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ARSENIC TOXICITY IN DOMESTIC ANIMAL IN RAJNANDGAON DISTRICT OF CHHATTISGARH

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ABSTRACT
Fifty four milch cattle were randomly selected from all nine block of Rajnandgaon district of Chhattisgarh. Arsenic level in soil; water feed material (straw), and biological samples (Hair, Serum). Milk, milk products, cow dung samples were also tested for arsenic toxicity. It was observed that high concentration of arsenic was present in milk, dung, hair, water and feed samples in arsenic prone areas. Ambagarh Chowki block of Rajnandgaon district found higher arsenic level in the soil, water, paddy straw and serum samples than other blocks of Rajnandgaon district, with lower hematological parameters i.e. Hb, TEC and TLC and higher biochemical parameters i.e.SGPT and SGOT level. Affected cattle showed higher excretion of arsenic in dung and storage in hair. Arsenic in soil and feed stuff did not adversely affect milk production performance in indigenous cattle and confirms positive correlation.

KEYWORDS; Arsenic Toxicity, Hemoglobin, feed sample, parameter, Milk Products

INTRODUCTION

Geological and anthropogenic sources contaminate the soil with arsenic reach a liquid state, mix with water, under conditions that promote the dissolution of arsenic into solids (soil). Absorption of arsenic from soil into water and consumption of this contaminated water further increases the toxicity of arsenic as it enters the food chain through microorganisms, plants, animals and humans. Absorption of arsenic from soil into water and consumption of this contaminated water further increases the toxicity of arsenic as it enters the food chain through microorganisms, plants, animals and humans. By continuing to use contaminated groundwater exposed to arsenic for irrigation, the soil has become a secondary source of arsenic. Regularly analysis of mineral content in soil and water should be done to avoid the chronic toxicity in animal and human being, should be adopted.[1]

Arsenic can be introduced in the environment either by natural processes (such as during atmospheric emissions or when naturally occurring minerals rich in arsenic are desorbed and dissolved) or by anthropogenic actions (such as mining, combustion of fossil fuels, metal extraction processes, timber preservatives, etc.)[2-3].Arsenic is natural metalloid which is present in the universe everywhere. It is used for different insecticides and pesticides preparation. Poisoning of arsenic is a major issue that affects different species. Environmental contamination is the largest concern of human and animal health in India. It is common element that occurs in soil, water and plant. Level of arsenic in ground water creates a serious issue in many parts of the country. Natural or anthropogenic presence of toxic metals is the leading cause of environmental toxicity[1].

The present research work on “Study on Arsenic toxicity in domestic animal in Rajnandgaon district of Chhattisgarh” was carried out. The exposure of arsenic was evaluated in terms of arsenic level in soil, feed material (straw), and biological samples (Hair, Serum). Blood samples were also collected for the study to know the deviation of various blood parameters in different area of Rajnandgaon district of cattle. The details of the materials used, various techniques and methodologies adopted during the course of the present study are presented in this Research paper.

Metabolism of arsenic

Methylation is very important steps in Arsenic metabolism; glutathione conjugation is to be intermediate steps in case of arsenic toxicity. Researchers confirmed the importance of glutathione or S- containing compound called thiol compound in arsenic metabolism. Arsenic enters in to the body through the various routes 80% of the arsenic is bound to Red blood cells, then it distributes to tissues of the body, and produce its toxic effect through the DNA damage by exerting cytotoxic effect mainly inorganic form of Arsenic,(arsenite and arsenate). Ingested Arsenic after metabolism will accumulates in sweat glands, nails, hooves, and hair with long term exposure of animals and produce its chronic form of toxicity. Liver, kidneys, heart, and lungs having the highest concentration of Arsenic.

MATERIALS AND METHODS

Nine blocks of Rajnandgaon district of Chhattisgarh i.e. Parmalkasa, Somni, Paneka, Bankal, Sukul Dehan and Suragi villages of Rajnandgaon block, from Dongargarh block, Aliwara, Amlidih, Bijepur, Purena, Andi and Bhanukonha villages, Achanakpur-nawagaon, Dallikholi, Charbhata, Kesla, Bhardakalan and Depka villages from Khairagarh block, from Chhuikhadan block, Dalli,

Dhaba, Deopura, Bundeli, Aamgaon and Atargaon villages, Achholi, Aliwara, Atargaon, Amakatta, Baputola and Baniatola villages from Chhuria block, Amlidih, Arjuni, Alikhunta, Godri, Aasra and Dongargaon in Dongargaon block, from Manpur block, Aundhi, Badgaon, Dhaba, Dulki, Gotia and Kotri villages, from Mohla block, Bonjari, Angara, Bodai, Bogatola, Bholapur and Churiya villages, and from AmbagarhChowki block, Kaurikasa, Atargaon, Kumardha, Aamatola, Atra and Bogatola villages were selected. The collection of various biological and other samples were made from all the above selected villages for the testing of Arsenicosis.

