

Web of Science



Search Search Results

Tools Searches and alerts Search History Marked List

Free Full Text from Publisher

Full Text from Publisher



Save to EndNote online

Add to Marked List

1 of 1

Assessing Indoor Air Quality Using Chemometric Models

By: [Azid, A](#) (Azid, Azman)^[1]; [Amran, MA](#) (Amran, Mohammad Azizi)^[1]; [Samsudin, MS](#) (Samsudin, Mohd Saiful)^[1]; [Abd Rani, NL](#) (Abd Rani, Nurul Latiffah)^[1]; [Khalit, SI](#) (Khalit, Saiful Iskandar)^[1]; [Gasim, MB](#) (Gasim, Muhammad Barzani)^[1,2]; [Yunus, K](#) (Yunus, Kamaruzzaman)^[3]; [Saudi, ASM](#) (Saudi, Ahmad Shakir Mohd)^[4]; [Amin, SNSM](#) (Amin, Siti Noor Syuhada Muhammad)^[5]; [Yusof, KMKK](#) (Yusof, Ku Mohd Kalkausar Ku)^[1]

[View ResearcherID and ORCID](#)

POLISH JOURNAL OF ENVIRONMENTAL STUDIES

Volume: 27 Issue: 6 Pages: 2443-2450

DOI: 10.15244/pjoes/78154

Published: 2018

Document Type: Article

[View Journal Impact](#)

Abstract

The objectives of this study are to identify the significant variables and to verify the best statistical method for determining the effect of indoor air quality (IAQ) at 7 different locations in Universiti Sultan Zainal Abidin, Terengganu, Malaysia. The IAQ data were collected using in-situ measurement. Principal component analysis (PCA), partial least squares discriminant analysis (PLS-DA), linear discrimination analysis (LDA), and agglomerative hierarchical clustering (AHC) were used to classify the significant variables as well as to compare the best method for determining IAQ levels. PCA verifies only 4 out of 9 parameters (PM10, PM2.5, PM1.0, and O-3) and is the significant variable in IAQ. The PLS-DA model classifies 89.05% correct of the IAQ variables in each station compared to LDA with only 66.67% correct. AHC identifies three cluster groups, which are highly polluted concentration (HPC), moderately polluted concentration (MPC), and low-polluted concentration (LPC) area. PLS-DA verifies the groups produced by AHC by identifying the variables that affect the quality at each station without being affected by redundancy. In conclusion, PLS-DA is a promising procedure for differentiating the group classes and determining the correct percentage of variables for IAQ.

Keywords

Author Keywords: indoor air quality (IAQ); pattern recognition; PCA; PLS-DA; LDA

KeyWords Plus: POLLUTION

Author Information

Reprint Address: Azid, A; Amran, MA (reprint author)

+ Univ Sultan Zainal Abidin, Fac Bioresources & Food Ind, Besut Campus, Terengganu, Malaysia.

Addresses:

+ [1] Univ Sultan Zainal Abidin, Fac Bioresources & Food Ind, Besut Campus, Terengganu, Malaysia

+ [2] Univ Sultan Zainal Abidin, East Coast Environm Res Inst, Gong Badak Campus, Terengganu, Malaysia

+ [3] Int Islamic Univ Malaysia, Kulliyah Sci, Pahang, Malaysia

+ [4] Univ Kuala Lumpur, Inst Med Sci & Technol, Selangor, Malaysia

+ [5] Univ Sultan Zainal Abidin, Fac Hlth Sci, Gong Badak Campus, Terengganu, Malaysia

E-mail Addresses: azmanazid@unisza.edu.my; azizi.env@gmail.com

Funding

Funding Agency	Grant Number
university research fund	UniSZA/2016/GOT/01

[View funding text](#)

Publisher

HARD, POST-OFFICE BOX, 10-718 OLSZTYN 5, POLAND

Citation Network

In Web of Science Core Collection

0

Times Cited

[Create Citation Alert](#)

32

Cited References

[View Related Records](#)

Use in Web of Science

Web of Science Usage Count

2

Last 180 Days

2

Since 2013

[Learn more](#)

This record is from:

Web of Science Core Collection
- Science Citation Index Expanded

Suggest a correction

If you would like to improve the quality of the data in this record, please suggest a correction.

