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## **KOMAL JAYASWAL**

Ph.D. (IIT Roorkee)

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I am looking for an organization that provides me an opportunity to apply my knowledge and skills to achieve excellence for the organization and self. I want to work in a challenging and dynamic work environment where I can enhance my skills and abilities to bring success to the organization.

### **ACADEMIC PERFORMANCE**

#### **Doctor of Philosophy in Environmental Engineering (6<sup>th</sup> August 2014 – 23<sup>rd</sup> June 2021)**

Thesis: Studies on full scale UASB-DHS system for the treatment of municipal wastewater.

Advisors: Prof. B.R. Gurjar, Department of Civil Engineering, Indian Institute of Technology (IIT), Roorkee, India.

Prof. Hideki Harada, Department of Civil and Environmental Engineering, Tohoku University, Sendai, Japan.

#### **B.E Degree in Civil Engineering AMIE - The Institution of Engineers, India (December 2016 –pursuing)**

Subjects cleared: 8 Subjects of section B Civil Engineering

Subjects left: 1 subjects of section B Civil Engineering, Lab experiments & project work

#### **Master of Technology in Environmental Engineering (2012-2014)**

CGPA- 8.2 /10

Thesis: Water quality assessment using conventional and soft computing methods.

Advisors: Prof. R.M. Singh & Dr. N. Rawal, Department of Civil Engineering, Moti Lal Nehru National Institute of Technology (MNNIT), Allahabad, India.

#### **Bachelor of Technology in Biotechnology (2008-2012)**

CGPA – 9.74/10 (Second position)

Sam Higginbottom Institute of Agriculture, Technology and Sciences (SHIATS) Allahabad, India

#### **Intermediate, Bihar Board (2005)**

S.N.S.Y College, Purnea, India

## High School, I.C.S.E Board, (2003)

Jesus & Mary Academy, Patna, India

## PROFESSIONAL EXPERIENCE

### 1. Assistant Professor

April 2021 to June 2021

Department of Civil Engineering, **Greater Noida Institute of Technology, Greater Noida, India**

**Job responsibilities:** Teaching Hydraulics Engineering and Machines to Bachelor students and Solid Waste Management to Master Students. Administrative responsibilities (Student coordinator, Environmental lab in charge and others).

### 2. Researcher

December 2014 to May 2016

Environmental Engineering group, Department of Civil engineering, **Indian Institute of Technology, Roorkee**. Department of Civil and Environmental Engineering, Graduate School of Engineering, **Tohoku University, Japan**

Work done at 78 MLD municipal sewage treatment plant at Dhandupura, Agra.

**Advisor:** Prof. B.R. Gurjar and Prof. Hideki Harada

**Project titles:** UASB-DHS Integrated system- A sustainable sewage treatment technology.

**Job responsibilities:** Waste water characterization through physico-chemical method, handling of operation and maintenance of 5 MLD DHS plant, on site lab setup, study of DHS media over the operation period by investigating retained sludge and oxygen uptake rate, compare the process performance of UASB-DHS system with other full scale aerobic system such as UASB-FPU and UASB-EAS, quantification of five full scale UASB reactor sludge by specific methanogenic activity test using different substrate, presentation of research findings and manuscript writing.

**Achievements:** 4 Research paper, 1 Book chapter and 3 conference presentation.

## PUBLICATIONS

### Journal:

- Nomoto, N., Ali, M., **Jayaswal, K.**, Iguchi, A., Hatamoto, M., Okubo, T., Takahashi, M., Kubota, K., Tagawa, T., Uemura, S. and Yamaguchi, T., 2018. Characteristics of DO, organic matter, and ammonium profile for practical-scale DHS reactor under various organic load and temperature conditions. *Environmental technology*, 39(7), pp.907-916. [I.F: 2.21]
- Nomoto, N., Hatamoto, M., Ali, M., **Jayaswal, K.**, Iguchi, A., Okubo, T., Takahashi, M., Kubota, K., Tagawa, T., Uemura, S. and Yamaguchi, T., 2018. Characterization of sludge properties for sewage treatment in a practical-scale down-flow hanging sponge reactor: oxygen consumption and removal of organic matter, ammonium, and sulfur. *Water Science and Technology*, 77(3), pp.608-616. [I.F:1.63]

