

Decolourization of AZO Dyes and Degradation of Hydrocarbon by Mixed Culture of Microorganism Obtain from Soil Sample Treated with and without Cow Urine in Anaerobic Condition

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Abstract—Azo-dyes and hydrocarbons are widely found in the effluent from textile and food industries. They are non-degradable due to their complex chemical structures and are toxic to living organisms in water as well as mutagenic for humans. Isolation of micro-organisms, from soil samples near textile industry was found to decolorize azo-dyes (Red RB, Blue M2B and Yellow) and degrade hydrocarbons efficiently in absence of oxygen when added with cow urine. Cow urine has unimaginable curative powers. Samples have shown effective results when treated with cow's urine as compared to samples left untreated. Decolourization of azo-dyes and degradation of hydrocarbon were done with micro-organisms in soil sample. The percentage of degradation of three cow urine treated samples each of azo-dyes and hydrocarbon were found as 51.377, 65.333, 64.663 and 54.995, 66.666, 66.988 respectively. Cow urine untreated samples showed the results as 82.077, 85.849, 71.535 and 94.409, 63.364, 92.108. The isolation of micro-organisms was done from soil samples by serial dilution after that biochemical tests were performed. Identified micro-organisms using cow urine were as *Kluyvera ascorbata*, *Providencia rettgeni*, *Listeria grayi* and *Staphylococcus felis*, *Staphylococcus aureus*, *Staphylococcus haemolyticus* and micro-organisms in cow urine untreated samples were *Enterococcus casseliflavus*, *Streptococcus urinalis*, *Clostridium aurantibutyricum* and *Clostridium paraputrificum*, *Clostridium roseum*, *Vibrio haliotcoli*.

Keywords: Azo dyes, Hydrocarbons, Isolation, Spectrophotometer.

1. INTRODUCTION

Azo dyes are very harmful for human health since these are degraded by many micro-organisms and chemicals. In this research paper the optimization of media ingredients the effect was to obtain micro-organisms to decolorized the azo dyes compounds (Oranusi and Ogugbue, 2005)

Industrial waste is used to isolation of *Bacillus cereus*, that is, effluent and soil samples was screened for its ability to

decolorize the azo dyes under aerobic conditions at pH 7 and incubated at 35°C. Optimization of carbon and nitrogen sources were used for the decolourization study (Ola et.al.,2010).

In this study the Biotransformation of food dyes (Tartrazine and Quinoline yellow) by *Streptococcus faecalis* and *Escherichia coli* isolated from human intestinal microflora was investigated. Decolourisation of the media containing the dyes was used as an index of biotransformation, was higher under aerobic than under anaerobic conditions. The potential health risk of the resulting colourless metabolites (aromatic amines) is under investigation. (Oranusi, N A; Njoku, H O, September, 2006)

Synthetic dyes have a wide application in the food, pharmaceutical, textile, leather, cosmetics and paper industries due to their ease of production, fastness, and variety in colour compared to natural dyes. More than 100,000 commercially available dyes are known and close to one million tons of these dyes are produced annually worldwide (Adedayo et al.,2004).

Azo dyes are the largest group of dyes used in textile industry constituting 60-70% of all dyestuffs produced. They have one or more azo groups (R1-N=N-R2) having aromatic rings mostly substituted by sulfonate groups. These complex aromatic substituted structures make conjugated system and are responsible for intense color, high water solubility and resistance to degradation of azo dyes under natural conditions. Color in the effluent is one of the most obvious indicators of water pollution and the discharge of highly colored synthetic dye effluents is aesthetically displeasing and can damage the receiving water body by impeding penetration of light.

Moreover, azo dyes as well as their breakdown products are cytotoxic or carcinogenic (Khehra et al., 2006).

