

## International Journal of Innovative Research in Science, Engineering and Technology

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# Experimental Study on Treating Dairy Waste Water Using Jack Fruit Seeds and Aloevera Gel

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**ABSTRACT:** The dairy industry is one of the major source of food processing. These industries produce a huge amount of wastewater. Such wastewater is to be treated by using naturally and easily available coagulants and then tests are to be carried to check the water different characteristics of waste water before and after coagulation process. Natural coagulants used are Jack fruit seeds and Aloevera gel. The mixed proportion of jackfruit seed powder and Aloevera gel are used as adsorbents. The maximum percentage reduction of various parameters can be observed at a dosage of 0.8 gm of Jack Fruit seed. The maximum percentage reduction of various parameters can be observed at a dosage 4% of Aloevera Gel. The maximum percentage reduction of various parameters can be observed at a proportion of (20:80) of Aloevera gel + Jack Fruit seed.

## I. INTRODUCTION

Water pollution is a serious problem in India as almost 70% of its surface water resources and ground water resource are contaminated by biological, toxic, organic, and inorganic pollutants. This results in the pollution of water where by the quality of the water deteriorates, affecting aquatic ecosystems.

Hassan Milk Union Limited is district level milk co-operative society established under KMF on 30th March 1977. At the beginning it was started in a small shed beside Seetharamanjinaya temple at part road. Presently it is widely spread in a 27 acre plot in the industrial area B.M. Road, this being the procuring and processing unit. Milk is being collected daily in two shifts. Hassan dairy procures majority of milk from societies of Hassan district (344 societies), chilling centers and bulk milk coolers.

## II. OBJECTIVE

- To check the feasibility of the use of Jack fruit seeds and Aloevera as adsorbent for dairy waste water.
- To determine the removal efficiency of adsorbent over various parameters such as pH, Turbidity, Biochemical oxygen demand, Total dissolved solids, Total suspended solids.
- To check the feasibility of the use of Jack fruit seeds and Aloevera as adsorbents in combined proportion for dairy waste water.

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## III. MATERIALS AND PROPERTIES

### 3.1 Waste Water Considered

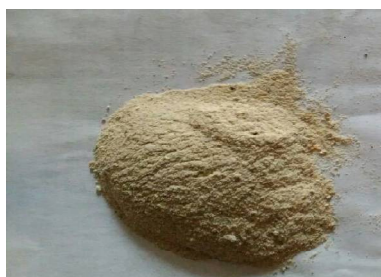
Wastewater considered for the present study of dairy waste water effluents is collected from KMF Hassan.

**Table 1:** Raw water characteristics Dairy Wastewater

Sl. No	Parameters	Untreated	Treated
1.	pH	14	8
2.	Alkalinity	651.34mg/l	439.34mg/l
3.	Total dissolved solid	20mg/l	13mg/l
4.	Suspended solid	1.9mg/l	0.56mg/l
5.	BOD	87.87mg/l	78mg/l
6.	Turbidity	175NTU	50NTU
7.	Dissolved oxygen	4.31 mg/l	3.58 mg/l
8.	Acidity	0	60.66 mg/l

### 3.2. Jackfruit Seed Powder Preparation

A jackfruit seed were cleaned with distilled water and sundried for 48 hours. Then the seeds were grained to fine powder in grinding mills. The powder was sieved using 0.425 mm mesh and was stored in an airtight container to prevent the entry of moisture into it and to avoid loss of its activity. The fine powder will be used as a coagulant for analysis.



### 3.3 Aloe Vera gel Preparation

Aloe Vera gel was extracted from Aloevera leaves. Aloevera leaves were collected from Plant nursery in Rangenahalli, Karnataka. The leaves were washed under the tap water to remove the dirt. Thick green cover or epidermis was carefully separated from the gel part. Then the gel part was blended in mixer to form liquid and preserved in glass bottles in refrigerator.



Fig:2 Aloevera Gel

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### 3.4 Jar Test Apparatus

Coagulation and flocculation are the most common method used for the removal of turbidity, colour, suspended matters, microorganisms and other odour producing substances. It involves the addition of coagulants that brings together the small destabilised particles to form large flocs so that they settle under the force of gravity and can be easily separated from the water. Jar test apparatus was selected for coagulation – sedimentation. Jackfruit seed powder and Aloevera gel was fed to the respective samples in varying dosages.

Initially rapid mixing was carried out for 2 minutes at 100 rpm followed by slow mixing for 25 minutes at 20 rpm. The sample after coagulation was allowed to settle for 30 minutes. The supernatant obtained was filtered and its characteristics were determined.

