

**UGC SPONSORED
MINOR RESEARCH PROJECT
ON**

**"Periodical study of different ground water sources of the
Jashpur District with reference to its physico-chemical
characteristics"**

F-MS-63/201035/XII/13-14/CRO

***Final report
Submitted To***

**The Deputy Secretary and Head
Central Regional Office (CRO),
University grants commission,
Tawa complex (Bitten Market)
E-5, Arera Colony, Bhopal**

Submitted by

Sanjay Kumar Jain

Principal Investigator
Postgraduate department of chemistry

**GOVT. R.B.R. N.E.S. PG COLLEGE, JASHPURNAGAR
DIST. JASHPUR (C.G.)**

Phone & fax: 07763-223539

E-mail: rbrnespg@gmail.com



Annexure -VI

UNIVERSITY GRANTS COMMISSION

BAHADUR SHAH ZAFAR MARG

NEW DELHI – 110 002.

Annual/Final Report of the work done on the Minor Research Project.

(Report to be submitted within 6 weeks after completion of each year)

1. Project report No. 1st /Final **Final**
2. UGC Reference No. **F. MS-63/201035/xii/13-14/ CRO dated-16/07/2014**
3. Period of report: from: **Sept 2014 to Sept 2016**
4. Title of research project: ” **Periodical study of different ground water sources of the Jashpur District with reference to its physico- Chemical characteristics**”
5. (a) Name of the Principal Investigator: **SANJAY KUMAR JAIN**
(b) Deptt.: **CHEMISTRY**
(c) College where work has progressed: **Govt R.B.R.N.E.S.P.G.College Jashpur Nagar**
6. Effective date of starting of the project: **Sept 2014**
7. Grant approved and expenditure incurred during the period of the report:
 - a. Total amount approved Rs. **3, 85,000/- (Released as first installment 2, 77,500/-)**
 - b. Total expenditure Rs. **4, 03,075/-**
 - c. Report of the work done: (Please attach a separate sheet)
 - i. Brief objective of the project **Please see Appendix - A**
 - ii. Work done so far and results achieved and publications, if any, resulting

from the work (Give details of the papers and names of the journals in

which it has been published or accepted for publication **Please see Appendix - B**

iii. Has the progress been according to original plan of work and towards achieving the objective. if not, state reasons **Yes**

iv. please enclose a summary of the findings of the study. One bound copy of the final report of work done may also be sent to the concerned Regional Office of the UGC. **Enclosed.**

v. Any other information **Please see Appendix – C.**



SIGNATURE OF THE PRINCIPAL INVESTIGATOR



PRINCIPAL

(Seal)

Annexure – VII

UNIVERSITY GRANTS COMMISSION

BAHADUR SHAH ZAFAR MARG

NEW DELHI – 110 002

**PROFORMA FOR SUBMISSION OF INFORMATION AT THE TIME OF SENDING
THE FINAL REPORT OF THE WORK DONE ON THE PROJECT**

1. Title of the Project ” **PERIODICAL STUDY OF DIFFERENT GROUND WATER SOURCES OF THE JASHPUR DISTRICT WITH REFERANCE TO ITS PHYSICO-CHEMICAL CHARACTERISTICS**”.
2. NAME AND ADDRESS OF THE PRINCIPAL INVESTIGATOR: **SANJAY KUMAR JAIN, DEPT. OF CHEMISTRY, GOVT. RBR NES PG COLLEGE JASHPUR NAGAR (C.G.)**
3. NAME AND ADDRESS OF THE INSTITUTION: **GOVT. RBR NES PG COLLEGE JASHPUR NAGAR (C.G.)**
4. UGC APPROVAL LETTER NO. AND DATE: **F. MS-63/201035/xii/13-14/ CRO DATED-16/07/2014**
5. DATE OF IMPLEMENTATION: **SEPT.2014 to SEPT. 2016**
6. TENURE OF THE PROJECT: **02 YEARS**
7. TOTAL GRANT ALLOCATED: **RS. 3, 85,000.00**
8. TOTAL GRANT RECEIVED: **RS. 2, 77,500.00**
9. FINAL EXPENDITURE : **RS. 4, 03,075.00**
10. TITLE OF THE PROJECT: ” **PERIODICAL STUDY OF DIFFERENT GROUND WATER SOURCES OF THE JASHPUR DISTRICT WITH REFERANCE TO ITS PHYSICO-CHEMICAL CHARACTERISTICS**”.
11. OBJECTIVES OF THE PROJECT : ” **TO DETERMINE THE PHYSICO-CHEMICAL CHARACTERISTICS OF THE GROUND WATER OF JASHPUR DISTRICT**”.
12. WHETHER OBJECTIVES WERE ACHIEVED : **THE OBJECTIVES OF THE STUDY HAS BEEN SUCCESSFULLY COMPLETED.**

13. ACHIEVEMENTS FROM THE PROJECT: ONE PAPER PRESENTED IN THE NATIONAL SEMINAR AND THREE M. SC. STUDENTS HAVE DONE THEIR PROJECT WORK ON THIS TOPIC.