A number of physico-chemical methods, such as adsorption, coagulation, precipitation, filtration and oxidation, have been used to treat dyestuff effluents, but these methods have many disadvantages and limitations. It is, therefore, important to develop efficient and cost-effective methods for the decolorization and degradation of dyes in industrial effluents and contaminated soil (Bhatt et al., 2000).

2. MATERIAL AND METHODS

Sample collection and Isolation of micro-organisms

For the isolation of bacteria soil sample was collected in the plastic bottle from the local market Ameenabad, Lucknow (Uttar Pradesh, India). Take 1ml of the sample was serially diluted and the dilutions 10^{-1} - 10^{-5} were inoculated on the nutrient agar plate by pour plate method, colony got 24 - 48 hr after incubation at 37°C. colonies were purified on streaking, purity of colony was checked by Grams staining procedure, the purified colonies were then inoculate Luria Burtenia broth.

Decolourization Tests

The next procedure is based on the used by Oranusi and Ogugbue (2005). The standard inoculum of isolated strains giving intense decolourization of azo dye was prepared by inoculating it in 25ml Luria Burtnia broth and autoclaving it at 121°C for 20 min. After inoculation 2ml of sample was taken out in sterile condition and centrifuged at 6000 rpm for 5min. supernatant was taken and its optical density was determined spectrophotometrically, at 532nm the absorbance maxima of azo dye being studied for decolourization. Thereafter the percent of dye decolourization on zero day was calculated by the formula (Oranusi and Ogugbue, 2005).

$$\% \text{ Dye decolourization} = \frac{(\text{O.D. of zero day} - \text{O.D. of sample}) \times 100}{\text{O.D. of zero day}}$$

Systematic Bacteriology is the main resource for determining the identity of bacteria species, utilizing every characterizing aspect by Bergey's manual and Abis online.

3. RESULTS

Single colony isolation

Fig-1 Steak plate methods



Grams Staining

Table-1 with cow urine treated grams staining

S.N.	Azodye soil sample			Hydrocarbon soil sample			
	Characteristics			Reaction			
	i	ii	iii	iv	v	vi	
1.	Grams staining	-ve	-ve	+ve	+ve	-ve	+ve
2.	Shape	Slightly Curved rod	Slightly Curved rod	Cocci in cluster	Cocci in cluster	Cocci in cluster	Cocci in cluster
3.	Spore	Apsent	Present	Present	Apsent	Apsent	Apsent

Table-2 without cow urine treated grams staining

S.N.	Azodye soil sample			Hydrocarbon soil sample			
	Characteristics			Reaction			
	i	ii	iii	iv	v	vi	
1.	Grams staining	+ve	+ve	+ve	+ve	-ve	-ve
2.	Shape	rod	Rod with chain	Rods in cluster	rod	cocci	cocci
3.	Spores	Present	Present	Absent	Absent	Absent	Absent

Table-3 with cow urine treated soil samples (Biochemical test)

Biochemical test	Azodye soil sample			Hydrocarbon soil sample		
	i	ii	iii	iv	v	vi
Catalase	+	+	+	+	+	+
Vogues Proskauer	-	-	-	-	+	-
D-Mannitol	+	+	+	-	+	+
Methyl Red	+	+	+	+	-	+
Citrate	+	+	+	+	+	-
6.5% NaCl	-	-	-	+	-	+
Starch utilization test	+	+	-	-	+	-
Urease test	-	+	-	+	+	-

Table-4 without cow urine treated soil samples (Biochemical test)

Biochemical test	Azodye soil sample			Hydrocarbon soil sample		
	i	ii	iii	iv	v	vi
Catalase	-	-	+	+	-	-
Vogues Proskauer	+	+	-	+	+	-
D-Mannitol	+	-	-	-	-	+
Methyl Red	-	-	+	-	-	+
Citrate	+	-	+	+	+	-
6.5% Nacl	+	+	-	+	+	-
Starch utilization test	-	-	+	+	-	+
Urease test	+	-	+	-	-	+