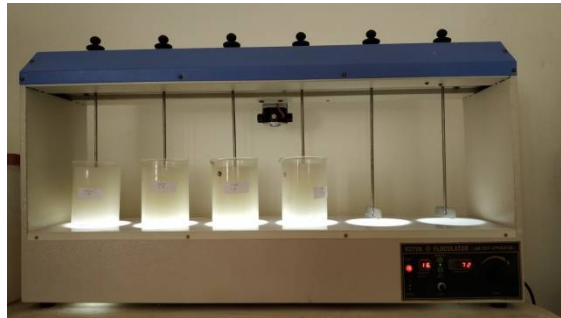


Fig: 3 Jar test apparatus

## IV. RESULTS AND DISCUSSIONS

### 4.1 Jack Fruit Seeds as a Coagulant

Table 2 Results of Experimentation

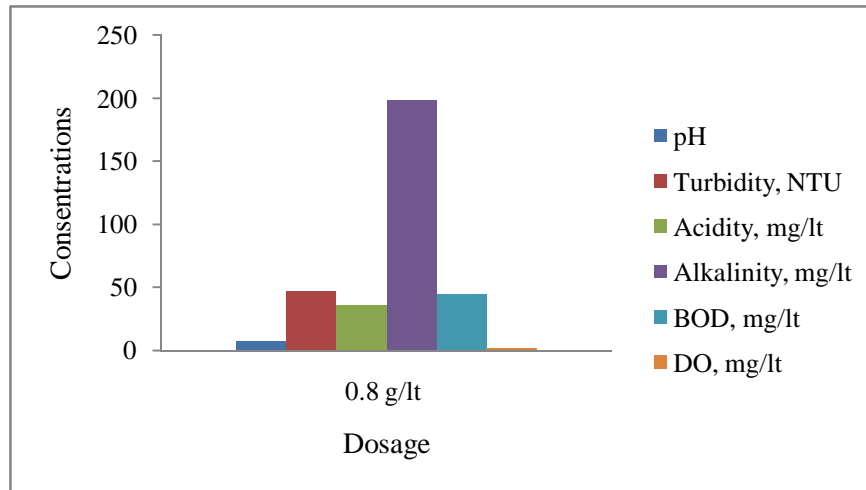
Dosage (g)	pH	Turbidity (NTU)	Acidity mg/l	Alkalinity mg/l	BOD mg/l	DO mg/l
0.2	7	120	78	214	62.13	2.86
0.4	7	83	72	236	61.98	2.46
0.6	7	68	48	212	53.28	2.170
0.8	7	47	36	198	44.19	1.67
1	7	58	52	240	26.52	1.18
1.2	7	77	68	264	47.31	2.07

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Graph:1

For dosage of 0.8 gm jackfruit powder, the construction of pH 14 and was neutral after treatment with a percentage reduction of 50%, in turbidity initially it was 180NTU and finally reduced to 47NTU with percentage reduction of 26.11%, in Alkalinity initially it was 664mg/l and finally reduced to 198mg/l with the percentage reduction of 29.82%, in BOD initially it was 91.8mg/l and finally reduced to 44.19mg/l with the percentage reduction 48.13%, in DO initially it was 4.63mg/l and finally obtained result was 1.67mg/l.

## 4.2 Aloe vera Gel as a Coagulant

Table 3 Results of Experimentation

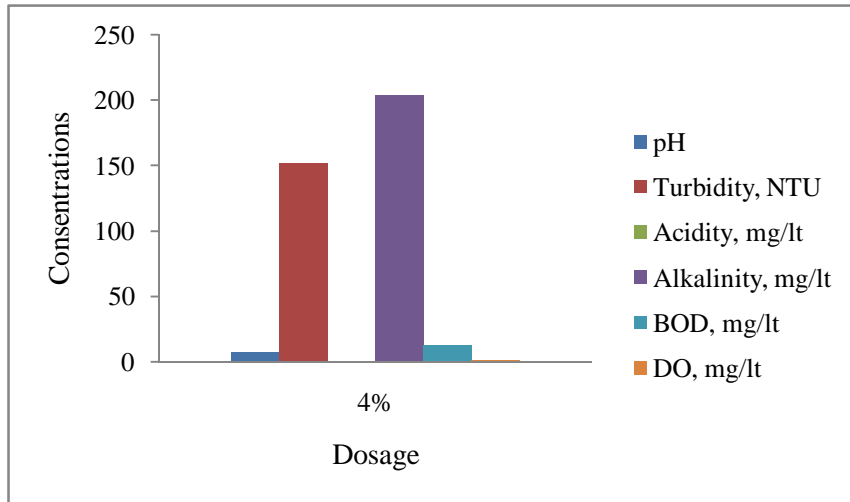
Dosage (%)	pH	Turbidity (NTU)	Acidity mg/l	Alkalinity mg/l	BOD mg/l	DO mg/l
1	8	160	0	178	11.85	1.48
2	8	156	0	210	14.70	1.57
4	8	152	0	204	13.35	1.48
6	8	163	0	206	8.85	0.98
8	8	167	0	210	13.20	1.67
10	8	163	0	212	13.20	1.87