Experimental Design

The experiment was carried out in all nine blocks of Rajnandgaon district of Chhattisgarh. 6 animals from each block have been selected and total 324 samples of soil, water, serum, hair and straw and dung were collected. Additionally, samples of soil, water, serum, hair and straw were collected from control zones for validation or the result.

Design of Experiment

Table-1 Selection criteria for sample collection

Block	Numbers of Samples					
	Soil	Water	Serum	Hair	Straw	Dung
Chuikhadan	6	6	6	6	6	6
Khairagarh	6	6	6	6	6	6
Rajnandgaon	6	6	6	6	6	6
Dongargaon	6	6	6	6	6	6
Dongargarh	6	6	6	6	6	6
Chhuriya	6	6	6	6	6	6
Ambagarh Chowki	6	6	6	6	6	6
Mohla	6	6	6	6	6	6
Manpur	6	6	6	6	6	6

Clinical sign

In case of poisoning primary treatment could be done on the basis of history clinical sign with chemical testing of biological fluid (urine, blood and gastrointestinal contents) if in per acute cases when sudden death of animal occur postmortem lesion is very important and helps for the treatment of rest animals. Hair samples testing in chronic cases provide the confirmatory diagnosis and take necessary action for prevention of same poisoning in in other herds. Samples of soil, water and straw were collected from the respective villages of all nine blocks of Rajnandgaon district; villages were selected on random basis. Samples of dung, hair, and blood were collected from non-descriptive female lactating cows of selected villages.

Sample collection

Samples for Soil, Straw, Water, Dung, Hair (Tissue) and serum for analysis were collected as follows:

Soil Sample: The soil samples for arsenic analysis were collected from the grazing land of all block of Rajnandgaon district. The land was excavated deep enough (6‘‘-8”) and approx. 100 gms of soil was collected in poly bags and sealed and numbered immediately.

Straw Sample: The straw that is offered to animals were collected from the manger directly and packed in poly bags and numbered for identification and stored for further analysis.

Water Sample: The drinking water from water trough at animal area was collected in a PET bottle and few drops of hydrochloric acid was added and sealed properly for further analysis.

Dung sample: Fresh dung was taken for the analysis which was collected from freshly defecated dung and packed in poly bag and numbered.

Tissue sample: Hair from tail end was considered as tissue sample, and taken from the animals by cutting hair bunch directly from tail end by scissor and packed in poly bag for further analysis.

Blood samples: Blood sample (10 ml) from each animal was collected from jugular vein by taking all aseptic precautions in sterilized vials, Heparinised blood was collected for haematological parameters. All the blood samples were collected of the same time of day, normally in the morning and approximately 2 hrs. after milking and feeding. The blood samples were collected with a minimum of excitement of cow. The bleeding site was cleaned and disinfected before collecting the blood; about 10 ml of blood was collected from all the cows by puncture of the jugular vein using a 18 gauge collection needle in thoroughly cleaned vial. 5 ml of the blood was immediately transferred in a test tube containing EDTA anticoagulant for hematological estimation, 5 ml blood samples in one plain test tube and blood sample collected in the plain test tube were allowed to stand in slanting position for 3-4 hrs at room temperature. Serum was separated and transferred into serum vials which were labeled with the animal identification number and stored in deep freeze until the analysis of various metabolites was done.

Estimation of total Arsenic: Estimation of total arsenic was done in all samples by using wet ashing procedure as per AOAC 2002, and analyzed using Atomic absorption spectrophotometer using arsenic as standard method). A Varian AA240 model AAS equipped with vapor generation accessories (model no AAS4141) was used for total arsenic estimation.