Sequences of cow urine treated samples

i-

ATGATGAGAAAAAGCGTAAGTCGGCGATATTATGA
CGACAGCCTGTGTTCGCTGCTGTTGCCAGTGTGCC
GCTGTATGCCAGCGAACGATATTCAAGCAAAAGCTG
GCGGCCTGGAGAAAAGCAGCGGGGACGACTGGG
TGTGGCGTTGATAACACCGCCGATAACACGCAGACG
CTCTACCGCGCCGACGAGCGTTTGCTATGTGCAGCA
CCAGTAAAGTGTGGCGGGCGGGCGGTGCTTAAGC
AAAGTGAACGCAAAAGACTTACTGAGTCAGCGGG
TTGAAATTAAAGTCCTCAGACTTGATTAACACTAACCC
AATCGCTAAAAGCACGTCATGGCACGATGACACTC
GGGAGCTGAGCGCGGGCGCTGAGTACAGCGAT
AATACTGCCATGAATAAGCTGATTGCCATCTGGGG
GGCCGGGTAAAGTGACGGCATTTGCTCGCTGATTGG
CGATGACACTTCCGGCTGATCGTACCGAGGCCACG
CTCAACACCGCGATCCCCGGCAGCCCGCGATACCA
CCACGCCGTTAGCGATGGCGCAGACTCTACGCAATCT
CACATTGGCAATGCCCTGGGTGACACTCAGCGTGCG
CAGCTGGTACGGTGGCTGAAAGGCAACACCACCGGC
GCTGCCAGCATTCAAGCAGGGCTACCCACATCGTGGG
TTGTCGGGGATAAAACCGGCAGCGCGATTATGGTAC
GACGAATGATATCGCGTTATTGGCCGGAAGGTGCG
GCGCCGCTCGTTGGTACTTACCTACCCAGCCGA
AGCCGAAGGCAGAGAGCCGTCGTGACGTGCTCGTG
CTGCCGCCAGAATTGTCACCGACGGTTATTAG

ii-

GTTTCGTAACTAGTAAAAGTAAAATTCCCTAACCGAAGGTT
ACGGTTGGACGTAACGTACGGCCCAGAACGAAAGACAAT
AGAGAAAGAAGCGGGTATGGAACAGATGTCAGAACCTTC
CGTCCCCATGGCAGCGAACACTTACCGGTGCTGAAATTGT
GAATGCTGAGGTGGATGAAAATGCCAAAATTGCCATTGCT
ATAACTCTCCAAATGCCCTTCTGAGACTGCACACG
CCTTGGGCTTATCCCGTTGTTGAGTCCGTTGAATGGATTGA
ACGTTGCTTAATGCAGGTGTTCCACAAITCAATTGCGTAT
CAAAGACAAATCTGACGCAGATGTTGCTGATGAGATTCAAC
AAGCTATTGCGCTCGGGAAAAACATAACGCACCGCTTATT
ATTAATGATTACTGGCGGTTAGCGGTCAGTTGGTGTATT

