



IOSR Journals

International Organization
of Scientific Research

Executive Editor

Dr. Archana Saily Painuly

India

Affiliation :	Indian Institute of Technology, Roorkee
Position :	Senior Associate Professor
Paper Publication in Int Journal :	10
Paper Publication in Conference ::	25
Patent :	Three

Managing Editor Board







Dr. Gamal Khalil
Egypt

Affiliation :	Alexandria University Prof. of Soil Physics and the Head of Soil and Agricultural Chemistry Dept.
Position :	
Experiens :	32 Years.
Paper Publication in Int Journal :	05









Dr. Seema Akbar
India





Affiliation :	Regional Research Institute of Unani Medicine
Position :	Departmental Head
Experiens :	25 Years.
Paper Publication in Int Journal :	34
Paper Publication in	44







Paper Publication in National Journal : 87 Awards : N/A	National Journal : Awards : FSTP, FLS, FRSC
 <p>Dr. Gusti Rusmayadi Indonesia</p> <p>Affiliation : Agroscentiae Position : General Manager Experiens : FA Paper Publication in Int Journal : 02 Paper Publication in National Journal : 10 Awards : N/A</p>	 <p>Dr. Salvatore Parisi Italy</p> <p>Affiliation : EUPHA Food and Nutrition Section, Brussels, Belgium Position : Leader of the FHG associated Experiens : 17 Years. Paper Publication in Int Journal : 31 Paper Publication in National Journal : 57 Awards : The Italian OXOID Award (2001, Bologna, Italy)</p>
 <p>Dr. John Jiya Musa Nigeria</p> <p>Affiliation : Federal University of Technology, Minna, Nigeria Position : LECTURER Experiens : 06 Years. Paper Publication in Int Journal : 30 Paper Publication in National Journal : 10 Awards : N/A</p>	 <p>Dr. Boutheina DOUH Tunisia</p> <p>Affiliation : Higher Institute of Agronomy of Chott Meriem Position : Assistant professor Experiens : 07 Years. Paper Publication in Int Journal : 14 Paper Publication in National Journal : 03 Awards : N/A</p>

 <p>Dr. SANGITA PRADEEP INGOLE India</p> <p>Affiliation : SGBAU, Amravati Position : HOD Experiens : 13 Years. Paper Publication in Int Journal : 11 Paper Publication in National Journal : 13 Awards : N/A</p>	 <p>Dr. S SHANTHA KUMAR India</p> <p>Affiliation : VIT University, TN, India Position : Associate Professor Experiens : 08 Years. Paper Publication in Int Journal : 18 Paper Publication in National Journal : 08 Awards : Awarded USD \$500 on publication of paper</p>
 <p>Dr. P.M. Telkhade India</p> <p>Affiliation : Arts Commerce and Science College Chandrapur Position : Head and Assistant Professor Experiens : 18 Years. Paper Publication in Int Journal : 09 Paper Publication in National Journal : 17 Awards : Best poster presentation</p>	 <p>DR. M.VIJAYARAGAVAN India</p> <p>Affiliation : Government Arts College Thiruvannamalai Position : Assistant Professor Experiens : 4 Years. Paper Publication in Int Journal : 07 Paper Publication in National Journal : 10 Awards : N/A</p>
 <p>Dr. Miltonprabu India</p> <p>Affiliation : Annamalai University Position : Assistant professor Experiens : 12 Years.</p>	 <p>Dr. Arti Gupta India</p> <p>Affiliation : Invertis University, Bareilly (UP) Position : University Asstt. Prof. Experiens : 19 Years.</p>