Statistical analysis: For interpretation of the results, the data were analyzed by one-way Analysis of Variance (ANOVA) following completely randomized design. The significance of difference was analyzed by Duncan's Multiple Range Test (DMRT). Correlation coefficient among Soil, Feed stuff and Serum were also analyzed. Overall data were analyzed as per the standard procedure given by (Snedecor and Cochran, 1994)[11]. Arsenic toxicity to the soil and aquatic environment is considered a major problem of cancer mortality, especially in countries such as Bangladesh, India, and China.[4] The global average of arsenic in soil is 10 ppm, and according to the European Union, the maximum permissible limit for arsenic in agricultural soils is 20 ppm[5]. In 1993, the US Environmental Protection Agency (EPA) had a maximum concentration of arsenic in industrial sludge at 75 ppm. The arsenic limit of drinking water recommended by the World Health Organization (WHO) and the Food and Agriculture Organization of the Federation (FAO) is 10 ppb, and a limit under the Bureau of Indian Standards (BIS) in India. That is 50 ppb endemic arsenic in several Chinese provinces, which were contaminated with high levels of arsenic due to continuous water intake. High concentrations in groundwater have been reported in several countries, including Argentina, Japan, Bangladesh, China, India, Nepal, Mexico, Mongolia, Poland, Vietnam, Taiwan, Chile, and parts of the United States[6].Arsenic pollution in ground water is estimated to affect 500 million people worldwide. Frequent exposure to high levels of arsenic can cause pigmentation, hyperkeratosis, ulcers, skin cancer, and can also affect the kidneys, liver, lungs, and heart. The toxic dose of sodium arsenite (NaAsO2) for oral use is 6.5 mg / kg for horses, 7.5 mg / kg for cattle, 11 mg / kg for sheep and 2 mg / kg arsenic trioxide for pigs. (As_2O_3)) is 11 mg / kg body weight for pigs and 55 mg / kg body weight for horses, cattle and sheep. In contrast to inorganic arsenic in pigs treated with 100 mg of organic acid / kg feed for 6 weeks, only a decrease in food intake was observed[7] .

Arsenic Contamination In Different Part Of World

More than 2.5 billion people on the globe rely on groundwater for drinking and providing high-quality drinking water has become one of the major challenges of human society. Although groundwater is considered as safe, high concentrations of heavy metals like arsenic (As) can pose potential human health concerns and hazards. In this paper, we present an overview of the current scenario of arsenic contamination of groundwater in various countries across the globe with an emphasis on the Indian Peninsula. With several newly affected regions reported during the last decade, a significant increase has been observed in the global scenario of arsenic contamination. It is estimated that nearly 108 countries are affected by arsenic contamination in groundwater (with concentration beyond maximum permissible limit of 10 ppb recommended by the World Health Organization.

Figure 1.1: Districts of Chhattisgarh

Collection of soil, water and Plants sample:

The soil samples for analysis were collected from the grazing field of animals in totally 54 villages in which 6 villages from each blocks of Rajnandgaon Block, Dongargarh Block ,Khairagarh Block , Chui Khadan Block , Chhuria Block ,

Dongargaon Block, Manpur Block, Mohla Block, Ambagarh Chauki Block of Rajnandgaon District in Chhattisgarh. The soil was processed by using standard formula[8].

Arsenic Contaminated Soil collection

Figure 1.2: Collection of soil sample

The paddy plants devoured by the creatures of the field land filled in the dirt of the nibbling spaces of that influenced region gathered in two encompass containing test no. space of assortment and date for each example and the examples were handled further[9] .

Paddy crop collection for Arsenic testing

Figure 1.3: Collection of feed sample

Selection of Arsenic Affected And Control Animal:

We chose arsenic influenced cows by noticing the clinical signs which included shortcoming, lack of hydration, rosy pee, epilated hair, hyper pigmentation, hyperkeratosis, polyuria, polydipsia, iron deficiency and blocked mucous film. They were classified as Group (Gr). II. also, sound cows from non influenced zone was chosen as Control bunch (Gr. I) ,Cow's milk was gotten during the cow's draining and 1-L was put into a polyethylene bottle recently washed with 20% nitric corrosive in deionized water. [10]

Figure 1.4: Collection of feed sample

It has been reported that soil arsenic is the major source for the arsenic uptake of crops, When arsenic-contaminated groundwater is used for irrigation, it creates hazards both m the soil environment and in the crop quality The upper soil is reported to be contaminated with arsenic in the study area due to continuous irrigation by arsenic-contaminated groundwater Soil samples were collected from 10—15 cm depth in a 2 m2 area by composite sampling from the fields irrigated with the arsenic-contaminated groundwater and after proper treatment total arsenic was evaluated The distribution of arsenic m the paddy field soil m the study area (block wise) m the two cropping seasons have been shown in the Tables, respectively Sampling location wise in arsenic contents m paddy field soil for the above said penods are given m the Tables, respectively.