GGCGTGCAITTAGGCCAAGAAGATTGGAAACTACCGATT
ATTAGCAATCCACCAAGCAGGCTTACGTTAGGAATATCAAC
GCACGATGAGCATGAATTGGCTATCGCAAAATCGGTTGCC
CTTCTTACATTGCCATGGGCATATCTTCCAACACAAACCA
AAGAGATGCCCTCTCGCTCAGGGTTAGAAACACTTAAA
GCCATGGTGGAAAGTAACACACTGATTACCAACGGTAGCCAT
TGGTGGGATTTCATTGATAAAAGTGCCTGACGTGCTAGCAA
CTGGAGTGGGAGTGTGCGCTAGTCAGTGCAGTACTA
GCCATGATGTTGCCGCGCCAAACAGAAACTTTGCTGAATT
AATTGAGCGGGATCACGCCAATTAGTCGATTTAAATCACA
AATTAGCCCTAGTTATCGTCAAAAAACAGGGCTAATGATG
ATTTAGGAATTCAATCATGTTAAGTGACCAAGAATTGATG
GTTACAGCCGCGACTTACTTGAAGAGACATCAGTCTGAG
GGGCAACAAAAGTGAAGGAAACTGCCAATTGCT
GTTTAGGGGCTTAGGCTCTCCGATCCCTTATTAAACGG
GCGCTGGTGTGGCAATTGTTGCTAGCTGACCGACGATGAC
TTACAGTTCTAACCTACAAACGGCAGGTACTTACGATACC
GATGATATTGGCCAGTCAAAGGCCAGCTGCCAGATAG
GCTACATCAACTCAATCCGTTGTAAGAACCCATGTTATG
ACAAAAGTTGGATGTTGAGACTTTAACCTAGCGGAAC
AAGTCGACTTAGTGTGATTGCTGCGATAACATGGGACACT
GTCATGCACTTAATGCCCTGTGTCATGACCAATACAACCT
TAGTCAGCGGAGTGTGTTGGGTTGGCTGCAATTATG
GTACTTGAGCCGCAATTAGTACCGGTTGCTATGCCCTTT
ACCCAGACCAAGATGAACCCGAACGCAACTGCCGACTGC
TGGGGTATTAGGGCCAGTGGTTGGGATTATGCCACGTTG
AAGCACTGGAAGCCATTAAATTACTGTCGGCTTCCCTT
CACTGAGCGGTAATTGCGTTATTGATGAAACAGCAA
CAATGGAATACATTGCAATTAAATGCCGTCAGTCAATTG
ATCTGTCGGAGAACATGCAATCATAATTAAATGACCAAC
CTATGGAATTGACGCCCACTGACGGTTAATCAATTATTT
CCACTCTCGATGCCCAATTGGGGAACTGCACTGCCATC
AATCAAGTGTACATTCCGAAGAGTCACTGGGATTATC
ATTAAATGACCAAGATAATATCTGTTGTTCAAGCTATCG
GGGGGCTAATGATGTTAAAATGCCAGATTACTTTCACT
CACGCCATTACTGGAACAGGTAATTGCCAGCGCCAAC
CTCATGCAAGACGCC

iii-

GTGCTTAATACATGCAAGTCGAACGAATGACCTTAGGAGCT
TGCTCCTTGGCTGTTAGTGGCGGACGGGTGAGTAACACGT
GGGCAACCTGCCCTGTAAGATTGGGATAACTCCGGAAACCG
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TGAAAGCGGCCCTCGGCTGTCACTTACAGATGGGCCCG
TGCATTAGCTAGTGGTGGGTAAGGGCTACCAAGGGGAC
GATGCATAGCCGACCTGAGAGGGTGTACGCCACACTGGGA
CTGAGACACGCCAGACTTCTACCGGGAGGCAGAATAGG
GAAACTCCGCAATGGAGAACAGTCTGACGGAGAACGCC
GCGTGTGAAAGAGTTTCCGATCGTAAAGCACTGTTG
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GGTATCTAACCGAGAACGCCAGGCTAACACTACGTCGAC
CCGCCGAATACGTAGGTGGCAAGCGTTGTCGGAAATTATG
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AAGCCCCGGCTTAACCGGGAGGGTATTGGAAACTGGG
AGACTTAGAGTGCAGAAGAGGAGAGTGGAAATTCCATG
AGCGGTAAATGCGTAGATATGGAGGAACACCAAGTGG
AAGGGCACTCTGGTGTGAACTGACGCTGAGCGCGAA
AGCGTGGGAGCAAACAGGATTAGATAACCTGGTAGTCCAC
GCCGTAACCGATGAGTGTAAAGTGTAGGGGTTCCGCC
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CCCGCACAAGCGGTGGAGCATGTGGTTAATCGAACGAAAC
GCGAAGAACCTTACCAAGGTCTTGACATCCTTGACCACACT
GGAGACAGAGCTTCCCTTCGGGACAAAGTGACAGGTGG
TGCATGGTTGTCGTAGCTCGTGTGAGATGTTGGGTTA
AGTCCCACAGAGCGAACCCCTGATTAGTGCAGCA
TTTAGTGGGCACTCTAAAGTGACTGCCGGTGAAGCCGGA
GGAAGGTGGGGATGACGTCAAATCATCATGCCCTTATGAC
CTGGGCTACACACGTGCTACAATGGATGATAACAAAGGGTCG
CGAACCGCGAGGTGAAGCTAATCCCATAAAATCATTCTCAG
TTCGGATTGTAGGCTGCAACTCGCCTACATGAAGCCGGAAT
CGCTAGTAATCGGGATCAGCATGCCGGTGAATACGTTCC
CGGGCCTGTACACACCGCCCCGTACACCCACGAGAGTTGT
AACACCCGAAGTCGGTAGGGTAAACCTTATGGAGCC

