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## Water Pollution in Fim Kassar Well 1A

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**Abstract:** The present study has been conducted to determine the water quality and estimation of heavy metals of Fim Kassar Nallah. The water quality parameter including Hardness, Alkalinity, Total Suspended Solids and pH. The water samples were collected from the selected site for the period of six month from January to June 2005 on monthly basis. The data indicates that the amount of total suspended solids and electrical conductivity is not suitable for aquatic life. The values of pH were found more or less same during the six months. The values of total suspended solid were found to be higher during the month of June while there is no significance difference could be found between dissolved oxygen. The heavy metals including Copper, Zinc, Lead and Cadmium were tested by using Atomic Absorption Spectrophotometer. The data show that there is no significance difference among the concentration of heavy metals. The level of Copper and Zinc were found to be tolerable range which is 2 and 5 mg L<sup>-1</sup> respectively, while the values of Cadmium and Lead were found higher than tolerable range for aquatic life which were 0.005 and 0.015 mg L<sup>-1</sup>, respectively.

**Key words:** Water Pollution, heavy metals, alkalinity, total suspended salts, pH

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### INTRODUCTION

Pollution of aquatic environment by a variety of toxic substances has been measuring during the last few decades and it is only recently that the world has started realizing it a serious concern. The major sources of pollution which endanger the water quality are various types of heavy metals mud chemical such as ferrochromeligno sulphonates bactericides and fungicides. Water pollution by such types of mud chemical is unfavorable for the normal physiological and biochemical function of plants and fish life (Rojik *et al.*, 1983; Newsome, 1967).

Aquatic environment is becoming polluted not only because of a single source but a variety of sources including domestic and industrial wastes. These may be derived from inputs of suspended solid in which toxic substances are absorbed, such as soil particles in surface water run off from the fields treated with mud chemicals. Mud chemicals are useful tool in drilling but their contribution in the gradual degradation of aquatic system can not be ignored (Baker and Brooks, 1989).

Commercially available and most common used mud chemicals are biotrol bactericides, aluminum sterate, sodium ammonium phosphate, zinc sulphate silicate compound etc. These effect the aquatic life in a great deal and are responsible for several physiological problems such as the deviated serum transaminase activity as well

as changes in serum glucose triglycerides and cholesterol contents, impaired glycogen metabolism, excessive catabolism in mussel tissues, liver hypertrophy, disturbed asymmetry, hemorrhage in vertebral area and fin erosion in demersal fish (Cross, 1983).

Heavy metals have been extensively tested and identified in the area more often used for fish life and have been observed to carry toxic affects. Among them lead, mercury, copper, zinc, cadmium, nickel cobalt and selenium are mostly aimed for study (Ahmad and Khan, 1983; Dewani *et al.*, 1997).

The knowledge of distribution of heavy metals in water, sediments and plankton play a key role in dictating source of heavy metals pollutants in aquatic ecosystem (Javed and Hayat, 2002). Heavy metals are usually imported from industrial effluents and domestic sewage to the inland aquatic ecosystem and get accumulated in the fish which eventually result in physiological perturbation from an ecological point of view, survival, growth, reproduction, spawning and hatchery success, in fish under different level of toxicity, provide end point of undoubted significance (Mastoi *et al.*, 1997). Based upon the above said information there is an assumption that fauna and flora of the Nallah must have been effected drastically due to the enormous amount of pollution present and so the present study is aimed finding out the pollutant content in water of Nallah as well as in aquatic life present there.

**Table 1: Value of hardness, dissolved oxygen, alkalinity and total suspended solid of fim Kassar Nallah in six months**

Month	Hardness	Dissolved oxygen	Alkalinity	Total suspended solid
January	150	1.75	200	310
February	160	1.69	175	290
March	145	1.37	215	299
April	160	1.55	210	320
May	187	1.50	220	280
June	210	1.73	250	340
Mean	169	1.59	211	307

## MATERIALS AND METHODS

The present study was planned in area of Fim Kassar Well 1A which originate from well head of Fim Kassar Well #1A flow toward Fim Kassar Nallah in district Chakwal. Water samples were collected on monthly bases for study of water quality parameter like pH, dissolved oxygen, alkalinity, hardness, total dissolved solids, electrical conductivity and estimation of heave metals contents.

pH is measured electrochemical using a glass electrode. Conductivity is measured by using Conductivity Bridge (Backman Conductivity Bridge RC-16 c). Potentiometric titration's with standard sulphuric acid measures alkalinity by using pH meter for end point. EDTA titration determines the hardness of the sample. Total suspended solid by filtration the known volume of the sample and dried at 105 C0. Heavy metals are determined by using atomic absorption spectroscope (Model Perkin Elmer, 2000) by making a stock solution of known concentration, Making known dilutions in order to standardize the equipment and then running the sample for obtaining its concentration. The dissolved oxygen was measured by digital DO meter (oxi 3301, wtw).

## RESULTS AND DISCUSSION

The Table 1 shows the values of hardness in six months (Jan. 2005-June 2005). The results were found to be 150, 160, 145, 160, 187 and 210 mg L<sup>-1</sup> for six months respectively. The data suggested that the higher values found in the month of May and June and minor difference with rest of the other months while the values of January, February March and April are not significantly difference. The lowest values were found in the month of March. The mean values of hardness in six month is 169 which is lower than the tolerance level suggested by PSQCA which is 250 mg L<sup>-1</sup>. Whereas one of higher values in the month of May and June was found due to the rain water which cause drastic changes in the hardness, in general in these months if the factor for increase in hardness is not the rain then the probable factor is the surface evaporation from the drain which increase the solids and ions so as to increase the hardness.

