



## A Study on Pre-retting and Post-retting Water of Waterbodies from a Selected Area of Bangladesh

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### ABSTRACT

The study was conducted to analyze the pre and post-retting water of five randomly selected ponds regarding the parameters viz. BOD<sub>5</sub>, COD, TSS, TDS, TKN, TP, Cl, Ph, **Ec PH**, to **Ec**. BOD<sub>5</sub> (ranging from 110 to 215 mg/l and 170 to 237 mg/l, respectively) and COD (227 mg/l to 310 and 299 to 403 mg/l, respectively) values of both pre and post-retting water of all the ponds were much higher than recommended values. Values of TSS, TKN, TP tests of both pre and post-retting water of the ponds reflected higher values than recommended values. Whereas, TDS (213 to 501 mg/l and 210 to 595 mg/l, respectively) and Cl (51 to 300 mg/l and 50 to 305 mg/l, respectively) values were less than recommended values. Ph values were within the recommended range of Ph 6 to Ph 9. All these results indicates that jute-retting is may not be the one and only factor to deteriorate the water quality of ponds. Jute-retting causes transitory water pollution in the water bodies only which can be minimized or removed by different ways. To find out specific way(s) to minimize or eradicate this transitory pollution, further research is required.

### KEYWORDS

retting, jute, pollution, Bangladesh.

### Academic Discipline And Sub-Disciplines

Agriculture

### SUBJECT CLASSIFICATION

Environmental pollution

### TYPE (METHOD/APPROACH)

Experimental

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## INTRODUCTION

Jute is the main cash crop of Bangladesh. Retting of jute in waterbodies plays an important role to upgrade the quality of raw jute. The event of retting and fibre extraction is complex and multidisciplinary in nature. Retting process produces biodegradable by-products with no toxins (Haque et al. 2002). However, there are excessive microbial load and the water loses its original color, odor, etc. and becomes darker. After sometime specially when the amount of water increases in the waterbodies, the effects disappear. So the effect of jute retting on water can be described as transitory pollution.

Water pollution is defined as something present in the wrong place, at wrong time in wrong quality which is due to adding something changing the natural quality of water (Rahman A, 2002). Water pollution is not independent, viz. adding of organic wastes influences not only the chemical properties but also the color, odor, biological properties of water (Das, ND, 2002). During retting as well as in post-retting water, the microbial contents increased greatly. The pH values of the water were usually between 6.60- 8.00 (Ali et al., 1962, 1970, 1972, 1973). Ahmad (2008) isolated higher amount of bacteria both aerobic and anaerobic from samples of retted water comprising 3 genera, Bacillus, Micrococcus, and Pseudomonas and 13 species.

However, the data regarding the phenomenon are inadequate. Hence the study was undertaken to investigate about pre-retting and post-retting water of several selected waterbodies of Dhamrai area near Dhaka, Bangladesh. To find out the pre and post retting water status, the parameters like BOD<sub>5</sub>, COD, TSS, TDS, TKN, TP, Cl, Ph and EC were analyzed.

## MATERIALS AND METHODS

The research was carried out in Biochemistry Laboratory of **University of Khulna, Bangladesh** during the period from January, 2012 to February, 2013.

Sample collection:

Water samples were collected from five randomly selected waterbodies (Ponds) of Dhamrai area near Dhaka. Clean plastic bottles were rinsed with distilled water for sample collection. Then the bottles were rinsed with sample water 3 times to avoid contamination. Carefully the air gaps at the top of the bottles were avoided when the bottles were filled with the pre and part retting water.

Analysis

The collected samples were subjected to test immediately in the lab within 48 hours. All the parameters viz. BOD<sub>5</sub>, COD, TSS, TDS, TKN, TP, Cl, Ph, and EC were tested following the standard method for examination of water and wastes water, A.P.H. A, 1992 and chemical methods for environmental analysis- water and sediment (Ramesh et al, 1996).

## RESULT AND DISCUSSION

In the present experiment both BOD<sub>5</sub> and COD values in post-retting water were higher than pre-retting water. But all the values for either BOD<sub>5</sub> or COD were much higher than recommended value (50mg/l for BOD, 200mg/l for COD value) by the Environment Conservation Rules, 1997. Both BOD<sub>5</sub> and COD values were found increased in post-retting water than pre-retting water as depicted in the table. The highest BOD<sub>5</sub> and COD values were found 237mg/l and 403mg/l, respectively in post-retting water of pond 3 where as the lowest BOD<sub>5</sub> and COD values were found 110mg/l and 227mg/l in pre-retting water of pond 1 and pond 4, respectively. The higher values of BOD<sub>5</sub> and COD proves the presence of pollutants other than usual household sewage (Amin et al, 1998). The result found here also correlated with the findings of Bakar M A, et al 2010, but differs with the findings of Haque, et al, 2002. It might be due to difference in geographical location, time period, etc.