iV-

TCGAGCGAACTGAAGAGGAGCTTGCCTTGACGTTAGCGC
GCGGACGGGTGAGTAACACGTGGTAACCTACCTATAAGAC
TGGATAACTCCGGAAACCGGGGCTAATGCCGGATAATAT
GTTAACCGCATGGTTCAACAGTGAAAGACGGTTTGTG
CACTTATAGATGGACCCCGCGCCGCATTAGCTAGTTGGTAG
GTAACGGCTACCAAGGCGACGATGCGTAGCCGACCTGAG
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V-

ACTACTGCTCAATTTCATTTTACTTTATCGATTAAAGATAGAAA
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TTACAACCTGAATTAACTGCTGAAGCTTAAAGATATCATT
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AGTGCACAAAACCGTACAAAGTCATTGCAATTCCCGCTCA
AATAGCTATGTAATTGCTAGAGAGCTACAGATTCTCATTA
CCTAAAATTGGTGAAGAATTGGTGGCGTGTACATACGAC
CGTCATTCTGCTCATGAAAAAATATCTAAAGATTAAAAGA
AGATCCTATTAAACAAGAAGTAGAGAATCTGAAAAAG
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TCTATATGCTAATGTGGCAAGATGAGCAGAAACTCATTG
GATAATGTTAAAGTCATACACACCACACAAAGTTATCAA
CATGTGTATAACTCGCCAAATCTATGTTAAGACTTATCC
ACCAATCCACAGCACCTACTACTATTACTAAGAACTTAAAC
CTATATAATTATATAACGACTGGAGGAGTTTAATTAAAT
GATGGAATTCACTATTAAAGAGATTATTTTACACAAATT
AATGACACATTAAAGCTATTCCACCAAGAACACATTACCT
ATATTAACGGTATCAAAATCGATGCGAAAG

vi-

TTGATTACTTAATTGTTAACAGATTCAAGTGCATTTC
AAGTGCTGTGGAGTCAGCGAACAAATGAGGGTATTCCCTGAA
TCACATTAGATAGATCAGTGGATAAAGGAGACGTTGCTTCAT
TTATCGCATCCGATAACGTTGAAGGGCGTAAAATGGCTGGTA
AGTATTIAGTTGATAAAGTAGGTAAAAATGCAAAAGTAGGA
GAACTTGAAGGAGTTCAGCGCAAGTGCACGAGAGAAA
GAGGAAAAGGCTTCCATGAGATTGCTGATAAACAGTTAAA
GTAATTGCCAAACAAAGTGCAGAGTTGATAGAGCAGAAG
GATTAAACGTAACGCAAAATATGCTAGAACGCGATCCAAT
ATCAAAGCAATCTTGTCTAAAATGATGAAATGGCACTTGG
TGCCATTGAAGCTATTGGGGACAAGGATATTCAAGTCATTGG

