

ORIGINAL ARTICLE

Effect of Agriculture Wash Off on Eutrophication Process in Water Sources at Nimad Area: A Water Pollution Study

Gopal Rathore^{1*}, Rakesh Patel², Neelam Chopara³, Anjali Malviya⁴ and Shanu Khan⁵

^{1*} Department of Chemistry, SRGBN, College Sanawad, Khargone (M. P.), India-451111

^{2,4,5} Department of Life Science, SRGBN, College Sanawad, Khargone (M. P.), India-451111

² Department of Chemistry, Government BHEL Collage, Bhopal (M.P.), India-462008

Corresponding Email: gopal.rathor8@gmail.com

ABSTRACT

Eutrophication is a process where a water body changes due to high concentration of nutrients drainage from agriculture land by farmer in to either surface or ground water. Water samples were collected from deferent's water sources of Nimad area and Laboratory experiments were conduct at 2017 for this study. In this study revaluated that the Phosphate level were 31.45, 18.87, 3.74, 24.82, 3.57 and 2.89ppm in Choral River, Narmada River, Bakud River, Well, Padali River and Small Pound respectively. Eutrofication density was high in water source which content higher concentration of Phosphate. After completion of the study we found that the major role of phosphate for increased Eutrophication process. Farmers should have aware to farming and balance fertigation should be applied with soil testing so phosphate and other nutrients level will be balance in there agricultural land and controlled nutrient drainage in to water sources. So we can control growth of algae bloom in water sources.

Keyword: Agriculture, Pollution, Eutrofication, Water, Algae

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INTRODUCTION

The Eutrophication is a process where a water body changes due to high concentration of nutrients such as nitrogen, potassium and phosphate from anthropogenic activities [1, 2]. Eutrophication is not a clearly defined term and there are various definition such as: The process of changing the nutritional status of a given water body by increasing the nutrient resources [3]. Increase the rate of organic carbon production in an ecosystem [4]. Algae are common photosynthetic organisms that can be found in water sources. A major problem with the use of fertilizers occurs when run off the land by rain water and flood irrigation into rivers, well, pond and lakes. The resulting increase the phosphate, nitrate and other nutrients in the water encourages algae growth, which forms a bloom over the water surface. In term of Eutrofication, some harmful algal blooms are harmful to plants and animals in aquatic system. The toxic compounds produce with Eutrofication process, can make their way up the food chain and resulting in animal mortality [5]. When the algae die or are eaten, neuro and hepato toxins are released which can kill animals and may be harmful to humans [6].

MATERIAL AND METHODS

Laboratory experiments were conduct at 2017 for this study. Total 6 water samples were collected from deferent's water sources of Nimad area (Table 1 Figure-1). These water samples were collected in plastic bottles with proper marking. The standard methods (Standard Operating Procedure Manual) were used for analysis of water sample. Calcium, Sodium and potassium were measured with Flame Photometer and Spectrophotometer was used for sulfate and Phosphate analysis. EC, TDS and Salinity were analyzed with multimeter.

Table-1: Water Samples collection Area and Source

S. No.	Details	Collection Date	Temperature °C
1	Choral River	23/04/2017	30
2	Narmada River	23/04/2017	28
3	Bakhund River	24/04/2017	31
4	Well	24/04/2017	29
5	Padali River	26/04/2017	31
6	Small pond	26/04/2017	30