Figure 1.5: Collection of dung sample

Figure 1.6: Collection of different samples

Digestion of samples –

All samples of soil, straw, dung, hair and serum were dried overnight in hot air oven at 250^0 C. o.5 gm of dried samples were taken for digestion, all samples are kept in digestion tube and mix with tri acid which was prepared by mixing Nitric acid, Perchloric acid and sulphuric acid in the ratio of 10:4:1. Mixtures were kept for 12 hours on heated plate for complete ashing. Properly digested samples were diluted with Millipore water passed through what man's filter paper no 1and make final volume to 50 ml for feeding in Atomic absorption spectrophotometer (AAS) equipped with vapour generation accessories.

Figure 1.7: Laboratory testing

Instrument –

A Varian AA240 model AAS equipped with vapor generation accessories (model no AAS4141) was used for total arsenic estimation.

Instrument condition –

Operating parameters for AA4141: lamp, arsenic hollow cathode lamp; wavelength, 193.7; slit width; 0.5 nm; lamp current, 10.0 mA; vapor type, air/acetylene; air flow, 10.00 l/min; inert gas for hydride generation, Argon.

Standard Working Solutions –

Working solutions were freshly prepared by dilution of stock solution (1000 µg/ml) and intermediate (10 µg/ml) standards. The working standards were as follow 2.5, 5, 10, 15 and 20 µg/ml and prepared it by same procedure as test samples.

Instrument calibration –

Working solutions were freshly prepared by dilution of stock solution (1000 µg/ml) and intermediate (10 µg/ml) standards. The working standards were as follow 2.5, 5, 10, 15 and 20 µg/ml and prepared it by same procedure as test samples.

Validation of total arsenic estimation –

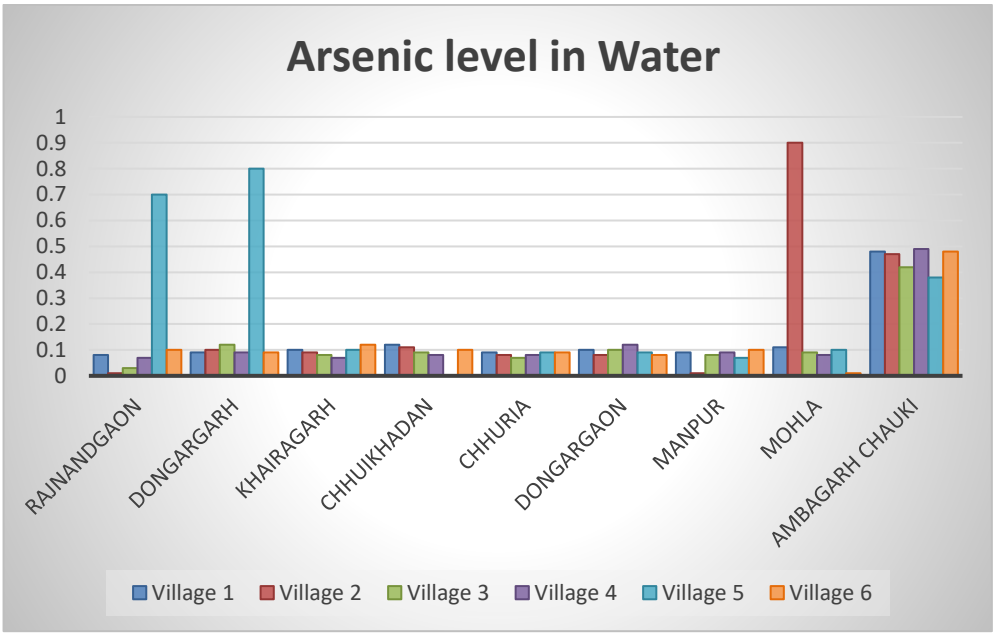
For validation of total arsenic analysis, samples, such as soil, water, serum, feces, straw and hair, were collected from animals of control zone as well as affected zone. Arsenic content of each substrate was then assayed and considered for validation.

Level of arsenic in Water

Table 2 Arsenic Level in Water of Study area

Arsenic level in Water of Animals from Different Villages of all 9 Blocks										
Block	**Village 1**	**Village 2**	**Village 3**	**Village 4**	**Village 5**	**Village 6**	**Overall Range**		**Overall Mean**	**Total Sample**

Rajnandgaon	0.08	0.01	0.03	0.07	0.70	0.10	0.01-0.70	0.70	0.17	6.00
Dongargarh	0.09	0.10	0.12	0.09	0.80	0.09	0.09-0.80	0.80	0.22	6.00
Khairagarh	0.1	0.09	0.08	0.07	0.1	0.12	0.07-0.12	0.12	0.09	6.00
Chhuikhadan	0.12	0.11	0.09	0.08	0.00	0.1	0.00-0.12	0.12	0.08	6.00
Chhuria	0.09	0.08	0.07	0.08	0.09	0.09	0.07-0.09	0.09	0.08	6.00
Dongargaon	0.1	0.08	0.1	0.12	0.09	0.08	0.08-0.12	0.12	0.10	6.00
Manpur	0.09	0.01	0.08	0.09	0.07	0.1	0.01-0.10	0.10	0.07	6.00
Mohla	0.11	0.9	0.09	0.08	0.1	0.01	0.01-0.90	0.90	0.22	6.00
AmbagarhChauki	0.48	0.47	0.42	0.49	0.38	0.48	0.38-0.49	0.49	0.45	6.00