Sequences of without treated cow urine samples

i-

TAGCTACTGCTTTGAAAATGATTGGTCAAAGCCTCGGAA
TTGCCTCAAGAACGACTGGGTTCAAAGTTGCCATCGTCGG
CAGCGGACAGCTGGTTATCCGCTGCATGGCGCTTGAATC
AACTAGGGCATCAAGTACGCGTCTATGAACGCAGTGATCGC
TTTGGCGGTTACTGATGTACGGTATTCCAATATGAAATT
GATAAAGACGTCGTTACGCACGGATTGACTTGATGGCAGA
GCTAGGCGTGACCTTGTGCTAATACCGAGATCGGTGCTG
ACTTGTGCGCAGAAGAATTGCCGCTCAGTATGATCGGGTC
ATCTTGGCAACAGGAGCTAGTGTCTCGTGTACTGAAAGAT
TCCAGGGCGTGAATTGACTGGGTCGAAATTGACGTCGATT
ATCTGACGGAAGCAACAAAGATGTGTTAAGCAGTGGCAA
AGCGGCAACAAGTAAAAACTTGTGCGAAGCATGTTATCG
TGATTGGTGGCGGCACACTGGAAATGACTGTATTGGTTCA
GCGATTGGCAAGGAGCCGCTCTGTGCGTCAATTGGAGAT
CACGCCCAACTGCCATTGACACGGACCGACAGCAATCCTT
GCCAGAAACCCATGACAGCCCCGACAGGATATGGGCAA
GAAGAACGCGCTGAAGTGTACAAACACAAGTGACGTATC
ATGGGTTGTCACACGGCTTATCGCGCCGAACGCGGC
CAGTTGATGCCATCGAAACGGTCTCAGTGGATCAACAGTT
TCAGCCGATCCCTGGCACAGAGCAAGTGATCAAGGCGGATT
TGGCTTGCTGGCAATGGGCTTGTGTCAGAGACCCAA
CTCTTCGATGCCATTGGTGTGCGAGAAGTGTACGATGATTAC
ACGACGAACAATGAACGAGTGTAGTCGAGGAGATGCCA
AAAGAGGACCGAGTTAGTCATCTGGCGATTGTAAGGA
CGCTTAGCGGCAGAAAAAGTCGATCAAGCGTTACGATCTT
GGTGTATCAATAAGCAATCAAAAAACACCTGAGCAGC
TATTCCCTCTGAATTAGAAGGGAGCAGCGAAATGCTC
AGGTTGTTGCCCTG

ii-

TCAACATGCTGGTAAAGTTATCTCTCAGATGCTGAAAAAG
TTGAAGTACGTCGCAAGATGGTCTTGTGATGTTACCATG
TTACTAAATTCCGTCGTTCAAACCTCAGGTACTGCCATAACC
AACGTACACTGTAAAAGTTGGAGATATTGTAAGAAGGTT
GATTTATTGCTGATGGACCATCTATGGAAAGTGGTAAATG
GCCCTGGACAAAACCCAGTTGTTGCCATATGACTTGGGA
AGGCTATAACTTCGAGGATGCCGTATTGAGTGAAACGTCT
TGTAAAGAAGATGTTACTTCAGTCACTTAGAAGAATT
TGAATCAGAAACACGTGATACAAAGCTGGGCTGAAGAA
ATCACACCGAAATTCCAATGTTGGTGAAGAACGCTCTAA
AGACTTAGACGAAATGGGTATTATCCGTATCGGTGCTGAAGT
CAGCGAGGGAGATATTGTTAGTGTGTAAGTAACACCTAAAG
GTAAAAAGATTATCTGAGAAGAACGCTTGTACATGCTA
TCTTGGTATAAATCCGTGAAGTTCGTGATACTTCACTGC
GTGTACACACGGTGGTGTGATGGTATTGTCGAGATGTTAAA
ATCTTACTCGTCCAATGGTGTGATGAATTGCAATCAGCGTA
AATATGCTTGTGTTACATTGACACAAAACGTAACATC
AAAGTCGGTATAAGATGGCCGTCGTCACGAAACAAAG
GGGTTGTTCTCGTATTGTTCCAGTTGAAGAGATATGCCATATT
ACCAGATGGAACACCAGTTGATATCATGTTAAATCCACTTGG
TGTGCCCTCACGTATGAATATCGGACAAGTTATGGAGCTTCA
CTTAGGTATGGCTGCCGTAATTAGGTATCCACATTGCAAC
ACCTGTTGATGGTGTGCAACATCTGAAGATTATGGGAAAC
AGTTCAAGAAGCTGGTATGGATAGCGATGCTAAGACTGTCC
TTTATGATGGCGTACTGGTGTGAGCCATTGACAAACCGTGT