- Nomoto, N., Hatamoto, M., Hirakata, Y., Ali, M., **Jayaswal, K.**, Iguchi, A., Okubo, T., Takahashi, M., Kubota, K., Tagawa, T. and Uemura, S., 2018. Defining microbial community composition and seasonal variation in a sewage treatment plant in India using a down-flow hanging sponge reactor. *Applied microbiology and biotechnology*, 102(10), pp.4381-4392. [I.F:3.53]
- Nomoto Naoki, Tyagi Vinay Kumar, Ali Muntjeer, **Jayaswal Komal**, Maharajan Namita, Iguchi Akinori, Hatamoto Masashi, Okubo Tsutomu, Takahashi Masanobu, Kubota Kengo, Tagawa Tadashi, Uemura Shigeki, Yamaguchi Takashi, Harada Hideki., 2017. Application of DHS Reactor to Sewage Treatment in a Developing Country: Performance during Start-Up Period and under High Organic Load Condition. *Journal of Japan Society on Water Environment*, 40(1), pp.11-19. [I.F:1.07]

### **Book Chapter:**

- **Jayaswal, K.**, Sahu, V., & Gurjar, B. R. (2018). Water Pollution, Human Health and Remediation. In *Water Remediation* (pp. 11-27). Springer, Singapore.

**Citations: 50, h index: 4**

### **CONFERENCE PROCEEDINGS AND PRESENTATIONS**

- **Jayaswal, K.**, Nomoto, N., Singh, R.P., Gurjar, B.R., Kazmi, A.A., Harada, H., 2017. On Site Evaluation of Performance of a Practical Scale UASB-DHS System for Treating Municipal Sewage in India. In 2nd International Conference on Recent advancements in Chemical, Environmental & Energy Engineering., Chennai, India (**Best paper award**).
- **Jayaswal, K.**, Nomoto, N., Sahu, V., Gurjar, B.R., Kazmi, A.A., Harada, H., 2017. Performance Evaluation of a Practical Scale Down-Flow Hanging Sponge Process for Treatment of Municipal Sewage. In International Conference on Sustainable Energy and Environmental Challenges, Mohali, India (Poster presentation).
- Nomoto, N., Ali, M., **Jayaswal, K.**, Iguchi, A., Hatamoto, M., Okubo, T., Takahashi, M., Kubota, K., Tagawa, T., Uemura, S. and Yamaguchi, T., 2017. Removal and Oxygen Consumption of Retained Sludge for Organic Matter, Ammonium, and Sulfur in a Practical-Scale Down-Flow Hanging Sponge Sewage Treatment Reactor. In *International Conference on Sustainable Energy & Environmental Sciences (SEES). Proceedings* (p. 52). **Global Science and Technology Forum. Singapore.**
- **Jayaswal, K.**, Kalamdhad, A. and Singh, R.M. (2013). Physico-chemical Analysis of Vegetable Wastes using Rotary Drum. Published in Proceedings: International Conference on Health, Environment and Industrial Biotechnology (BioSangam-2013) at MNNIT Allahabad (Biotechnology Dept.), November 21-23, 2013 (**Best paper award**).

### **RESEARCH INTEREST**

- Environmental biotechnology
- Energy efficient wastewater and water treatment system
- Anaerobic wastewater treatment and sludge characterization
- Solid waste management

## TEACHING INTEREST

- Biological water and waste water treatment
- Environmental chemistry and microbiology
- Solid waste management
- Air pollution control

## ACADEMIC & INDUSTRIAL TRAINING

- One-week short term training programme on “Statistical Analysis using SPSS for Engineers and Researchers” October 2017 at Department of Mathematics at **National Institute of Technology, Hamirpur**, India.
- Fifty days summer training programme on “Rotary Drum Composting of Vegetable Waste with different composition and analysis of physico-chemical & biochemical parameters” May 2013 at Department of Civil Engineering at **Indian Institute of Technology, Guwahati**, India.
- One-month winter training programme on “Bioinformatics tools for analysis of gene, protein structure and computer aided drug designing” December 2011 at Biobrainz, Lucknow, India
- Forty days hands on training programme on “Different techniques of Molecular Biology, Proteomics & Immunotechnology” June 2010 at G Bioscience private limited, Noida, India.
- Fifteen days training programme on “Basic tools and techniques involved in Biotechnology laboratory” January 2010 at Transgene Life Sciences, Lucknow, India.

