
This item was submitted to [Loughborough's Research Repository](#) by the author.
Items in Figshare are protected by copyright, with all rights reserved, unless otherwise indicated.

Challenges to co-treatment caused by excess grit in faecal sludge

PLEASE CITE THE PUBLISHED VERSION

PUBLISHER

WEDC, Loughborough University

VERSION

VoR (Version of Record)

LICENCE

CC BY-NC-ND 4.0

REPOSITORY RECORD

Govindaraj, Senthilkumar, S Jeevan Raj, Dhanik Narayan, Yohananthan Sukumar, and Santhosh Ragavan. 2021. "Challenges to Co-treatment Caused by Excess Grit in Faecal Sludge". Loughborough University. <https://hdl.handle.net/2134/16974163.v1>.

42nd WEDC International Conference

ONLINE: 13 – 15 September, 2021

**EQUITABLE AND SUSTAINABLE WASH SERVICES:
FUTURE CHALLENGES IN A RAPIDLY CHANGING WORLD**

**Challenges to co-treatment caused by excess grit
in faecal sludge**

Govindaraj Senthilkumar, S. Jeevan Raj, N. Dhanik, S. Yohananthan & S. Ragavan

India

REFERENCE NO. 3206

Introduction

Tamil Nadu has around 50 functional Sewage Treatment Plants (STP), of which 31 STPs co-treat Fecal Sludge (FS) from Onsite Sanitation Systems along with sewage. There are multiple challenges involved in the co-treatment of FS. Some of the challenges are due to the difference in characteristics of sewage and FS which includes parameters such as Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), and solids content. Based on field observations by the TSU, handling of grit has turned out to be one among the key challenges for co-treatment.

This paper discusses in detail the challenges caused by grit on co-treatment infrastructure, operation and maintenance practices as well as the potential solutions for addressing the same. It will further discuss the limitations and practical considerations required while implementing the same based on ongoing field studies.

Discussion

The grit content in FS varies in the range of 1,000-8,000 cubic metres / million cubic metre whereas in sewage it is only 5-50 cubic metres / million cubic metre (EPA, 1995). The daily additional quantities of grit to be handled in STPs, due to FS addition vary from 2 to 22 cubic metres / million cubic metre of waste water treated. The grit in FS causes additional stress in grit removal mechanisms since the decanting facilities are operational for only 8 hours in a day.

There are multiple issues caused in the sewerage network and treatment infrastructure which emanate from the grit in FS. This includes challenges faced in the pump houses, STPs and the pipelines, based on the point of addition of FS. The composition of grit in FS is different from that of sewage. Grit in FS contains more gravel than fines compared to composition of grit in sewage. Grit removal arrangements in pump houses and STPs are primarily designed for removal of finer particles as seen in sewage. This affects the efficiency of grit removal mechanisms at pump houses and STP. The grit chamber in the pump houses gets filled quickly affecting the ability of the system to remove grit.

Approach to solutions

There is limited guidance on additional infrastructure to be provided, capacity enhancement required and operation and maintenance practices required to handle the disproportionate increase in grit arising from addition of FS. Two arrangements for improving grit removal efficiency are being implemented in the field. The first approach includes the use of an agitator along with the grit removal pump so that larger particles in the grit are kept in suspension and are removed. The second approach involves introducing separate grit removal infrastructure for FS before it is added to the sewage stream.

References

Environmental Protection Agency (1995). Waste water Treatment Manuals: Preliminary treatment. Environmental Protection Agency, Ireland.

Contact details

Senthilkumar is a chemical engineer with 18 years of experience in the field of water and waste treatment. At present he is working with the Tamil Nadu Urban Sanitation Support Programme to support the Government of Tamil Nadu for co-treatment scale up and process improvements.

IIHS CHENNAI, Floor 7A, Chaitanya Exotica, 24/51 Venkatnarayana Road, T Nagar, Chennai 600 017. India. Website: <https://iihs.co.in/>

G Senthilkumar: Telephone: +917200784430

Email: sgkumar@iihs.ac.in

S Jeevan Raj:

Telephone: +918300475319 Email: sjeevanraj@iihs.ac.in

Dhanik Narayan:

Telephone: +919891867681

Email: dnarayan@iihs.ac.in

Santhosh Ragavan:

IIHS CHENNAI, Floor 7A, Chaitanya Exotica, 24/51 Venkatnarayana Road, T Nagar, Chennai 600 017. India. Telephone: 9880030182

Email: santhoshkv@iihs.ac.in

Yohananthan Sukumar: IIHS TRICHY, 12B, Ponsri Villa, VOC Road, Cantonment, Trichy-620001, Tamilnadu, India. Telephone: +91 9080008478

Email: yohananthans@iihs.ac.in