

DECOLOURISATION AND DEODOURISATION OF DILUTED SPENT WASH USING CHEMICAL AND BIOLOGICAL AGENTS

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ABSTRACT

In India there are 290 distilleries producing 2.75 billion liters of alcohol generating 45 billion liters of waste water annually. The distiller) disposing waste water, in to the natural streams, on to the land (or agricultural land), pollutes the mother earth. Also it is essential to sustain the mother earth lor the future oT our next generation. The technology for treatment ol such a waste water is ol prime concern. Hence, the present study was locussed on dcolouri/ation and deodourisation ol spent wash using oxidixing. coagulating agents and biological material AM the treatment has shown complete odour removal. No colour removal has been noticed with powdered *strychnus potatorium* treatment. The result ol chemical treatment revealed the highest colour removal than biological agents. Complete colour removal has been noticed when the 5% diluted spent wash treated with 1.5 g and 2 g of calcium hypo ehlorite (bleaching powder).

INTRODUCTION

Water is a vitally important commodity to all organisms. It is the medium which gave birth to the first primitive living molecules and without which life can never exist. Many anthropogenic activities especially industrialization play a main role to pollute the aquatic ecosystem to a maximum. One such industry, distillery consumes large amount of water and consequently generate huge quantities of spent wash.

The spent wash is ehacterised by the intense colour, objectionable odour.

higher TDS, TSS, TS, HOD, COD, nitrate. chloride etc. (Nanjundaswamy *et al.* 1998). Ramchandra and Singh 1999 have been reported that colour and odour poses a serious threat to the environment as the coloured waste affects the aquatic organism. light penetration and reduces the aesthetic value.

The colour is reddish brown to dark brown, due to the presence of melanoidins and polyphenolic compounds (Kasturibai and Ganga 1996). The unpleasant odour caused by distillery spent wash has been found due to the presence of odour causing compounds such as hydrogen sulfide ammonia, mercaptans, amines, aldehydes, ketones. indole and skatole has been reported by (Youngwoo *et al.* 1994). Hence the treatment of spent wash is utmost essential.

MATERIALS AND METHODS

Physico-chemical characterisation of distillery spent wash

The spent wash was collected (Iron; a distiller) located at (rich). Tamil Nadu. The physico-chemical characteristics such as pH, EC, TS, TDS, TSS, COD were determined (APHA 1989). The intensity of the colour was measured at 420 nm (max).

Dilution of the distillery spent wash

Spent wash was diluted with distilled water to obtain the 5% dilution. This dilution was prepared by diluting 5ml of spent wash to 100mL with distilled water.

Effect of oxidising agents and coagulating agents on colour and odour removal of 5 % diluted spent wash

About 100 mL of diluted spent wash was taken in 12 different conical flasks. Accurately 0.5g, 1g, 1.5g, 2g of calcium hypochlorite was added to the first four flasks. Stirring was done immediately and left for 2 hrs.

Accurately 0.5 g, 1g, 2g of calcium oxide was added to the another four flasks, mixed and left for 2 hrs.

About 0.5 mL, 1 mL, 1.5 mL, 2 mL of Hydrogen peroxide was added to the remaining conical flasks stirred and left for 2 hrs.

After 2 hrs they were filtered and colour was determined using spectro-

Table 1
Physico chemical characteristics of distillery spent wash

S. No.	Parameters	Values (mg/L)
1.	Colour	Dark Brown
2.	Odour	Objectionable
3.	pH	4.5
4.	TS	70000
5.	TDS	65000
6.	TSS	5000
7.	COD	92000

Except colour, odour and pH all are expressed in mg/L.

Table 2
Effect of oxidizing agents, coagulating agent and biological agents on colour and odour removal of diluted distillery spent wash

S.No.	Agents	Dosage	Colour Removal	Odour Removal
1.	Calcium Hypochlorite (g) (Bleaching powder)	0.5 1 1.5 2	60% 90% 100% 100%	Complete removal " " "
2.	Calcium Oxide (g)	0.5 1 1.5 2	25% 50% 70% 70%	" " " "
3.	Hydrogen peroxide (mL)	0.5 1 1.5 2	No colour removal 2% 5% 5%	" " " "
4.	Strychnus potatorium (g)	0.5 1 1.5 2	No colour removal " " "	" " " "

photometer at 420 nm.

Effect of biological agents on colour and odour removal

About 100mL of spent wash was taken in 4 conical flask. Accurately 0.5g, 1g, 1.5, 2g of powdered *strychnus potatorium* was added and mixed. Left for 2 hrs and filtered. The filtrate was subjected to colour analysis.

RESULTS AND DISCUSSION

Physico chemical characterisation of spent wash

The characteristics of the distillery spent wash have been presented in Table 1. The colour and odour of the spent wash is dark brown and unpleasant alcoholic odour respectively, colour of the spent wash may be due to presence of melanoidin pigments. Melanoidins are formed due to decomposition products such as hydroxy methyl furfural (Saxena and Rai, 2000).

Youngwoo *et al.* 1994) have reported the objectionable odour was produced by the anaerobic decomposition of compounds containing nitrogen and sulphide, mercaptans, amines, aldehydes, ketones, indole, and skatole. The pH of the spent wash was acidic which may be due to fermentation process and the total solids, total dissolved solids were so high, which may be the reason for the higher BOD and COD. Hence the DO was nil.

Effect of oxidising agents and coagulating agents on colour and odour removal of 5 % diluted spent wash

Complete colour removal has been noticed when the spent wash was treated with 1.5g and 2g of calcium hypochlorite. It was achieved by the oxidizing power of calcium hypochlorite. The oxidizing agent may have oxidized the

pigments imparting the colour.

Diluted spent wash treated with calcium oxide has shown complete deodourisation and slight reduction of colour. The colour removal has decreased with decrease in amount of calcium oxide. It may be due to the hydroxy radicals which are generated capable of degrading the contaminants through oxidation (Inthorn *et al.* 2001). 5% diluted spent wash treated with 0.5 ml of H_2O_2 has resulted in no colour removal. It may be due to insufficient dosage of H_2O_2 . Complete removal of odour has been achieved but only 10 % of colour removal have been noticed.

Effect of biological agents on colour and odour removal from the 5 % diluted spent wash

No colour removal was noticed and complete odour removal was noticed when 5 % diluted spent wash was treated with powdered *Strychnus potatorum*. The coagulating property of the powdered *strychnus potatorum* (poly electrolyte) has been already reported by Rangwala *et al.* 1997.

CONCLUSION

Calcium hypo chlorite, hydrogen peroxide, Calcium oxide and powdered *Strychnus potatorum* were used for the decolonisation and deodourisation. Chemical treatment has shown the highest reduction of colour when compared to biological treatment. But complete deodourisation has taken place by all the treatments. Hence, chemical treatments are better than biological treatment for the removal of colour and odour from the diluted spent wash which has been diluted with distilled water.

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