Graph;1 Arsenic Level in Water of Study area

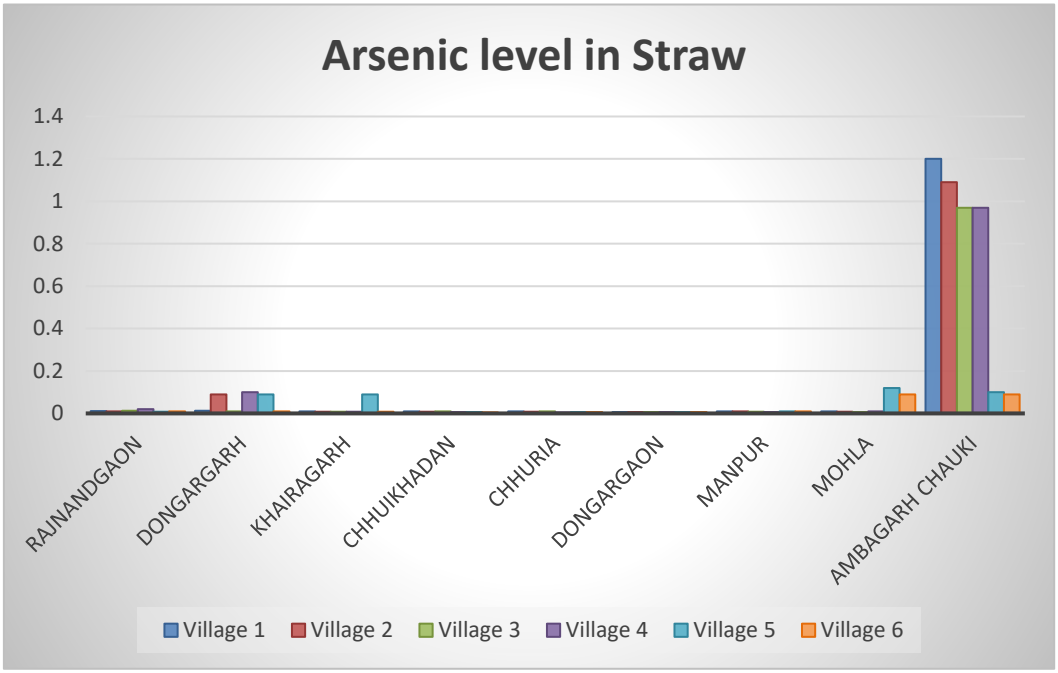
The above figure portraits the different arsenic level in water of Villages 1, 2, 3, 4, 5, 6 are Parmalkasa, Somni, Paneka, Bankal, SukulDehan and Surgi respectively, in Dongargarh- Aliwara, Amlidih, Bijapur, Purena, Andi and bhalukonha, in Khairagarh block, AchanakpurNawagaon, Dalli Kholi, Charbhata, Kesla, Bhardakalan and Depka respectively, In Chhuikhadan Block, Dalli, Dhabba, Deopura, Bundeli, Aamgaon and Atargaon, in Chhuria Block, villages were, Achholi, Aliwara, Atargaon, Amakatta, Baputolla and Baniyatola, in Dongargaon Block, Amlidih, Arjuni, Alikhunta, Godri, Asra and Dongargaon village, Manpur block, Aundhi, Badgaon, Dhabba, Dulki, Gotia and Kotri, in Mohla Block, villages were Bonjari, Angara, Bodai, Bogatola, Bholapur and Churiya villages from AmbagarhChauki block were, Kaudikasa, Atargaon, Kumardha, Amatola, Atra and Bogatola villages were taken for study. The water of village 5 of Rajnandgaon and Dongargarh and village 2 of Mohla Blocks are peak in arsenic contamination in water. Villages of Ambagarh Chauki blocks are also show the major arsenic affected water comparing to other blocks.