The results were found to be 1.75, 1.69, 1.37, 1.55, 1.50 and 1.73 mg L<sup>-1</sup> for six month, respectively (Table 1). The monthly data of dissolved oxygen shows no significant difference. All these values are very low than the values of studied in river Kunhar 8.42 mg L<sup>-1</sup> (Kamran 1988), River Sardaryab 7.5 mg L<sup>-1</sup> (Shafiq, 1987) and Karghah Nallah Gilgit 6.23 mg L<sup>-1</sup>. The reason for such a low values of dissolved oxygen is due to the water coming from well head which is not suitable for the aquatic life. Because this water is coming from the source underneath the soil surface i.e., well so the D/O concentration is less.

The results were found 200, 175, 215, 210, 220 and 250 mg L<sup>-1</sup> for six month, respectively (Table 1). There is no significant difference, but the data of the month of June is different from rest of the month. The alkalinity range from 50-200 ppm is considered to be very suitable for a good production of fish. Low alkalinity water are usually un productive (Boyd, 1990).

Present study have higher values as compared to the mean values of Mangla reservoir at Harbour was 82.67 ppm, Mangla reservoir at Sukhian was 82.93 ppm (Samina, 1998) and Launch Adda 82.76 ppm. All the values of alkalinity from Nallah Fim Kassar were found to be higher than 200 mg L<sup>-1</sup> which is tolerable level for fish production.

The results regarding total suspended solids were found to be 310, 290, 299, 320, 280 and 340 mg L<sup>-1</sup> for six months.

The present study have lower values than 400 mg L<sup>-1</sup> by an agency NEQS. But the values were found to be higher than studies conducted in river Kunnar 289.9 ppm (Bangash, 1986) River Jhelum at Holar 92.33 ppm (Rafique, 1988) River Kunhar 22.1 ppm (Kamran, 1988). The values of present study were found to be low than the study conducted at river Kabal 1025 ppm (Naeem, 1988). The reason for these high values were due to heavy amount of pollution.

The Table 2 shows the data of pH of Nallah Fim Kassar in six month. The results were found to be 7.59, 7.54, 7.50, 7.54, 7.45 and 7.59 for six month, respectively and these values are all basic and suitable for plants and aquatic life.

Table 2: Data of pH of Nallah Fim Kassar in six months

Months	Electrical conductivity	pH
January	539	7.59
February	520	7.54
March	577	7.50
April	572	7.54
May	566	7.45
June	572	7.59
Mean	557	7.54

Table 3: Mean concentration of different heavy metals (Cu, Zn, Ca and Pb) (mggm<sup>-1</sup>)

Months	Copper	Zinc	Cadmium	Lead
Jan	0.233	0.216	0.068	0.090
Feb	0.210	0.200	0.049	0.46
March	0.255	0.144	0.030	0.67
April	0.301	0.136	0.088	0.77
May	0.240	0.130	0.062	0.100
June	0.215	0.140	0.055	0.54
Mean	0.242	0.161	0.057	0.44

The results were found to be 539, 520, 577, 572, 566 and 572 mg L<sup>-1</sup>. The data of these months was found to be relatively same and no significant difference with each other. The values were found to be higher than the study conducted at Mangla reservoir at Sukhian 167.5 (Samina, 1998) and Mangla Reservoir at Lanuch Adda 165.68 (Fakhara, 1998). The reason for such a high values is due to the waste which is coming from the village.

In order to determine the concentration of metals in the water sample of Fim Kassar Nallah (Table 3) four metals were selected i.e., Copper, Zinc, Lead and Cadmium. The results were found to be 0.233, 0.210, 0.255, 0.301, 0.240, 0.215 mg L<sup>-1</sup> Copper, 0.216, 0.200, 0.144, 0.136, 0.130, 0.140 mg L<sup>-1</sup> Zinc, 0.068, 0.049, 0.030, 0.088, 0.062, 0.055 mg L<sup>-1</sup> Cadmium, 0.090, 0.46, 0.67, 0.77, 100, 0.54, mg L<sup>-1</sup> lead in six month, respectively. No significant difference was found between the concentrations of different metals during six months. The level of Copper and Zinc were found in tolerable range suggested by difference agencies i.e. WHO, Eu and PSQCA which were 2 mg L<sup>-1</sup> and 5 mg L<sup>-1</sup>, respectively while the values of Cadmium and Lead were found little bit higher than tolerable rang suggested by different agencies i.e., WHO, EU and PSQCA which were .005 mg L<sup>-1</sup> and .015 mg L<sup>-1</sup>, respectively.

The present study has been conducted to determine the water quality and estimation of heavy metals of Fim Kassar Nallah. The water quality parameter including Hardness, Alkalinity, Total Suspended Solids and pH. The water samples were collected from the selected site for the period of six month from January to June 2005 on monthly basis. The data indicates that the amount of total suspended solids and electrical conductivity is not suitable for aquatic life. The values of pH were found more or less same during the six months. The values of total suspended solid were found to be higher during the

month of June while there is no significance difference could be found between dissolved oxygen. The heavy metals including Copper, Zinc, Lead and Cadmium were tested by using Atomic Absorption Spectrophotometer. The data show that there is no significance difference among the concentration of heavy metals. The level of Copper and Zinc were found to be tolerable range which is 2 mg L<sup>-1</sup> and 5 mg L<sup>-1</sup>, respectively, while the values of Cadmium and Lead were found higher than tolerable range for aquatic life which were 0.005 mg L<sup>-1</sup> and 0.015 mg L<sup>-1</sup>, respectively.

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