CAGTTGGTGTATGTACATGATTAAACTTCATCACATGGTCG
ATGATAAACTTCATGCGCCTCAGTTGGACCATACTCACTTG
TTACACAACACCTTGTGAAAGC

iii-

TGGCTCAGGACGAACGCTGGCGCGTCTAACACAGCAA
GTCGAGCGGGAAACTTCGGTTCCAGCGCGACGGGTGA
GTAACACGTGGCAACCTGCCTCACAATAGGGATAGCCT
CCGAAAGGAGGATTAATACCCATAACACAAGGAAACGCA
TTTTCTTGTGCAAAGAATTGTTGAGATGGGCCCCTGCG
CGCATTAGCTTGTGGTGTGAGGTAACGGCTCACCAGGCTTC
GATGCGTAGCCGACCTGAGAGGGTGTGATCGGCCACATTGGAA
CTGAACACGGTCCAGACTCCTACGGGAGGCAGCAGTGGG
AATATTGACAAATGGAGGAACACTCTGATGCGAGCAACGCC
GTGAGTGTGAGGCTCGGATTGTAACACTCTGTTATG
GGAGCATATGACGGTACCCATAGGAGGAAGCCACGGTAA
ACTACGTCGAGCAGCCGCGTAATACCTAGGTGCGAAGCGTTG
TCCGAGTTACTGGCGTAAAGGATGTGAGGCGGATATT
AGTGAAGATGTGAATCCCCGGCTTAACTTGGGGCTGCATT
TCAAACCTGGATGCTAGAGTGTGAGGAGAGGAAGCAGAAT
TCCTAGTGTAGGGTGAATGCGTAGAGATTAGGAAGAATA
CCAGTGGCGAAGGGTCTGGACTGTAACGCGTGA
GGCATGAAAGCGTGGGGAGCAAACAGGATTGATACCTG
GTAGTCCACGCCGTAACAGGATGAATACTAGGTGAGGAGG
ATCGACTCCTCTGTGCCAGTAACACAATAAGTATTCC
CTGGGGAGTACGGTGCAGAAGATTAAACTCAAAGGAATTG
ACGGGGGCCCGACAAGCAGCGGAGCATGTGGTTAATTG
AAGCAACCGAAGAACCTTACCCAGATTGACATCTCTGAA
TTAATCGTAATGGATGAAATCCCTCGGGACAGGAAGACA
GGTGGTGCATGGTGTGTCAGCTGTCGTGAGATGTG
GGTTAAGTCCCGCAACGAGCGAACCTTACATTAGTTGCT
AACATTCACTGAGCACTTAGTGTGAGACTGCCGGTTAAC
CGGGAGGAAGGTGGGGATGACGTCAAATCATCATGCC
ATGTCCTGGGCTACACAGTGTCTACATGGTGGACAAAAAA
GATGCAAGACCGCAAGGTGGAGCTAAACTCAAAACCCAT
CCCAGTTGCGATTGTAGGCTGAAACTCGCCTACATGAAGCT
GGAGTTGCTAGTAATCGCAAATCAGAATGTTGCGGTGAAAC
GTTCCCGGGCTTGTACACACCGCCGTACACCATGAGAG
TCGCGAACACCCGAAGCCCCGTGAGGTAACCTTTGAAACC
AGCGGTGAAAGGTGGGGTGTAAATTGGGGTGAAGTC
CA