3 Level of arsenic in Straw.

Table 3 Arsenic Level in Straw of Study area

Arsenic level in Straw of Animals from Different Villages of all 9 Blocks										
Block	**Village 1**	**Village 2**	**Village 3**	**Village 4**	**Village 5**	**Village 6**	**Overall Range**		**Overall Mean**	**Total Sample**
Rajnandgaon	0.011	0.01	0.012	0.02	0.008	0.009	0.01-0.02	0.02	0.01	6.00
Dongargarh	0.012	0.09	0.01	0.1	0.09	0.009	0.01-0.10	0.10	0.05	6.00
Khairagarh	0.009	0.008	0.008	0.008	0.09	0.008	0.01-0.09	0.09	0.02	6.00
Chhuikhadan	0.009	0.008	0.009	0.007	0.006	0.005	0.01-0.01	0.01	0.01	6.00
Chhuria	0.009	0.008	0.009	0.005	0.006	0.006	0.01-0.01	0.01	0.01	6.00
Dongargaon	0.006	0.006	0.007	0.006	0.007	0.006	0.01-0.01	0.01	0.01	6.00
Manpur	0.009	0.009	0.008	0.007	0.009	0.009	0.01-0.01	0.01	0.01	6.00

Mohla	0.009	0.008	0.007	0.009	0.12	0.09	0.01-0.12	0.12	0.04	6.00
AmbagarhChauki	1.2	1.09	0.97	0.97	0.1	0.09	0.09-1.2	1.20	0.74	6.00



Graph 3 Arsenic Level in Straw of Study area

The above figure portraits the different arsenic level in Straw of Villages 1, 2, 3, 4, 5, 6 are Parmalkasa, Somni, Paneka, Bankal, SukulDehan and Surgi respectively, in Dongargarh- Aliwara, Amlidih, Bijapur, Purena, Andi and bhalukonha, in Khairagarh block, AchanakpurNawagaon, Dalli Kholi, Charbhata, Kesla, Bhardakalan and Depka respectively, In Chhuikhadan Block, Dalli, Dhabba, Deopura, Bundeli, Aamgaon and Atargaon, in Chhuria Block, villages were, Achholi, Aliwara, Atargaon, Amakatta, Baputolla and Baniyatola, in Dongargaon Block, Amlidih, Arjuni, Alikhunta, Godri, Asra and Dongargaon village, Manpur block, Aundhi, Badgaon, Dhabba, Dulki, Gotia and Kotri, in Mohla Block, villages were Bonjari, Angara, Bodai, Bogatola, Bholapur and Churiya villages from AmbagarhChauki block were, Kaudikasa, Atargaon, Kumardha, Amatola, Atra and Bogatola villages were taken for study. The Straw of all the six villages of AmbagarhChauki have the most affected variation of arsenic level comparing to other blocks.

Statistical analysis

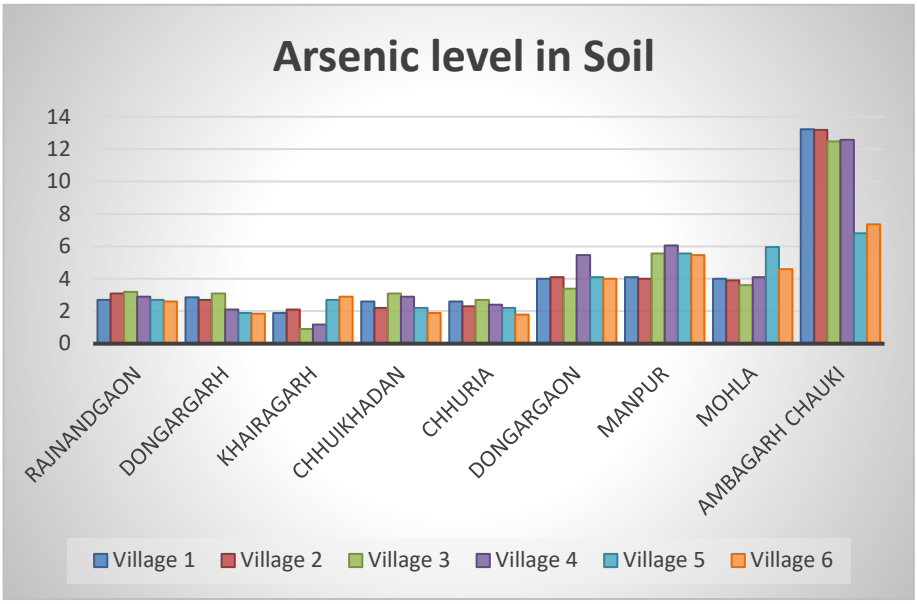
For interpretation of the results the data were analyzed by one-way Analysis of Variance (ANOVA) using completely randomized deign. The significance of difference and interaction will be analyzed by Duncan's Multiple Range Test (DMRT). Overall data was analyzed as per the standard procedure given by (Snedecor and Cochran, 1994)[11]