**Table 01 : Properties of post-retting and pre-retting water from different ponds •\*.**

Ponds	BOD <sub>5</sub> mg/l		COD mg/l		TSS mg/l		TDS mg/l		TKN mg/l		TP mg/l		Cl mg/l		P <sup>H</sup>		EC µs/cm	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
1	110	170	285	305	209	285	501	595	8	14	1.1	1.5	51	50	6.84	6.72	1010	1000
2	200	230	290	337	327	325	209	251	7	10	2.3	2.5	97	111	7.2	6.9	800	700
3	215	237	310	403	190	213	213	210	11	15	0.9	1.9	190	187	6.4	6.8	650	640
4	179	219	227	299	207	210	305	295	13	17	1.7	2.7	300	305	6.9	7.1	455	405
5	211	235	271	301	155	151	301	315	9	15	1.05	1.5	90	95	7.5	7.1	988	918
Average ±	183 ±43	218 ±28	277 ±31	329 ±44	218 ±65	237 ±68	306 ±118	333 ±152	10 ±2	14 ±3	1.41 ±0.58	2.02 ±0.56	146 ±100	149 ±100	6.96 ±0.41	6.92 ±0.17	781 ±234	733 ±236

\*Average of three replications.

- BOD<sub>5</sub>-Biological Oxygen Demand
- COD-Chemical Oxygen Demand
- TSS-Total Suspended Solid
- TDS-Total Dissolved Solid
- TKN-Total Kjeldahl Nitrogen
- TP-Total Phosphorous
- Cl-Chloride
- P<sup>H</sup>-Hydrogen ion Concentration
- EC-Electrical Conductivity

TSS values were found higher in post-retting water except pond 2 and pond 5. But the difference of TSS values of pre and post-retting water of pond 2 and 5 was not so high. All the TSS values found here were above the recommended value (150mg/l) of the Environment Conservation Rules, 1977. TDS values were higher in post-retting water with the exception in pond 3 and pond 4. All the TSS values ranging from 209mg/l to 595mg/l were less than the recommended value, 2100mg/l (Environment Conservation Rules, 1997). The values of TSS and TDS found here correlate the findings of Bakar M A, 2010 and Das N D, 2002.

Post-retting water of all the ponds gave higher TKN and TP values than pre-retting water. Maximum TKN and TP values were 17mg/l and 2.7mg/l which were very much lower than the recommended values (1000mg/l and 8mg/l, respectively) by the Environment Conservation Rules, 1997. The finding of Bakar M A, 2010 is similar with the TKN and TP values. There was no significant difference in Cl values of pre and post-retting water of the ponds. The minimum value was 50mg/l whereas maximum value was 305mg/l. All the values were much lower than 600mg/l as recommended by the Environment Conservation Rules, 1997.

According to the 'Bangladesh Gazette', August, 1997; the Ph values should be within the range of Ph 6 to Ph 9. All the Ph values in this experiment were within the range. The result is similar with the findings of Das ND, 2002. The Electrical conductivity was higher in pre-retting than post-retting water. The maximum and minimum values were 1010 µs/cm and 405µs/cm respectively. The findings regarding EC were identical with the findings of Das ND, 2002.



All the tests done here reflects that the degree of pollution is higher in post-retting water than pre-retting water in most cases, specially regarding BOD5 , COD values ,etc. But the test parameters of pre-retting water were not satisfactory also. So, only retting of jute is not responsible for increasing degree of pollution. Other factors like improper caring to the pond, less amount of water, stagnant condition, etc are also responsible for increasing degree of pre and post-retting water pollution. According to IJO, 1994; the ponds cannot meet the hygienic standard of drinking water until 217 days. On the other hand, it was termed as “transitory pollution” because retting in stagnant water results in bad odor, increasing microbial load, etc and after sometime, the negative effects disappear (Haque, et al, 2002). However, scientific community can play a key role here by constantly providing information to develop strong public, specially jute farmers opinion against all types of pollution. Media, Government and NGOS can play a significant role regarding this.

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