Determining ammonia nitrogen decay rate of Malaysian river water in a laboratory flume

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Abstract

There is lack of information regarding ammonia nitrogen (AN), (i.e. NH3-N) decay rate of river water in tropical regions like Malaysia. AN decay rate is a very important kinetic parameter to estimate NH3-N, nitrate nitrogen (NO3-N) and dissolved oxygen concentrations of river water by using computer models. This study presents determination of ammonia nitrogen decay rate of river water in the tropical environment of Malaysia. A laboratory flume was used to conduct twelve experiments. The flume was used to represent the turbulent condition of a typical river. Ammonia nitrogen decay rate for the tropical environment of Malaysia was observed to be between 0.194 and 0.554 per day. Median value of AN decay rate was 0.26 per day, which is slightly lower than the global median value of 0.295 per day. To check the accuracy of flume experiments, the AN decay rate of Pusu River obtained from the flume experiment was used to calibrate and validate ammonia nitrogen concentration of the river by using water quality analysis and simulation program (WASP). Very good calibration and validation results were achieved, which sub-stantiated the accuracy of the flume experiments.

Keywords

Author Keywords: Ammonia nitrogen; Decay; Tropical region; Laboratory flume; Water quality modeling
KeyWords Plus: TAIHU LAKE; QUALITY; ANAMMOX; SIMULATION; QUAL2K; SYSTEM; NITRIFICATION; TEMPERATURE; MANAGEMENT; CAPACITY

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Cited References: 35

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1. **A simulation-based suitability index of the quality and quantity of agricultural drainage water for reuse in irrigation** — Times Cited: 10
   By: Allam, Ayman; Fleifle, Amr; Tawfik, Ahmed; et al.
   SCIENCE OF THE TOTAL ENVIRONMENT Volume: 536 Pages: 79-90 Published: DEC 1 2015

2. Title: [not available] — Times Cited: 13
   By: Ambrose, R; Wool, T.
   WASP7 Stream transport-model theory and user's guide, supplement to water quality analysis simulation program (WASP) user documentation Published: 2009
   Publisher: National Exposure Research Laboratory, Office of Research and Development, US Environmental Protection Agency, Athens Georgia

3. Title: [not available] — Times Cited: 6,806
   Group Author(s): APHA, American Public Health Association, Inc
   Standard methods for the examination of water and wastewater Published: 2005

4. **Rates, constants, and kinetics formulations in surface water quality modeling** — Times Cited: 44
   By: Bowie, G L; Mills, W B; Porcella, D B.
   EPA Volume: 600 Pages: 3-85 Published: 1985

5. Title: [not available] — Times Cited: 56
   By: Chapra, S.C; Pelletier, G.J.
   QUAL2K: A Modeling Framework for Simulating River and Stream Water Quality: Documentation and Users' Manual Published: 2003
   Publisher: Civil and Environmental Engineering Dept., Tufts University, Medford, MA, USA.

6. Title: [not available] — Times Cited: 77
   By: Chapra, S. C.
   Surface water-quality modeling Published: 2008
   Publisher: Waveland press, Singapore

7. **The influence of lower temperature, influent fluctuations and long retention time on the performance of an upflow mode laboratory-scale septic tank** — Times Cited: 25
   By: Daija, Laura; Selberg, Aare; Rikmann, Ergo; et al.
   DESALINATION AND WATER TREATMENT Volume: 57 Issue: 40 Pages: 18679-18687 Published: 2016

8. **Sensitivity Analysis and Water Quality Modeling of a Tidal River Using a Modified Streeter-Phelps Equation with HEC-RAS-Calculated Hydraulic Characteristics** — Times Cited: 7
   By: Fan, Chihhao; Wang, Wei-Shen; Liu, Kevin Fong-Rey; et al.
   ENVIRONMENTAL MODELING & ASSESSMENT Volume: 17 Issue: 6 Pages: 639-651 Published: DEC 2012

9. **An innovative modeling approach using Qual2K and HEC-RAS integration to assess the impact of tidal effect on River Water quality simulation** — Times Cited: 53
   By: Fan, Chihhao; Ko, Chun-Han; Wang, Wei-Shen
   JOURNAL OF ENVIRONMENTAL MANAGEMENT Volume: 90 Issue: 5 Pages: 1824-1832 Published: APR 2009

10. **MODELING NITRIFICATION EFFECTS ON THE DISSOLVED-OXYGEN REGIME OF THE SPEED RIVER** — Times Cited: 12
    By: GOWDA, TPH
    WATER RESEARCH Volume: 17 Issue: 12 Pages: 1917-1927 Published: 1983

11. Title: [not available] — Times Cited: 2
    By: Haider, H.
    Water quality management model for Ravi River Published: 2010
    Publisher: University of Engineering & Technology, Lahore

12. **Evaluation of various relationships of reaeration rate coefficient for modeling dissolved oxygen in a river with extreme flow variations in Pakistan** — Times Cited: 23

By: Haider, Husnain; Ali, Waris; Haydar, Sajjad
HYDROLOGICAL PROCESSES Volume: 27 Issue: 26 Pages: 3949-3963 Published: DEC 30 2013

13. Title: [not available] Times Cited: 144
By: Ji, Z.G.
Hydrodynamics and Water Quality: Modeling Rivers, Lakes, and Estuaries Published: 2008
Publisher: Wiley-Interscience, Hoboken, NJ