4. Arsenic level in different biological samples

4. Level of arsenic in soil

Table 4. Arsenic Level in Soil of Study area

Arsenic level in Soil of Animals from Different Villages of all 9 Blocks										
Block	**Village 1**	**Village 2**	**Village 3**	**Village 4**	**Village 5**	**Village 6**	**Overall Range**		**Overall Mean**	**Total Sample**
Rajnandgaon	2.70	3.10	3.19	2.90	2.70	2.60	2.60-3.19	3.19	2.87	6.00
Dongargarh	2.85	2.70	3.10	2.10	1.90	1.85	1.85-3.10	3.10	2.42	6.00
Khairagarh	1.9	2.1	0.9	1.19	2.7	2.9	0.9-2.90	2.90	1.95	6.00
Chhuikhadan	2.6	2.2	3.1	2.9	2.2	1.9	1.90-3.10	3.10	2.48	6.00
Chhuria	2.6	2.3	2.7	2.4	2.2	1.8	1.80-2.70	2.70	2.33	6.00
Dongargaon	4	4.1	3.4	5.46	4.1	4	3.40-5.46	5.46	4.18	6.00
Manpur	4.1	4	5.56	6.06	5.56	5.46	4.00-6.06	6.06	5.12	6.00
Mohla	4	3.9	3.6	4.1	5.96	4.6	3.60-5.96	5.96	4.36	6.00
AmbagarhChauki	13.23	13.18	12.47	12.58	6.81	7.36	6.81-13.23	13.23	10.94	6.00



Graph 4 Arsenic Level in soil of study area

RESULTS AND DISCUSSION

he 6 samples of soil, water and paddy straw from nine block i.e. Chuikhadan, Khairagarh, Rajnandgaon, Dongargaon, Dongargarh, Chhuriya,AmbagarhChowki, Mohla and Manpur blocks of Rajnandgaon district were collected. Simultaneously six blood and serum samples of locally cattle were also collected from all the nine blocks of Rajnandgaon district. Six soil samples for arsenic analysis were collected from the grazing land of all block of Rajnandgaon district. The land was excavated deep enough for uniformly collection of representative samples and it was further placed in hot air oven. Six water samples were also collected from the boring of all the selected blocks and it was preserved with 4 ml concentrated hydrochloric acid for further analysis. Further, six samples of paddy straws were also collected from all the selected bloTck of Rajnandgaon district and it was further dried in hot air oven and stored for further analysis. Fresh sample of faeces of selected block of cattle were also collected and kept in hot air oven at 80°C. Further, dried samples of soil and paddy straws were digested and final volume of known dilution were made by triple distilled water for analysis of arsenic level. Hair samples were also collected from tail region of cattle with the help of a stainless-steel scissor and were kept individually in polythene packets at room temperature to determine arsenic level in hair. Hair samples were also further digested and final volumes of known dilution were made by triple distilled water for analysis of arsenic level. The arsenic level in soil, paddy straw, feces, hair and serum were analyzed as per the method of AOAC. 2002 through Atomic Absorption Spectrophotomer.5- ml blood of cattle from selected blocks were collected from juggler vein in heparized for Hb, Packed Cell Volume (PCV), TEC and TLC. Similarly, for biochemical parameters, 5 ml of blood were also collected in non-heparin zed tube from 6 cattle in the selected blocks of Rajnandgaon district. The serum was separated and analyzed for SGOT (AST), SGPT (ALT), Total protein and albumin. Significantly highest arsenic level in the soil was observed from Ambagarh Chowki block followed by Dongargarh and Khairagarh. Whereas, arsenic level in soil sample from Manpur, Rajnandgaon, Mohla,Chhuikhadan, Dongargarh and Chhuria did not differ significantly among each other. Significantly highest arsenic level in the water was observed from Ambagarh Chowki than the remaining block of Rajnandgaon district. However, arsenic level in the water sample of this remaining block Rajnandgaon, Dongargarh, Khairagarh, Chhuikhadan, Chhuria, Manpur and Mohla did not differ significantly among each other. Similar trend of arsenic level in paddy straw like in water were also observed from Ambagarh Chowki. Significantly highest arsenic level in the paddy straw was observed in Ambagarh Chowki than other block of Rajnandgaon district except Khairagarh. However, arsenic level in the straw sample of Rajnandgaon, Dongargarh, Khairagarh, Chhuikhadan, Chhuria, Manpur and Mohla were comparable among each other. Significantly highest arsenic level was revealed in the serum sample of cattle from Ambagarh Chowki block than other blocks of Rajnandgaon district, however these other blocks did not differ significantly among each other. Significantly higher arsenic concentration was noticed in the hair of cattle from AmbagarhChowki followed by Mohla and Khairagarh. Arsenic level in the hair of cattle did not reveal significant difference among Rajnandgaon, Dongargarh, Chhuikhadan, Chhuria, Dongarhgaon and Manpurblock.Significantly highest level of arsenic was observed in the faeces sample of cattle from Ambagarh Chowki followed by Rajnandgaon and other blocks. The arsenic level in the dung of cattle from these other blocks did not differ significantly among each other, however dung sample of these blocks showed significantly lower arsenic than Ambagarh Chowki and Rajnandgaon. Significantly lower TEC and TLC (10^6 /mm^3) was observed in the blood sample of cattle from Ambagarh Chowki than rest of other blocks, which showed comparable level of arsenic among each other. Similarly, significantly lower concentration of Hb(g/dl) was also observed in the blood sample of cattle from Ambagarh Chowki followed by Mohla and Dongargarh block. Hb(g/dl) value in the blood sample of Rajnandgaon, Khairagarh, Chhuikhadan, Chhuria, Dongargaon, Mohla and Manpur was comparable among each other but these values were significantly higher than Dongarhgarh, Mohla and Ambagarh Chowki. PCV (%) did not reveal significant difference among the blood sample of cattle from different blocks of Rajnandgaon District. Significantly highest SGPT, SGOT and lowest albumin levels in the serum sample of cattle from Ambagarh Chowki were observed than other blocks; however, these other blocks did not