Paper Publication in Int Journal : 24 Paper Publication in National Journal : 12 Awards : BEST PRESENTER AWARD-ICCVD-11	Paper Publication in Int Journal : 02 Paper Publication in National Journal : 03 Awards : Best Research Paper Award
 <p>Dr. Yogesh Patil India</p> <p>Affiliation : Symbiosis Institute of International Business Position : Associate Professor Experiens : 13 Years. Paper Publication in Int Journal : 15 Paper Publication in National Journal : 05 Awards : NET, CSIR, GATE, IFS-Sweden, UGC-PDF</p>	 <p>Dr. Ali ESSAHLAOU</p> <p>Affiliation : Faculty of Science, Moulay Ismail university Position : Professor and Responsible of Research Group Experiens : 22 Years. Paper Publication in Int Journal : 20 Paper Publication in National Journal : 15 Awards : Associate Head of Dpt</p>
 <p>Dr. Saltanat Parveen India</p> <p>Affiliation : University Grant Commission Position : Assistant Professor Experiens : 12 Years. Paper Publication in Int Journal : 04 Paper Publication in National Journal : 25 Awards : N/A</p>	 <p>Dr. Archana Saily Painuly India</p> <p>Affiliation : Shri Ramswaroop Memorial University, India Position : Associate Professor Experiens : 15 Years. Paper Publication in Int Journal : 06 Paper Publication in National Journal : 11 Awards : SEEWRT & BEST PAPER AWARD, PDF-CSIR, PATENT</p>

	<p>Dr. Zawawi Daud Malaysia</p> <p>Affiliation : Universiti Tun Hussein Onn Malaysia Head of Department Water and Environmental Engineering 13 Years.</p> <p>Position :</p> <p>Experiens : 30</p> <p>Paper Publication in Int Journal : 20</p> <p>Paper Publication in National Journal :</p> <p>Awards : Associate Head of Dpt</p>	 <p>Dr. Ashok Kumar Pandurangan Virgin Islands (USA)</p> <p>Affiliation : CHORI, CA, USA Position : Researcher Experiens : 06 Years.</p> <p>Paper Publication in Int Journal : 07</p> <p>Paper Publication in National Journal : 00</p> <p>Awards : Best Ph.D thesis award, Award SRF by CSIR India</p>
	<p>Dr. Kanchan Deoli Bahukhandi India</p> <p>Affiliation : University of Petroleum and Energy Studies Position : Asst. Professor 11 Years.</p> <p>Experiens :</p> <p>Paper Publication in Int Journal : 03</p> <p>Paper Publication in National Journal : 08</p> <p>Awards : PhD</p>	 <p>Dr. Ashish Kumar Singh United States of America</p> <p>Affiliation : Trudeau Institute Inc, New York (USA) Position : Postdoctoral Fellow 05 Years.</p> <p>Experiens :</p> <p>Paper Publication in Int Journal : 08</p> <p>Paper Publication in National Journal : 00</p> <p>Awards : CSIR/NET-JRF and GATE/IIT India (99.46 percentile)</p>
	<p>Dr. DEEN DAYAL GIRI India</p> <p>Affiliation : Dept. Chem. Engg.</p>	 <p>Dr. Ahmed Jalal Samed Bangladesh</p> <p>Affiliation : Shahjalal University of</p>


<p>Position : IIT BHU DS Kothari postdoc Fellow</p> <p>Experiens : 06 Years.</p> <p>Paper Publication in Int Journal : 06</p> <p>Paper Publication in National Journal : 01</p> <p>Awards : DSK PDF</p>	<p>Position : Science and Technology Associate Professor</p> <p>Experiens : 12 Years.</p> <p>Paper Publication in Int Journal : 07</p> <p>Paper Publication in National Journal : 03</p> <p>Awards : Young Scientist Award 2008</p>
 <p>Dr. Ibrahim Nma Mohammed Nigeria</p> <p>Affiliation : Applied Geophysics</p> <p>Position : Lecturer</p> <p>Experiens : 05 Years.</p> <p>Paper Publication in Int Journal : 05</p> <p>Paper Publication in National Journal : 01</p> <p>Awards : N/A</p>	 <p>Dr. Papita Das India</p> <p>Affiliation : Department of Chemical Engineering Jadavpur University Kolkata, India</p> <p>Position : Associate Professor</p> <p>Experiens : 08 Years.</p> <p>Paper Publication in Int Journal : 68</p> <p>Paper Publication in National Journal : 07</p> <p>Awards : DST Fast Track Young Scientist Award 2011</p>
 <p>Dr. Mahmud Hossain Sumon Bangladesh</p> <p>Affiliation : Bangladesh Agricultural University</p> <p>Position : Associate Professor</p> <p>Experiens : 10 Years.</p> <p>Paper Publication in Int Journal : 05</p> <p>Paper Publication in National Journal : 11</p> <p>Awards : Commonwealth Scholarship tenable at UK in 2008</p>	 <p>Dr. Rana Jordan</p> <p>Affiliation : Amman Ahliyya University- AAU</p> <p>Position : Assistant Professor</p> <p>Experiens : 16 Years.</p> <p>Paper Publication in Int Journal : 03</p> <p>Paper Publication in National Journal : 02</p> <p>Awards : N/A</p>