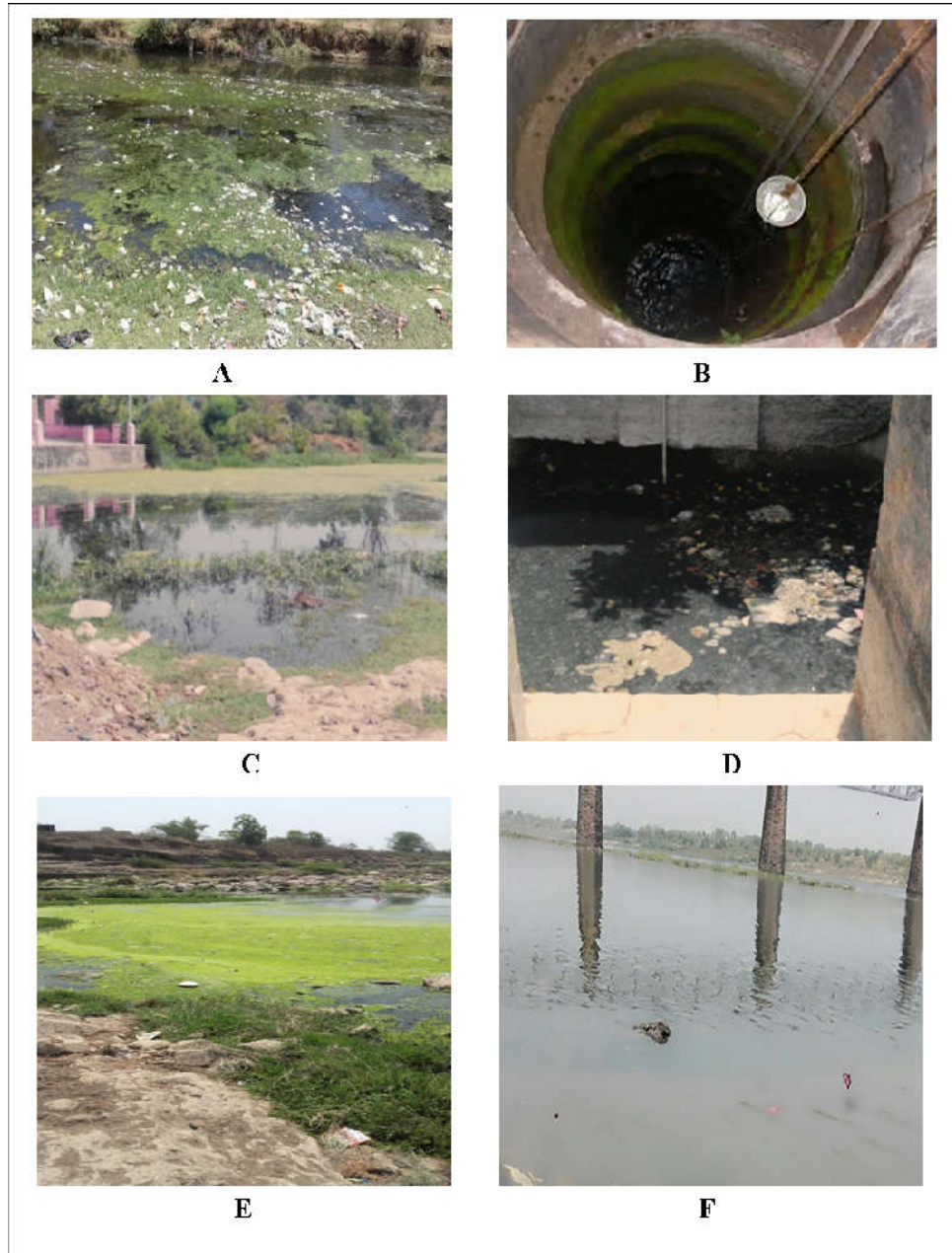


Figure-1: A. Bakud River, B. Well, C. Padali River, D. Small Pond, E. Choral River and F. Narmad River.

RESULT AND DISCUSSION

According to data of physicochemical properties of sewage given in Table 2 revealed that the had a wide range of variation pH (7.32 to 8.59, mean=8.04), EC (0.28 to 2.22 ms cm⁻¹, mean=0.96), Ca (380 to 3080 ppm, mean=1495), Na (1030 to 10100 ppm, mean=4738), K (210 to 2240 ppm, mean=1087), Sulphate (8.96 to 236ppm, mean=91.98) and Phosphate (2.89 to 31.45ppm, mean=14.22). Eutrofication density was high in source A, D and E (Figure-1) and in these samples we also found the concentration of Phosphates were high. The concentration of phosphate into water is low, hence the difficulty of reversing

the effects of eutrophication [7]. In the Source F (Narmada River) Eutrofication density and phosphate level were low as compeer to Source A, because the number of awareness program run by government of Madhya Pradesh for control Narmada River pollution.