14. SUMMARY OF THE FINDINGS : SEPARATE SHEET ATTACHED.

(IN 500 WORDS)

15. CONTRIBUTION TO THE SOCIETY: SEPARATE SHEET ATTACHED.

(GIVE DETAILS)

16. WHETHER ANY PH.D. ENROLLED/PRODUCED OUT OF THE PROJECT: I HAVE ENROLLED FOR PH. D. IN BILASPUR UNIVERSITY(C.G.) ON THIS TOPIC.

17. NO. OF PUBLICATIONS OUT OF THE PROJECT (PLEASE ATTACH):

MANUSCRIPT PREPARATION UNDER PROGRESS.



(PRINCIPAL INVESTIGATOR)



(PRINCIPAL)

(Seal)

Appendix- A

Brief objective of the project: ” To determine the physico-chemical parameters of different ground water sources of the Jashpur district”

Appendix- B

Work done so far and results achieved and publications

Following work has been completed under this Minor research project:

1. **Selection of sampling spots:** we have selected ten sampling spots in Jashpur district of C.G. after intensive field inspection on the basis of environmental significance. These sampling spots assigned spot JD-1 to JD-10.
2. **Collection of water samples:** Water samples were collected from selected spots of study field in pre cleaned polyethylene as well as glass bottles separately in the session of pre monsoon, monsoon and post monsoon from March 2015 to August 2016 at the period of 15th to 20th date of every month within the time 9:00 AM to 5:00 PM.
3. **Preservation of water samples:** After detection of spot parameters, the collected water samples were preserved by keeping in the insulated coolant at 4⁰c and by adding AR grade reagents such as con. Sulphuric acid and con. Nitric acid for preventing biodegradation, hydrolysis, precipitation and chemical decomposition.
4. **Analysis of spot parameters:** The climatic water quality parameters such as pH, electrical conductivity, turbidity, total dissolved solids, and dissolved oxygen were measured in the spots instantly with the help of Elico made water quality analyzer (Model, PE-138) purchased under this UGC-MRP.
5. **Analysis of laboratory parameters:** The remaining chemical parameters were analyzed in the chemical laboratory within the 24

hours by using the standard methods as per described in APHA and NEERI manuals. The Na and K ions concentration were detected by flame photometer.

- 6. Analysis of Iron & Fluoride:** The Fluoride and iron ions were tested from the instrumental section (CIF), BIT, MESRA, RANCHI of only Seven months samples (in the month of May, Sep, Nov. of 2015 & Jan., March, May, July of 2016) due to insufficient fund in the scheme.

Outcome: After the physico-chemical monitoring specially the concentration of fluoride and iron of the different ground water sources were reported up to alarming level; from BDL to 5.9 mg/L & from BDL to 67.85 mg/L respectively. This is many folds higher than the upper limits; 1.5 mg/L & 1.0 mg/L respectively.

PUBLICATION: manuscript research paper publication under process.

Appendix- C

Any other information: One research paper entitled “ **MONITORING OF PHYSICO-CHEMICAL CHARACTERISTICS OF GROUND WATER SOURCES OF JASHPUR DISTRICT(C.G.) INDIA**” Presented on dated 18-19 Jan.2016 & its abstract is published in the souvenir at national seminar organized by Dept. of PG studies and research in Chemistry, T.C.L. Govt. P.G. College, Janjgir (C.G.) and sponsored by UGC, CRO, Bhopal (M.P.)

SUMMARY OF THE FINDINGS

- (1) The present investigation on “**periodical study of different ground water sources of the jashpur district with reference to its physico-chemical characteristics**” was carried out during the two consecutive sessions, 2014-15 & 2015-2016.
- (2) The study area belongs to Jashpur district of Chhattisgarh state which geographical location lies at 22°17' to 23°15' North altitude and 83°30' to 84°24' East altitude with majority of tribe and rural population.
- (3) The aim of present study was to evaluate the physico-chemical characteristics of ground water of the Jashpur district with specially emphasized on Iron and Fluoride parameter.
- (4) For this a total of 10 nos. of ground water samples from the selected sampling spots of entire district area were collected from March 2015 to August 2016 and various physico-chemical parameters such as Tem., pH, Electrical Conductivity, Turbidity, Total solid, TDS, TSS, Total Hardness, Total Alkalinity, DO, BOD, COD, Calcium, Magnesium, Chloride, Sodium, Potassium, Iron, Fluoride, Carbonate, Bicarbonate, SAR, PS and RSC were determined on monthly basis as per standard methods.
- (5) The obtained results were compared with the standard values prescribed by WHO and BIS.
- (6) The analytical data of various physico-chemical parameters indicates that some parameters like pH, turbidity etc. are found to be below or excess than the prescribed limit in a no. of samples.
- (7) The concentration of the Iron and Fluoride was reported up to alarming level.
- (8) The outstanding results of the present study are as follows:
 - a. The water temperature of the study area varies from 21.4 °C to 32.7 °C.
 - b. The pH ranges from 5.62 to 7.53 indicating the water sources are weak acidic to weak alkaline in nature. In a no. of samples the value of pH found below the permissible limit.
 - c. The turbidity, TDS and TSS ranges from 2.2 NTU to 125 NTU, 73.94 mg/liter to 422.6 mg/liter and 63.8 mg/liter to 318.60 mg/liter respectively. The value of Turbidity in almost all the sampling point showed very high giving information about suspended matter; microbes etc. present excess in water.
 - d. Hardness, Ca and Mg ranged from 82 to 434 ppm, 54 to 272 ppm and 28 to 178 ppm respectively which were not accepted for the drinking as well as other commercial purpose
 - e. Electrical conductivity varies from 129.3 to 727 µmho/cm which is within the limit.