## INSTRUMENT HANDLED

Gas chromatography, Atomic Absorption Spectroscopy, High Performance Liquid Chromatography, Liquid chromatography mass spectrometer.

## AWARDS

- Got award for **best paper presentation** in 2nd International Conference on Recent advancements in Chemical, Environmental & Energy Engineering., Chennai, India, 2018.
- Ministry of Human Resource Development, Govt. of India, **Doctoral Fellowship**, 2014.
- Ministry of Human Resource Development, Govt. of India, **GATE Fellowship**, 2012 and 2014.
- Won **best poster** presentation award in International Conference on Health, Environment & Industrial Biotechnology, held on 21-23 November 2013, at MNNIT Allahabad.
- Secured **second position** in the Bachelor of Technology in Biotechnology programme of faculty of Engineering and Technology in 2012.
- Won **1<sup>st</sup> prize** in Poster competition held on 13<sup>th</sup> April 2011, by society of Biochemistry & Bioprocess Technology in SHIATS, Allahabad.
- Won **1<sup>st</sup> prize** in Collage competition in Ciencia Fusion competition held on 27<sup>th</sup> February 2011 by Society of Microbiology in SHIATS, Allahabad.

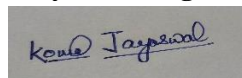
## PROFESSIONAL AFFILIATIONS

- Associate Member of Institution of Engineers India (IEI).

## NON SCHOLASTIC ACTIVITY

- Completed elementary **Japanese language** course during August 2019 to November 2019 from IIT Roorkee.
- Winner of cooking competition conducted in IIT Roorkee and passionate about cooking.
- Participated in “**Anti Cracker Campaign**” in association with the **Dainik Jagran**, in between 3<sup>rd</sup> to 12<sup>th</sup> November 2012 and 28<sup>th</sup> October to 2<sup>nd</sup> November 2013, for the cause of pollution free Diwali by delivering talks in various schools of Allahabad.
- Work in the **WWF-India project** “River health Assessment of the River Ganga during Kumbha 2013” from 10<sup>th</sup> March to 20<sup>th</sup> May 2013 for on-site sample collection and water quality parameter analysis from bathing ghats.
- Practicener of Heartfulness Meditation from Heartfulness Institute India.

**I hereby declare that all the information given above is correct to the best of my knowledge.**



**Place: Greater Noida**

**Komal Jayaswal**



# Defining microbial community composition and seasonal variation in a sewage treatment plant in India using a down-flow hanging sponge reactor

Naoki Nomoto<sup>1,2</sup> · Masashi Hatamoto<sup>3</sup> · Yuga Hirakata<sup>4</sup> · Muntjeer Ali<sup>5</sup> · Komal Jayaswal<sup>6</sup> · Akinori Iguchi<sup>7</sup> · Tsutomu Okubo<sup>8</sup> · Masanobu Takahashi<sup>5</sup> · Kengo Kubota<sup>9</sup> · Tadashi Tagawa<sup>10</sup> · Shigeki Uemura<sup>8</sup> · Takashi Yamaguchi<sup>4</sup> · Hideki Harada<sup>5</sup>

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## Abstract

The characteristics of the microbial community in a practical-scale down-flow hanging sponge (DHS) reactor, high in organic matter and sulfate ion concentration, and the seasonal variation of the microbial community composition were investigated. Microorganisms related to sulfur oxidation and reduction (2–27%), as well as *Leucobacter* (7.50%), were abundant in the reactor. Anaerobic bacteria (27–38% in the first layer) were also in abundance and were found to contribute to the removal of organic matter from the sewage in the reactor. By comparing the Simpson index, the abundance-based coverage estimator (ACE) index, and the species composition of the microbial community across seasons (summer/dry, summer/rainy, autumn/dry, and winter/dry), the microbial community was found to change in composition only during the winter season. In addition to the estimation of seasonal variation, the difference in the microbial community composition along the axes of the DHS reactor was investigated for the first time. Although the abundance of each bacterial species differed along both axes of the reactor, the change of the community composition in the reactor was found to be greater along the vertical axis than the horizontal axis of the DHS reactor.

**Keywords** DHS (down-flow hanging sponge) · Microbial community composition · Sewage treatment · Developing country

**Electronic supplementary material** The online version of this article (<https://doi.org/10.1007/s00253-018-8864-1>) contains supplementary material, which is available to authorized users.