	<p>Dr. Adedeji, Oludare H Nigeria</p> <p>Affiliation : Fed. University of Agriculture, Abeokuta, Nigeria</p> <p>Position : Lecturer I</p> <p>Experiens : 14 Years.</p> <p>Paper Publication in Int Journal : 09</p> <p>Paper Publication in National Journal : 12</p> <p>Awards : Netherland Fellowship Programme (NFP)</p>		<p>Dr. Mark Matsa Zimbabwe</p> <p>Affiliation : Midlands State University, Zimbabwe</p> <p>Position : Senior Lecturer</p> <p>Experiens : 07 Years.</p> <p>Paper Publication in Int Journal : 16</p> <p>Paper Publication in National Journal : 02</p> <p>Awards : N/A</p>
	<p>Dr. FARAH TARIQ Pakistan</p> <p>Affiliation : Dept. of Biochemistry, Jinnah University for Women</p> <p>Position : Program Head</p> <p>Experiens : 20 Years.</p> <p>Paper Publication in Int Journal : 09</p> <p>Paper Publication in National Journal : 02</p> <p>Awards : N/A</p>		<p>Dr. Keng Yuen Foo Mayalasia</p> <p>Affiliation : Universiti Sains Malaysia</p> <p>Position : Assistant Proffesor (Senior Lecturer)</p> <p>Experiens : 02 Years.</p> <p>Paper Publication in Int Journal : 51</p> <p>Paper Publication in National Journal : 00</p> <p>Awards : Publication Awards 2009-2013</p>
	<p>Dr. Jasvinder Singh Bhatti India</p> <p>Affiliation : SGGGS College, Sector-26, Chandigarh</p>		<p>Dr. sawsan abd elghany abd ellatif Egypt</p> <p>Affiliation : city for scientific research and technological app</p>


Position : Assistant Professor Experiens : 07 Years. Paper Publication in Int Journal : 07 Paper Publication in National Journal : 02 Awards : UGC-CSIR National Fellowship for PhD	Position : Associate professor Experiens : 23 Years. Paper Publication in Int Journal : 08 Paper Publication in National Journal : 01 Awards : Who\'sWho In The World 2011
 <p>Dr. Sohail Ayub India</p> <p>Affiliation : Department of Civil Engg. AMU Aligarh UP India Position : Associate Professor Experiens : 19 Years. Paper Publication in Int Journal : 32 Paper Publication in National Journal : 25 Awards : two national awards</p>	 <p>Dr. Kanchan Deoli Bahukhandi India</p> <p>Affiliation : University of Petroleum and Energy Studies Position : Asst. Professor Experiens : 11 Years. Paper Publication in Int Journal : 03 Paper Publication in National Journal : 08 Awards : Dedicated Service Award</p>


Volume 8 - Issue 4


[Version 1](#) [Version 2](#)


Paper Type : Research Paper
Title : Climate Change Adaptation Measures Used By Farmers In Southsouth Nigeria.
Country : Nigeria
Authors : Ifeanyi-obi, C.C, Nnadi, F.N
[REDACTED] : **10.9790/2402-08410106** 