- f. The DO, BOD and COD were in the range of 2.89 to 8.46mg/l, 2.93 to 8.51 mg/l and 7.02 to 14.12 mg/l respectively. The observed value of DO indicates that it is not fit for aquatic life.
 - g. The Chloride, Fluoride and Total Alkalinity were in the range of 35.6 to 92.6mg/L, BDL to 5.9 mg/L and 94 to 352 mg/L respectively.
 - h. In the sampling spot JD-8, the value of fluoride con. was found above the permissible limit; 0.5 mg/L to 1.5 mg/L. this high concentration of fluoride causing various types of fluorosis.
 - i. Iron, sodium, and potassium were in the range of BDL to 67.85 mg/L, 91.2 to 177.8 mg/L, 2.89 to 7.81mg/L respectively. The concentration of Iron was reported very high from acceptable ranges; 0.3 mg/L to 1.0 mg/L. Iron in excess of 0.3 mg/L causes staining of cloths and utensils. The high con. of iron also not suitable for processing of food, beverages, ice, dyeing, bleaching, and many other items.
 - j. The sodium absorption ratio, percentage sodium and residual sodium carbonate were in the range of 1.80 to 7.20 meq/L, 33.79 to 76.79 and -5.02 to 0.94 meq/L respectively which are beyond the permissible limits.
- (9) At last conclusion of this project is goes to very high indication for the unsuitability of the ground water sources for potable as well as agricultural purpose in study field for fluoride as well as iron point of view.

CONTRIBUTION TO THE SOCIETY

We have taken the MRP of the UGC for comprehensive assessment of the ground water sources in the Jashpur district (C.G.) India. In this district the peoples are dependent in various ground water sources such as open wells, tube wells, bore wells etc. for potable as well as agricultural purpose. After the physico-chemical monitoring specially the concentration of Fluoride and Iron of the different ground water sources were reported up to alarming level; from BDL to 5.9 mg/L & from BDL to 67.85 mg/L respectively. This is many folds higher than the upper limits of WHO & BIS; 1.5 mg/L & 1.0 mg/L respectively. The higher values of these chemical constituents are causing different types of flurosis and other problems in human being. Especially we have observed dental fluorosis in the rural area of the district. Therefore the purification of the water sources by indigenous and cheapest techniques are mandatory before using of water for different human development purpose. The present study also indicates the need for periodic monitoring of water sources of study area is mandatory.



National Research Seminar

ON



**DEGRADATION PARAMETERS DUE TO RAPID INDUSTRIALIZATION IN CHHATTISGARH
STATE AND ITS IMPACT ON HUMAN HEALTH AND ENVIRONMENTAL CONDITION"**

Sponsored By :

UNIVERSITY GRANTS COMMISSION, CENTRAL REGIONAL OFFICE - BHOPAL (M.P.)

Organized By :

Department of P.G. Studies & Research in Chemistry

T.C.L. GOVT. P.G. COLLEGE, JANJIGIR (C.G.)

CERTIFICATE

This is to certify that श्री/श्री/श्री/श्री/श्री/श्री Sanjay Kumar Jain of _____

Govt. R.B.R. NES PG College, Jashpur has delivered on invited talk /

Chaired the Technical Session / Participated / Presented [Oral / Poster] the paper entitled Monitoring of Physico-Chemical

Characteristics of Ground Water Sources of Jashpur Disth. National Research Seminar on "Degradation Parameters Due to Rapid

Industrialization in Chattisgarh State and Its Impact on Human Health and Environmental Condition". Organised by Department of P.G. Studies &

Research in Chemistry, T.C.L.Govt. P.G. College, Janjgir (C.G.) held on 18-19 January 2016.

(Dr. P.K. Singh)
Organizing Secretary

(Dr. K.K. Mishra)
Convener

(Dr. J.K. Jain)
Principal