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Graph 2

For dosage of 4% Alovera gel, the concentrations of pH was 14 and was neutral after treatment with percentage reduction of 57.14%, in turbidity initially it was 178NTU and finally reduced to 152NTU with percentage reduction of 85.39% ,in Alkalinity initially it was 630mg/l and finally reduced to 210mg/l with the percentage reduction of 32.38%, in BOD initially it was 39.96mg/l and finally reduced to 11.85mg/l with the percentage reduction of 33.40%, in DO initially it was 3.74mg/l and finally obtained result was 1.148mg/l.

### 4.3 Proportion of jackfruit seed powder and Alovera Gel as a Coagulant

Table 3 Results of Experimentation

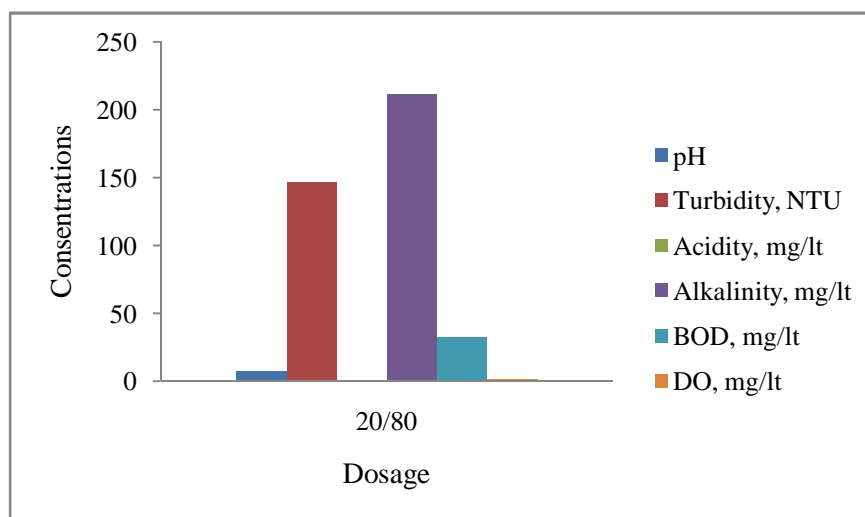
Dosage (%)	pH	Turbidity (NTU)	Acidity mg/l	Alkalinity mg/l	BOD mg/l	DO mg/l
50:50	8	155	0	240	44.40	3.06
35:65	8	150	0	216	47.40	2.76
20:80	8	147	0	212	32.40	1.87
5:95	8	152	0	270	38.40	2.37

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Graph 3

For dosage of (20:80) Alovera gel + jackfruit seed powder, the initially pH was 14 and was reduced to 8 with the percentage reduction of 57.14%, in turbidity initially it was 175NTU and finally reduced to 147 NTU with percentage reduction of 84%, in Alkalinity initially it was 684mg/l and finally reduced to 212mg/l with the percentage reduction of 30.99%, in BOD initially it was 62.1mg/l and finally reduced to 32.40mg/l with the percentage reduction of 52.17%, in DO initially it was 4.14mg/l and finally result obtained was 1.87mg/l.

### VI. CONCLUSIONS

Based on the results of experiment carried out under varied experimental conditions and the analysis of the same thereby the following conclusion has been drawn:

1. Jack Fruit seed powder and Alovera Gel seed powder is inexpensive and easily available in large quantities raw material and hence may be used for treatment of dairy wastewater as a lower cost adsorbent for the removal of dairy wastewater pollutants.
2. The maximum percentage reduction of various parameters can be observed at a dosage of 0.8 gm/l of Jack Fruit seed, 48.13% of Alkalinity, 26.11% of Turbidity, and at dosage of 1gm of Jack fruit Seed, 28.88% of BOD.
3. The maximum percentage reduction of various parameters can be observed at a dosage 4% of Alovera Gel, 32.38% of Alkalinity, 85.69% of Turbidity, and at dosage of 6% of Alovera Gel, 22.14% of BOD.
4. The maximum percentage reduction of various parameters can be observed at a proportion of (20:80) of Alovera gel + Jack Fruit seed, 30.99% of Alkalinity, 84% of Turbidity, 52.17% of BOD.

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