarity of the manuscript. Please find in **black** the reviewers’ comments, in **red** the answers to the points raised by the reviewer and in **blue** the new additions to the paper.

Reviewer #2: The authors have responded to my requests and comments in a satisfactory way. The manuscript may be accepted for publication.  
  
We appreciate the support of the reviewer to the revised version.  
  
Reviewer #3: The revised paper has addressed most of the previous comments. However, it is still not ready for publication.  Authors should further improve the structure of the paper to provide better flow of the proposed idea.  Based on the current arrangement, readers will be difficult to understand the proposed scope fully.  
  
Besides, authors should also address the following issues.  
  
- Literature review of process synthesis and optimization for bioenergy system should be provided. Highlight the novelty of the proposed framework.

We have provided a mathematical framework for the evaluation of nutrient recovery technologies that is nonexistent in the literature. Most of the work is experimental and the comparisons between technologies scarce

- Provide the list of component in a table form.

Following the suggestion of the reviewers

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Components set** | | | | | | | |
| **Number of component** | **Component** | **Number of component** | **Component** | **Number of component** | **Component** | **Number of component** | **Component** |
| **1** | Wa | **12** | O | **23** | K2O | **34** | Cl |
| **2** | CO2 | **13** | N | **24** | CaCO3 | **35** | Struvite |
| **3** | CO | **14** | Norg | **25** | FeCl3 | **36** | KStruvite |
| **4** | O2 | **15** | P | **26** | Antifoam | **37** | MgCl2\_CSTR |
| **5** | N2 | **16** | K | **27** | Fe2SO4\_3 | **38** | NaOH\_CSTR |
| **6** | H2S | **17** | S | **28** | Al2SO4\_3 | **39** | Mg\_CSTR |
| **7** | NH3 | **18** | Rest | **29** | AlCl3 | **40** | Cl\_CSTR |
| **8** | CH4 | **19** | Cattle\_slurry | **30** | MgCl2 | **41** | Struvite\_CSTR |
| **9** | SO2 | **20** | Pig\_slurry | **31** | NaOH | **42** | KStruvite\_CSTR |
| **10** | C | **21** | Poultry\_slurry | **32** | Struvite\_seeds | **43** | FeCl3\_Coag |
| **11** | H | **22** | P2O5 | **33** | Mg |  |  |

- Equations should be provided along with the discussion in Section 3.  This will allow the readers to understand the modelling better.

Actually we removed them because the reviewers said it was too long. We preferred them in the text of course. We have added them again

- Reaction equations should also be numbered.

Following the suggestion of the reviewer we have number all, equations and reactions.

- What is the computational time and model size for the case study?

Following the suggestion of the reviewer we have added to section 3

The superstructure consists of an NLP of approximately 4000 equations and 5000 variables solved using a multistart procedure with CONOPT 3.0 as the preferred solver. The computational time is around 60 min, although it varies for each problem as a consequence of the different data used in each case.

- Is the process selection only focusing on recovery of N and P? How about the selection technology for production and purification of biogas, power generation via biogas?

This work focuses on nutrient recovery since we have already addressed optimal power generation in a previous paper. Therefore, building on those results we focus on N and P recovery.

León, E., Martín, M., 2016. Optimal production of power in a combined cycle from manure based biogas. Energy Conv. Manag. 114, 89-99.

- How to generate the presented results?

We solve the optimization model as presented in section 3.

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