iv-

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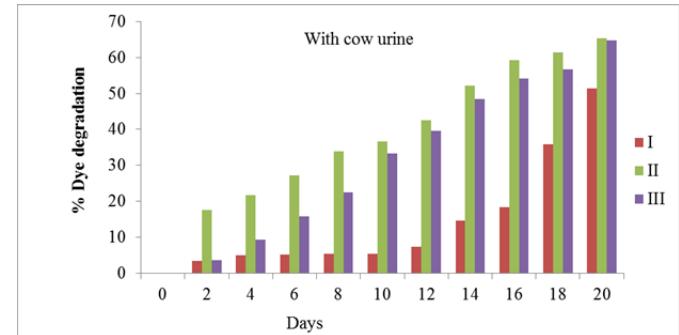
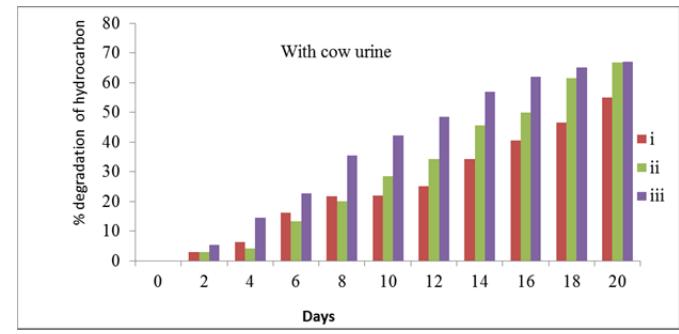
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Fig-2 Azo dye degradation**Fig-3 Hydrocarbon degradation****Fig-4 Azo dye degradation**

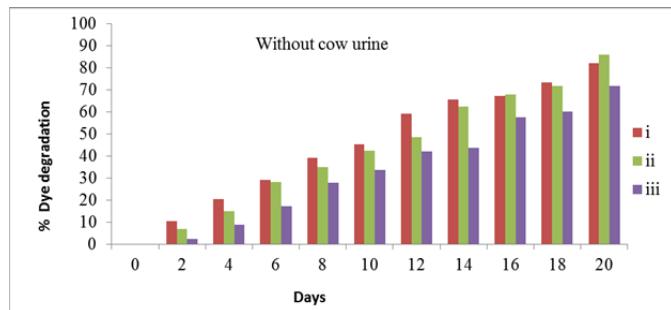
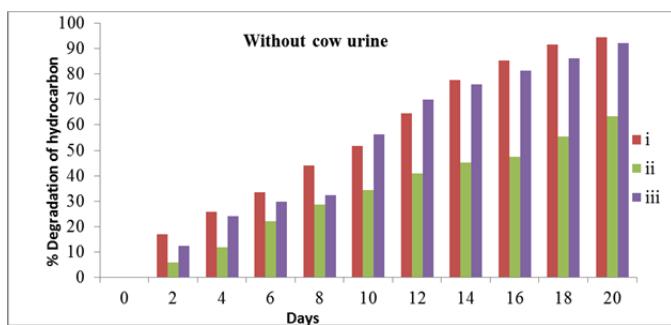


Fig-5 Hydrocarbon degradation



4. CONCLUSION

In this Azo dyes and hydrocarbon degradation, used cow urine which is very use full for many types of bacteria kill but here this is shows the result untreated samples were highly degraded both like 82.077, 85.849, 71.535 and 94.409, 63.364, 92.108.

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