Paper Type : Research Paper
Title : Floristic Diversity of Karwapani Wetland of Doon Valley, Uttarakhand,India
Country : India
Authors : Nisha Subba, Pramod Kumar, Laxmi Rawat
[REDACTED] : **10.9790/2402-08410709** 


Paper Type : Research Paper
Title : Histopathological Studies on Nitrite Toxicity to Freshwater Fish, Cirrhinus Mrigala
Country : India
Authors : Yesudass Thangam
[REDACTED] : **10.9790/2402-08411014** 


Paper Type : Research Paper
Title : Comparative analysis of physio chemical characteristics of dyeing industry effluent between Sanganer and Bagru printing clusters, Jaipur (Rajasthan)
Country : India
Authors : Sunil k. Sharma1,Neetu Sharma2,Yogesh khandelwal
[REDACTED] : **10.9790/2402-08411518** 


Paper Type : Research Paper
Title : Indoor Fungal Populations Inhabiting Cement Structures - Remedial Measures
Country : India
Authors : JayaPrada R Chunduri
[REDACTED] : **10.9790/2402-08411924** 


Paper Type : Research Paper
Title : Hepatoprotective Potential Of Leaf And Bark Extracts Of Gambia ALBIDUM
Country : Nigeria
Authors : Aloh Godwin Sunday, Obeagu Emmanuel Ifeanyi, Agu Michael Ochigbo
[REDACTED] : **10.9790/2402-08412529** 


Paper Type : Research Paper
Title : Goitrogenic Effects Of Mustard Seed (Bassica Junca) Oils
Country : Nigeria
Authors : Aloh Godwin Sunday1*, Emmanuel Ifeanyi Obeagu2 And
Omeh Yusuf Ndukaku
[REDACTED] : **10.9790/2402-08413034** 


Paper Type : Research Paper
Title : In-Vitro Evaluation of some Nutritive and Antioxidant
Constituents of Oryctes Rhinoceros Larva
Country : Nigeria
Authors : Egba Simeon I, . Anaduaka Emeka G, Ogugua Vincent N,
Durunna Amarachi H.
[REDACTED] : **10.9790/2402-08413540** 

Paper Type : Research Paper
Title : MANOVA Statistical Analysis of Inorganic Compounds in
Groundwater Indonesia
Country : Indonesia
Authors : Heruna Tanty, Rokhana Dwi Bakti, Tati Herlina, Nurlelasari
[REDACTED] : **10.9790/2402-08414145** 

Paper Type : Research Paper
Title : Comparative Studies on the Extraction of Metagenomic
DNA from Various Soil and Sediment Samples of Jammu
and Kashmir Region in Prospect for Novel Biocatalysts
Country : India
Authors : Singh R.; Devi T.; Verma V. Rasool S.
[REDACTED] : **10.9790/2402-08414656** 

Paper Type : Research Paper
Title : Physico-chemical analysis of Sugar mill Effluent and their
Impact on Changes of Growth of Wheat (*Triticum
aestivum*) and Maize (*Zea mays* L.)
Country : India
Authors : Saurabh Saini, Shailja Pant
[REDACTED] : **10.9790/2402-08415761** 

Paper Type : Research Paper
Title : Case study on how Double Lid (DL) Silos improve grain
storage among farmers in semi-arid area by 100%
Country : Kenya
Authors : Isaac Muringih
[REDACTED] : **10.9790/2402-08416267** 

Paper Type : Research Paper
Title : Possible Pollution Threat to the Green Buffer Zone around
TAJ MAHAL
Country : India
Authors : Nilanjana Chakrabarti, Arup Kumar Mitra
█ : 10.9790/2402-08416872 