Categories / Classification

Research Areas: Environmental Sciences & Ecology

Web of Science Categories: Environmental Sciences

[See more data fields](#)

◀ 1 of 1 ▶

Cited References: 32

Showing 30 of 32 [View All in Cited References page](#)

(from Web of Science Core Collection)

1. [SPATIAL ANALYSIS OF THE CERTAIN AIR POLLUTANTS USING ENVIRONMETRIC TECHNIQUES](#) Times Cited: 4
By: Amran, Mohammad Azizi; Azid, Azman; Juahir, Hafizan; et al.
JURNAL TEKNOLOGI Volume: 75 Issue: 1 Pages: 241-249 Published: JUL 2015
2. [Outdoor ozone and building-related symptoms in the BASE study](#) Times Cited: 45
By: Apte, M. G.; Buchanan, I. S. H.; Mendell, M. J.
INDOOR AIR Volume: 18 Issue: 2 Pages: 156-170 Published: APR 2008
3. Title: [not available] Times Cited: 8
By: AZID A
JURNAL TEKNOLOGI Volume: 72 Pages: 83 Published: 2015
4. [Identification Source of Variation on Regional Impact of Air Quality Pattern Using Chemometric](#) Times Cited: 5
By: Azid, Azman; Juahir, Hafizan; Ezani, Ezureen; et al.
AEROSOL AND AIR QUALITY RESEARCH Volume: 15 Issue: 4 Pages: 1545-1558 Published: AUG 2015
5. [Prediction of the Level of Air Pollution Using Principal Component Analysis and Artificial Neural Network Techniques: a Case Study in Malaysia](#) Times Cited: 35
By: Azid, Azman; Juahir, Hafizan; Toriman, Mohd Ekhwan; et al.
WATER AIR AND SOIL POLLUTION Volume: 225 Issue: 8 Article Number: 2063 Published: AUG 2014
6. [Partial least squares for discrimination](#) Times Cited: 1,224
By: Barker, M; Rayens, W
JOURNAL OF CHEMOMETRICS Volume: 17 Issue: 3 Pages: 166-173 Published: MAR 2003
7. [Elemental carbon exposure and lung function in schoolchildren from Mexico City](#) Times Cited: 19
By: Barraza-Villarreal, A.; Escamilla-Nunez, M. C.; Hernandez-Cadena, L.; et al.
EUROPEAN RESPIRATORY JOURNAL Volume: 38 Issue: 3 Pages: 548-552 Published: SEP 2011
8. [Hospital Admissions and Chemical Composition of Fine Particle Air Pollution](#) Times Cited: 275
By: Bell, Michelle L.; Ebisu, Keita; Peng, Roger D.; et al.
AMERICAN JOURNAL OF RESPIRATORY AND CRITICAL CARE MEDICINE Volume: 179 Issue: 12 Pages: 1115-1120 Published: JUN 15 2009
9. [Single particle chemical analysis of ambient ultrafine aerosol: A review](#) Times Cited: 43
By: Bzdek, Bryan R.; Pennington, M. Ross; Johnston, Murray V.
JOURNAL OF AEROSOL SCIENCE Volume: 52 Pages: 109-120 Published: OCT 2012
10. [Particle size: A missing factor in risk assessment of human exposure to toxic chemicals in settled indoor dust](#) Times Cited: 47
By: Cao, Zhi-Guo; Yu, Gang; Chen, Yong-Shan; et al.
ENVIRONMENT INTERNATIONAL Volume: 49 Pages: 24-30 Published: NOV 15 2012
11. [Indoor/outdoor air pollution relationships in ten commercial buildings: PM2.5 and NO2](#) Times Cited: 27
By: Challoner, Avril; Gill, Laurence
BUILDING AND ENVIRONMENT Volume: 80 Pages: 159-173 Published: OCT 2014
12. [Application of PLS-DA in multivariate image analysis](#) Times Cited: 63

By: Chevallier, Sylvie; Bertrand, Dominique; Kohler, Achim; et al.