14. Application of automated QUAL2Kw for water quality modeling and management in the Bagmati River, Nepal Times Cited: 54
By: Kannel, Prakash Raj; Lee, S.; Lee, Y. -S.; et al.
ECOLOGICAL MODELLING Volume: 202 Issue: 3-4 Pages: 503-517 Published: APR 10 2007

15. Water quality modelling for small river basins Times Cited: 50
By: Marsili-Libelli, Stefano; Giusti, Elisabetta
ENVIRONMENTAL MODELLING & SOFTWARE Volume: 23 Issue: 4 Pages: 451-463 Published: APR 2008

16. Title: [not available] Times Cited: 483
By: Metcalf, Eddy.
Wastewater Engineering: Treatment and Reuse Published: 2003
Publisher: McGraw-Hill, New York, NY

17. ASSESSMENT OF FUTURE CLIMATE CHANGE IMPACT ON WATER QUALITY OF CHUNGJU LAKE, SOUTH KOREA, USING WASP COUPLED WITH SWAT Times Cited: 14
By: Park, Jong Y.; Park, Geun A.; Kim, Seong J.
JOURNAL OF THE AMERICAN WATER RESOURCES ASSOCIATION Volume: 49 Issue: 6 Pages: 1225-1238 Published: DEC 2013

18. A water quality modeling study of the Nakdong River, Korea Times Cited: 73
By: Park, SS; Lee, YS
ECOLOGICAL MODELLING Volume: 152 Issue: 1 Pages: 65-75 Article Number: PII S0304-3800(01)00489-6 Published: JUN 15 2002

19. Modeling of dissolved oxygen and biochemical oxygen demand in River Water using detailed and simplifiedmodels Times Cited: 36
By: Radwan, M.; Williams, P.; El-Sadek, A.; et al.
International Journal of River Basin Management Volume: 1 Issue: 2 Pages: 97-103 Published: 2003
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20. A Case Study of Water Quality Simulation in Gargar River, Iran Times Cited: 3
By: Rafiee, M.; Akhond-Ali, A. M.; Moazed, H.; et al.
J. Hydraulic Structures Volume: 1 Issue: 2 Pages: 10-22 Published: 2014
[Show additional data]

21. River water quality modelling: I. State of the art Times Cited: 69
By: Rauch, W; Henze, M; Koncsos, L; et al.
WATER SCIENCE AND TECHNOLOGY Volume: 38 Issue: 11 Pages: 237-244 Published: 1998

22. Nitrite inhibition and limitation - the effect of nitrite spiking on anammox biofilm, suspended and granular biomass Times Cited: 28
By: Raudkivi, Markus; Zekker, Ivar; Rikmann, Ergo; et al.
WATER SCIENCE AND TECHNOLOGY Volume: 75 Issue: 2 Pages: 313-321 Published: JAN 2017

23. Sulfate-reducing anammox for sulfate and nitrogen containing wastewaters Times Cited: 23
By: Rikmann, E.; Zekker, I.; Tomingas, M.; et al.
DESALINATION AND WATER TREATMENT Volume: 57 Issue: 7 Pages: 3132-3141 Published: FEB 7 2016

24. Comparison of sulfate-reducing and conventional Anammox upflow anaerobic sludge blanket reactors Times Cited: 23
By: Rikmann, Ergo; Zekker, Ivar; Tomingas, Martin; et al.
JOURNAL OF BIOSCIENCE AND BIOENGINEERING Volume: 118 Issue: 4 Pages: 426-433 Published: OCT 2014

25. NITRIFICATION AND OTHER FACTORS AFFECTING NITROGEN IN HOLSTON RIVER Times Cited: 14
By: RUANE, RJ; KRENKEL, PA
JOURNAL WATER POLLUTION CONTROL FEDERATION Volume: 50 Issue: 8 Pages: 2016-2028 Published: 1978

26. **Modelling equilibrium distribution of carbonaceous ions and molecules in a heterogeneous system of CaCO3-water-gas** Times Cited: 21
By: Tenno, Toomas; Rikmann, Ergo; Zekker, Ivar; et al.
PROCEEDINGS OF THE ESTONIAN ACADEMY OF SCIENCES Volume: 65 Issue: 1 Pages: 68-77 Published: 2016

27. **Application of a constructed wetland system for polluted stream remediation** Times Cited: 25
By: Tu, Y. T.; Chiang, P. C.; Yang, J.; et al.
JOURNAL OF HYDROLOGY Volume: 510 Pages: 70-78 Published: MAR 14 2014

28. **Water quality evaluation in Tidal River reaches of Liaohe River Estuary, China using a revised QUAL2K model** Times Cited: 8
By: Ye Hanfeng; Guo Shuhai; Li Fengmei; et al.
CHINESE GEOGRAPHICAL SCIENCE Volume: 23 Issue: 3 Pages: 301-311 Article Number: 1002-0063(2013)23:3<301:WQEITR>2.0.TX;2-W Published: JUN 2013

29. **Stream structure characteristics and their impact on storage and flood control capacity in the urbanized plain river network** Times Cited: 2
By: Yuan, W.; Yang, K.; Tang, M.; et al.
Geographical Research Volume: 5 Article Number: 008 Published: 2005
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30. **Anammox enrichment from reject water on blank biofilm carriers and carriers containing nitrifying biomass: operation of two moving bed biofilm reactors (MBBR)** Times Cited: 35
By: Zekker, Ivar; Rikmann, Ergo; Tenno, Toomas; et al.
BIODEGRADATION Volume: 23 Issue: 4 Pages: 547-560 Published: JUL 2012

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