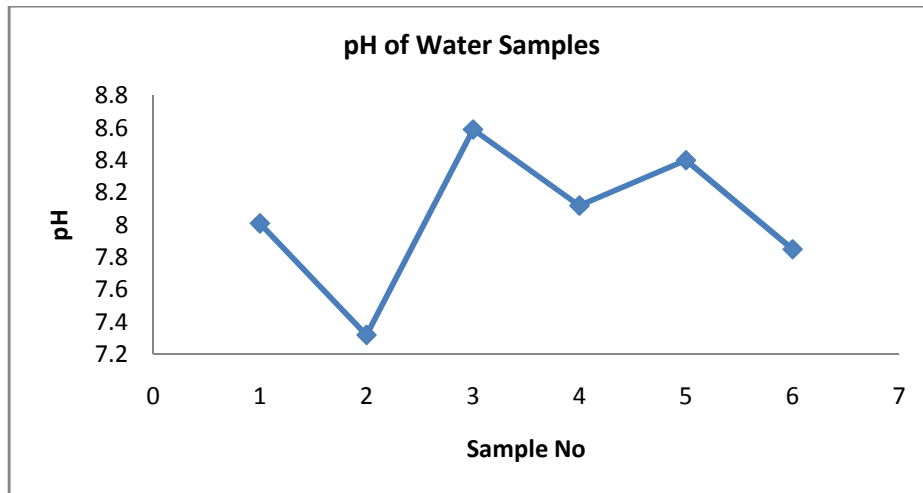


Figure-2: pH of collected Water Samples

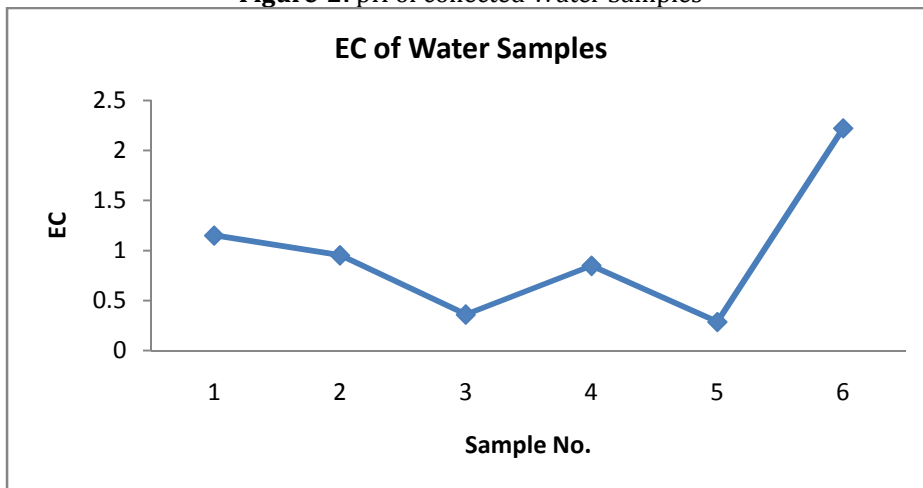


Figure-3: EC of collected Water Samples

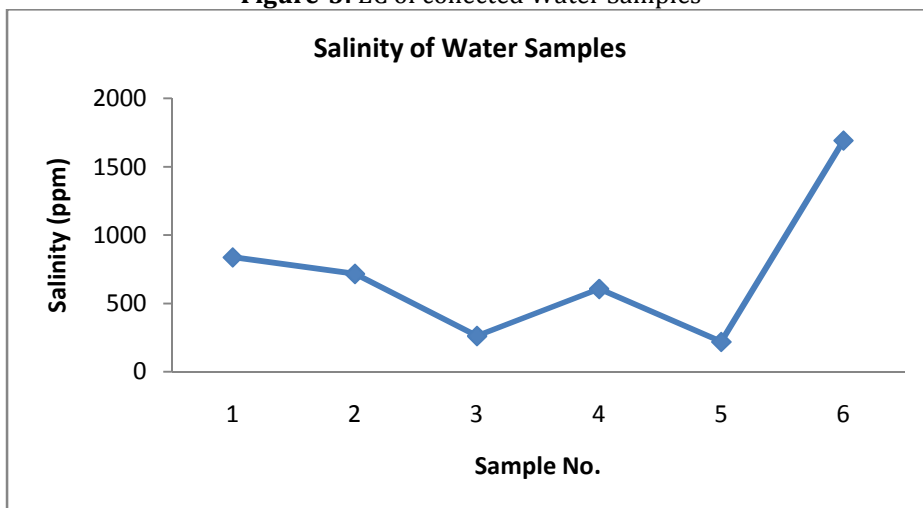


Figure-4: Salinity of collected Water Samples

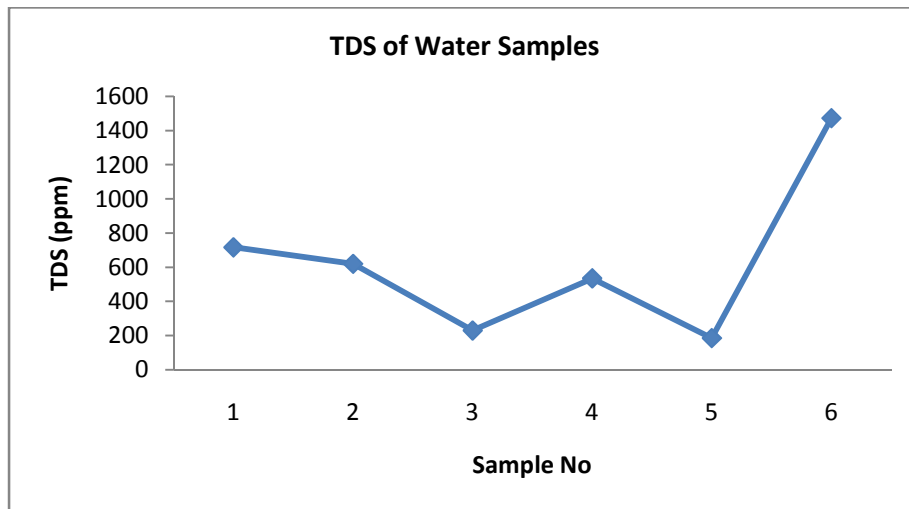


Figure-5: TDS of collected Water Samples

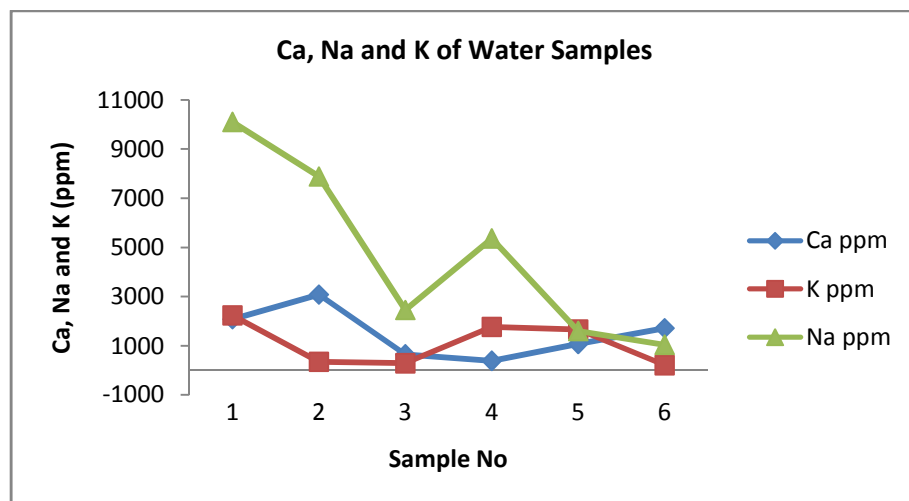


Figure-6: Ca, Na and K of collected Water Samples

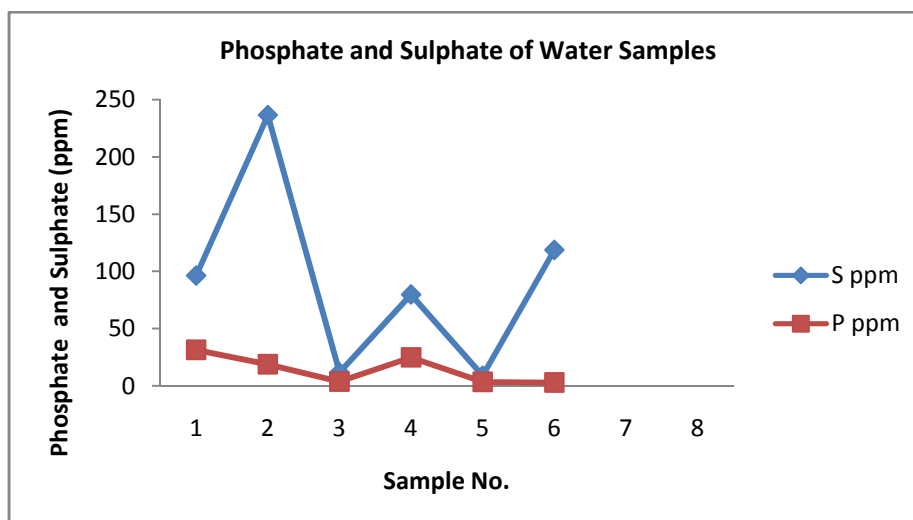


Figure-7: Phosphate and Sulphate of collected Water Samples

Table-2 Statistics of physico-chemical parameter of water

Statistic Parameter	pH	EC (ms ⁻¹)	TDS (ppm)	Salinity (ppm)	Ca (ppm)	K (ppm)	Na (ppm)	S (ppm)	P (ppm)
Minimum	7.32	0.287	186	220	380	210	1030	8.96	2.89
25% Percentile	7.58	0.324	208	241	510	250	1310	10.3	3.23
Median	8.06	0.900	578	662	1395	1005	3910	88.03	11.31
75% Percentile	8.49	1.685	1096	1265	2580	2005	8995	177.6	28.14
Maximum	8.59	2.220	1474	1692	3080	2240	10100	236.5	31.45
Mean	8.04	0.969	627	722	1495	1087	4738	91.98	14.22

CONCLUSION

The process by which a body of water becomes enriched in dissolved nutrients (such as phosphates) that stimulate the growth of aquatic plant life usually resulting in the depletion of dissolved oxygen". In this study we were collected the water sample from deferent place of water source and then we analyzed some chemical parameter and effect their concentration on the process of eutrophication. Eutrophication is a severe problem not only to ecosystems, but also to humans. Farmers should have aware to farming and balance fertigation should be applied with soil testing so phosphate and other nutrients level will be balance in there agricultural land and controlled nutrient drainage in to water sources. So we can control growth of alga bloom in water sources.

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