differ significantly among each other. Similarly, significantly lowest total protein in the serum sample of cattle from Ambagarh Chowki showed followed by Mohla, Chuikhadan, Chhuria and Khairagarh. The milk production data was obtained from various block of Rajnandgaon district by the help of questionnaire and result is presented in the table The milk production performance in the cattle of affected and non-affected area did not differ significantly among the block of district even due to higher level of arsenic in Ambagarh Chowki block of Rajnandgaon district. No acute and chronic symptoms in cattle were observed. The correlation coefficient of soil, paddy straw and serum revealed significant difference, however other blocks did not differ significantly. In metal especially in Chhattisgarh state there is Chowki, Mohla Manipur are the areas of Rajnandgaon district having AS contamination is more than the permissible limit, so preventive measure should be adopted to avoid this situation. In case of sudden exposure firstly to removal of contaminants, emesis is first step (in capable species), followed by activated charcoal with a cathartic and then oral administration of demulcents. Dimercaprol is one of the chelating agent will conjugate with AS, can be given either intramuscular or n Vein directly. Researcher proven that cur cumin (Haldi) is herbal compound can also be given @ 400 mg/kg will be very effective.

CONCLUSIONS

Arsenic is a naturally occurring element present in the earth in various form (arsenate, arsenite) contaminates soil, water and causes toxicity to animal as well as human beings. The main routes of exposure of humans and most animals to arsenic through the ingestion then absorption through the skin. Animals having Arsenic intoxication showing various form Peracute, acute and chronic form. First treatment is to removal of contaminants, emesis is first step (in capable species), followed by activated charcoal with a cathartic and then oral administration of demulcents. If diagnosis were confirmed early treatment should be started with Dimercaprol, even is given within two hours after ingestion of the toxic metal. Intramuscular injection or intravenous injection in peanut oil because of water insolubility was the reason. Supportive therapy includes fluid therapy produce additive effect and animal will improve the health condition. In the current study, relationship of arsenic level in soil, feed stuff and serum of cattle in Rajnandgaon District of Chhattisgarh were studied and the following conclusions are drawn:Ambagarh Chowki block of Rajnandgaon district contained higher arsenic level in the soil, water, paddy straw and serum samples than other blocks of Rajnandgaon district. Ambagarh Chowki block's cattle also showed higher excretion of arsenic in dung and higher storage in hair than other blocks of cattle. Similarly, cattle of Ambagarh Chowki also revealed lower hematological parameters i.e. Hb, TEC and TLC and higher biochemical parameters i.e.SGPT and SGOT than other blocks of Rajnandgaon district. Concentration of arsenic in soil, paddy straw and serum also confirmed positive correlation in the Ambagarh Chowki block of Rajnandgaon district. Higher level of arsenic in soil and feed stuff did not adversely affect milk production performance in indigenous cattle in the affected area of Rajnandgaon district.It was concluded that the soil, paddy straw and serum samples of Ambagarh Chowki block contains highest arsenic level and confirms positive Correlation.

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