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## Characteristics of DO, organic matter, and ammonium profile for practical-scale DHS reactor under various organic load and temperature conditions

Naoki Nomoto, Muntjeer Ali, Komal Jayaswal, Akinori Iguchi, Masashi Hatamoto, Tsutomu Okubo, Masanobu Takahashi, Kengo Kubota, Tadashi Tagawa, Shigeki Uemura, Takashi Yamaguchi & Hideki Harada

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# Characterization of sludge properties for sewage treatment in a practical-scale down-flow hanging sponge reactor: oxygen consumption and removal of organic matter, ammonium, and sulfur

Naoki Nomoto, Masashi Hatamoto, Muntjeer Ali, Komal Jayaswal, Akinori Iguchi, Tsutomu Okubo, Masanobu Takahashi, Kengo Kubota, Tadashi Tagawa, Shigeki Uemura, Takashi Yamaguchi and Hideki Harada

## ABSTRACT

The characteristics of sludge retained in a down-flow hanging sponge reactor were investigated to provide a better understanding of the sewage treatment process in the reactor. The organic removal and sulfur oxidation conditions were found to differ between the first layer and the following three layers. It was found that 63% and 59% of the organic matter was removed in the first layer, even though the hydraulic retention time was only 0.2 h. It is thought that the organic removal resulted from aerobic and anaerobic biodegradation on the sponge medium. The sulfate concentration increased 1.5–1.9-fold in the first layer, with almost no subsequent change in the second to fourth layers. It was shown that oxidation of sulfide in the influent was completed in the first layer. The result of the oxygen uptake rate test with an ammonium nitrogen substrate suggested that the ammonium oxidation rate was affected by the condition of dissolved oxygen (DO) or oxidation–reduction potential (ORP).

**Key words** | developing country, down-flow hanging sponge, retained sludge, sewage treatment

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## 開発途上国における実機スケール DHS リアクターのスタートアップ 特性および高有機物負荷条件下における有機物処理性能

野 本 直 樹 <sup>1),*</sup>	Tyagi Vinay Kumar <sup>2,3)</sup>	Ali Muntjeer <sup>4)</sup>
Jayaswal Komal <sup>5)</sup>	Maharjan Namita <sup>1)</sup>	井 口 晃 徳 <sup>6)</sup>
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久保田 健 吾 <sup>2)</sup>	多 川 正 <sup>9)</sup>	上 村 繁 樹 <sup>8)</sup>
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### Application of DHS Reactor to Sewage Treatment in a Developing Country: Performance during Start-Up Period and under High Organic Load Condition

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Namita MAHARJAN<sup>1)</sup>, Akinori IGUCHI<sup>6)</sup>, Masashi HATAMOTO<sup>7)</sup>, Tsutomu OKUBO<sup>8)</sup>,  
Masanobu TAKAHASHI<sup>4)</sup>, Kengo KUBOTA<sup>2)</sup>, Tadashi TAGAWA<sup>9)</sup>, Shigeki UEMURA<sup>8)</sup>,  
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#### Abstract

A full-scale UASB (Up-flow Anaerobic Sludge Blanket)-DHS (Down-flow Hanging Sponge) system, which is a sewage treatment technology for developing countries, was applied in India, and its performance was evaluated. In the initial phase of start-up (up to the 3rd month), the DHS system showed a 60% COD<sub>Cr</sub> removal efficiency. Up to the 9th month, the operation of the DHS reactor was affected by various unforeseeable situations, e.g. inappropriate volume of DHS influent. However, from the 9th month onwards, a stable flow was received by the DHS reactor. From the 9th to the 12th month, the average COD<sub>Cr</sub> in the DHS effluent was 92 ( $\pm 20$ ) mg L<sup>-1</sup>. During this period, organic load fluctuated from 2.59 to 12.59 kg-COD<sub>Cr</sub> m<sup>-3</sup> day<sup>-1</sup>, and was high. However, the organic load and removal of the DHS reactor were directly proportional to each other. As a result, it was clarified that this system can maintain its organic matter treatment performance even under high organic load. Also start-up of the DHS reactor was achieved without maintenance, despite some common problem that can be seen in developing countries. It was shown that the DHS reactor is an appropriate sewage treatment technology for developing countries.

**Keywords:** DHS (Down-flow Hanging Sponge); Sewage treatment; Developing country; Start-up characteristics; High organic load

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