MANOVA Statistical Analysis of Inorganic Compounds in Groundwater Indonesia

Heruna Tanty¹, Rokhana Dwi Bekt², Tati Herlina³, Nurlelasari⁴

^{1,2} Department of Mathematics and Statistic, ^{3,4} Department of Chemistry

^{1,2} School of Computer Science, Bina Nusantara University

^{3,4} University of Padjadjaran

Abstract: The present study was carried out to determination a levels of inorganic compounds contained in the ground water and Reverse Osmosis (RO) water filtration result. The data in groundwater samples was collected from Bekasi, Tangerang and Jakarta in Indonesia. A total of 30 samples were collected and analyzed for the determination of Cadmium (Cd), Chromium (Cr), Manganese (Mn), Cyanide (CN) and Lead (Pb). The results of the study revealed that in groundwater, the average of Cd 0.0058 mg/l, Mn 1.5233 mg/l, Cr 0.0127 mg/l, Pb 0.0060 mg/l, and CN 0.0040 mg/l. The level of RO result were: Cd 0.0027 mg/l, Mn 0.1767 mg/l, Cr 0.0024 mg/l, Pb 0.0021 mg/l, and CN 0.0023 mg/l. It's mean that Cd and Mn in ground water were higher than the values recommended by PAK-EPA and WHO or the standard of Indonesian Ministry of Health. But after filtration Reverse Osmosis (RO) Mn and Cd levels decreased to levels below the standardized value. By comparing of mean in MANOVA and nonparametric MANOVA in $\alpha=5\%$, there are differences in average levels of inorganic substances Mn, Cr, Cd, Pb, and CN between before and after RO filtration.

Keywords: Inorganic Compounds, Ground Water, Reserve Osmosis, MANOVA

PACS: 07.89.+b, 02.50.Sk

I. Introduction

Water is essential for human life. Functions of water in the body are cell life, chemical and metabolic reaction, transform of nutrients, body temperature regulation and elimination of waste [1]. Jakarta, Bekasi and Tangerang are a large region population in Indonesia. Water needs in these three areas is very high, but the local water company (PDAM) in Jakarta can only supply 39% of the population water needs. Most people use water refills. Some of them consume Reverse Osmosis (RO) water filtration result, but many low-income peoples directly consume groundwater for drinking.

Jakarta, Bekasi and Tangerang have many industries and densely populated residential. Increase in the number of septic tanks polluting the groundwater and can have serious health effects diseases such as hepatitis and dysentery. Inorganic compounds such as Chrome (Cr) reduces fatty acids and cholesterol and regulates sugar and insulin rates in the blood, but chronic exposure to high chromium levels causes lung cancer in human [2].

Groundwater for drinking has the potential to cause damage to liver, kidney, circulatory and nerve tissues and skin irritation from long-term exposures at levels above the Maximum Contaminant Level (MCL) [3]. Heavy metal toxicity like Lead (Pb), Cadmium (Cd), Manganese (Mn) are can result in damaged or reduced mental and central nervous function, cancer, lower energy levels, and damage to blood composition, lungs, kidneys, liver, and other vital organs [4]. Therefore, the study of inorganic compounds in the groundwater and water filtration Reverse Osmosis (RO) result was done.

There are some statistical methods for analysis the water quality, such as Multivariate Analysis of Variance (MANOVA) [5], [6]. Function of MANOVA is comparison of dependent variable means across multiple groups. It requires that the observations are independent, the response variables are multivariate normally distributed, and the covariance matrix of the dependent variables is homogeneous across groups. This research use MANOVA to compare inorganic compounds in the ground water and RO. The results of MANOVA can determine the effect of RO filtration in water quality, and the differentiation of quality water in groundwater and RO. When assumption of MANOVA, homogeneity variance or normal distribution, was violated, then it can use nonparametric MANOVA [7], [8].

II. Methodology

Sampling

For the present investigation, there were 30 groundwater samples collected from different localities of Bekasi, Tangerang and Jakarta in Indonesia. The time of data collecting was during the months of May to August 2013. The samples were in screw high density polyethylene bottles. The sample bottles were rinsed