JOURNAL OF CHEMOMETRICS Volume: 20 Issue: 5 Pages: 221-229 Published: MAY 2006

13. Title: [not available] Times Cited: 1
Group Author(s): DEPARTMENT OF SAFETY AND HEALTH
The Industrial Code of Practice Indoor Air Quality (ICOP) published on 2010 Published: 2010

14. **Posture class prediction of pre-peak height velocity subjects according to gross body segment orientations using linear discriminant analysis** Times Cited: 10
By: Dolphens, Mieke; Cagnie, Barbara; Coorevits, Pascal; et al.
EUROPEAN SPINE JOURNAL Volume: 23 Issue: 3 Pages: 530-535 Published: MAR 2014

15. Title: [not available] Times Cited: 1
Group Author(s): EEA
Environmental Signals. Improving air quality in Europe Published: 2013

16. **Indoor air quality in a dentistry clinic** Times Cited: 39
By: Helmis, C. G.; Tzoutzas, J.; Flocas, H. A.; et al.
SCIENCE OF THE TOTAL ENVIRONMENT Volume: 377 Issue: 2-3 Pages: 349-365 Published: MAY 15 2007

17. **Indoor air quality varies with ventilation types and working areas in hospitals** Times Cited: 23
By: Jung, Chien-Cheng; Wu, Pei-Chih; Tseng, Chao-Heng; et al.
BUILDING AND ENVIRONMENT Volume: 85 Pages: 190-195 Published: FEB 2015

18. **Bacterial aerosols in the dental clinic: effect of time, position and type of treatment** Times Cited: 24
By: Kedjarune, U; Kukiattrakoon, B; Yapong, B; et al.
INTERNATIONAL DENTAL JOURNAL Volume: 50 Issue: 2 Pages: 103-107 Published: APR 2000

19. Title: [not available] Times Cited: 1,917
By: KLEINBAUM DG
APPL REGRESSION ANAL Published: 1988

20. **Physico-chemical characteristics of particulate matter in the Eastern Mediterranean** Times Cited: 23
By: Kopanakis, I.; Eleftheriadis, K.; Mihalopoulos, N.; et al.
ATMOSPHERIC RESEARCH Volume: 106 Pages: 93-107 Published: MAR 2012

21. **Indoor air quality and thermal comfort in elderly care centers** Times Cited: 2
By: MENDES, A.; BONASSI, S.; ANGUIAR, L.; et al.
Urban Climate. Published: 2014
[\[Show additional data\]](#)

22. **On lines and planes of closest fit to systems of points in space.** Times Cited: 3,501
By: Pearson, Karl
PHILOSOPHICAL MAGAZINE Volume: 2 Issue: 7-12 Pages: 559-572 Abstract Number: A1902-00011 Published: JUL-DEC 1901

23. **Carbon monoxide poisoning - a public health perspective** Times Cited: 297
By: Raub, JA; Mathieu-Nolf, M; Hampson, NB; et al.
TOXICOLOGY Volume: 145 Issue: 1 Pages: 1-14 Published: APR 7 2000

24. **Indoor environmental quality in six commercial office buildings in the midwest United States** Times Cited: 1
By: REYNOLDS, S.J.; BORIN, S.S.; BREUER, G.; et al.
Appl Occup Environ Hyg. Volume: 16 Pages: 1065 Published: 2011
[\[Show additional data\]](#)

25. **Integrated environmental management for hospital** Times Cited: 1
By: SAAD, S.G.
Indoor Built Environ. Volume: 12 Pages: 93 Published: 2013

26. **Personal exposure to PM_{2.5} and biomarkers of DNA damage** Times Cited: 1

By: SORENSEN, M.
Cancer Epidemiol. Published: 2003

27. Title: [not available] Times Cited: **358**
By: VANDEGINSTE BMG
HDB CHEMOMETRICS Q B Published: 1998
28. **Long-term surveillance of air quality in medical center operating rooms** Times Cited: **45**
By: Wan, Gwo-Hwa; Chung, Feng-Fang; Tang, Chin-Sheng
AMERICAN JOURNAL OF INFECTION CONTROL Volume: 39 Issue: 4 Pages: 302-308 Published: MAY 2011
29. **Hospital indoor PM10/PM2.5 and associated trace elements in Guangzhou, China** Times Cited: **81**
By: Wang, Xinhua; Bi, Xinhui; Sheng, Guoying; et al.
SCIENCE OF THE TOTAL ENVIRONMENT Volume: 366 Issue: 1 Pages: 124-135 Published: JUL 31 2006
30. **Review of evidence on health aspects of air pollution REVIHAAP Project** Times Cited: **121**
Group Author(s): WHO
Technical Report. Published: 2013
Publisher: World Health Organization, Regional Office for Europe, Copenhagen

Showing 30 of 32 [View All in Cited References page](#)

Clarivate

Accelerating innovation

© 2019 Clarivate [Copyright notice](#) [Terms of use](#) [Privacy statement](#) [Cookie policy](#)

[Sign up for the Web of Science newsletter](#) [Follow us](#)

