## **Distillery Spent Wash**

Distillery spent wash is the wastewater (effluent) generated during the alcohol process. To ensure effective treatment all distillery industries follow 1-3 fold dilutions due to which a tremendous amount of spent wash is generated. Ethanol produced in distillery Industries is around 8 to 15 % by volume, which means that about 85 to 92 % wastewater content by volume. Thus distillery industries have a great adverse impact on the environment. Electrocoagulation treatment has been implemented to treat the cumbersome distillery spent wash. Continuous EC process using punched electrodes removes COD 94.77% and colour up to 78.57%. As the EC process has a limitation to decolourize the melanoidin present in distillery spent wash so ozone assisted electrocoagulation processes were implemented to treat the distillery industry. During the ozonolysis process, a carbon-carbon double bond of melanoidin started to cleavage with the remarkable increase in the decolourization. The ozone-assisted EC process degrades the COD 97.27 % and colour 98.72%.



Dr. Manoj Wagh is a Professor in the Civil Engineering Department and Dean Academics of Dr. Vithalrao Vikhe Patil College of Engineering Ahmednagar, Maharashtra, India. He has 19 years of teaching experience and published 44 papers in science citation index expanded. Author received a research grant of Rs 1.9 lakh from the BCUD, Pune.



Scholars' Press Manoj Wagh **Distillery Spent Wash** "Ozone Assisted Electrocoagulation and Fungal Treatment for Distillery Spent Wash"

Manoj Wagh

PRINCIPAL
Dr. Vithalrao Vikhe Patil
College of Engineering
Ahmednagar

## **Distillery Spent Wash**

"Ozone Assisted Electrocoagulation and Fungal Treatment for Distillery Spent Wash"

FOR AUTHOR USE ONLY

**Scholars' Press** 

PRINCIPAL
Dr. Vithairso Vikhe Patil
College of Engineering
Ahmednagar

## Imprint

Any brand names and product names mentioned in this book are subject to trademark, brand or patent protection and are trademarks or registered trademarks of their respective holders. The use of brand names, product names, common names, trade names, product descriptions etc. even without a particular marking in this work is in no way to be construed to mean that such names may be regarded as unrestricted in respect of trademark and brand protection legislation and could thus be used by anyone.

Cover image: www.ingimage.com

Publisher:
Scholars' Press
is a trademark of
Dodo Books Indian Ocean Ltd., member of the OmniScriptum S.R.L
Publishing group
str. A.Russo 15, of. 61, Chisinau-2068, Republic of Moldova Europe
Printed at: see last page
ISBN: 978-613-8-96554-1

Zugl. / Approved by: OZONE ASSISTED ELECTROCOAGULATION AND FUNGAL TREATMENT FOR DISTILLERY SPENT WASH. SAVITRIBAI PHULE PUNE UNIVERSITY FOR AWARD OF DEGREE OF DOCTOR OF PHILOSOPHY (Ph.D.) IN THE FACULTY OF CIVIL ENGINEERING

Copyright © Manoj Wagh Copyright © 2021 Dodo Books Indian Ocean Ltd., member of the OmniScriptum S.R.L Publishing group

> Dr. Vithalrao Vikhe Patil Cellage of Engineering Ahmednagar

## TABLE OF CONTENTS

1	Title page	I
2	Abstract	II
3	Acknowledgement	IV
4	Nomenclature	VI
5	Symbols and Abbreviations	VIII
6	Table of contents	X
7	List of figures	XV
8	List of tables	XVIII
1.1	Introduction	1
1.2	Distilleries Effluent Discharge Standards	6
1.3	Colour pigments present in Melanoidin	8
1.4	Alcohol Manufacturing Process	8
1.4.1	Alcohol Manufacturing Process  Fermentation  Adverse effect on environmental	11
1.4.2	Adverse effect on environmental	13
1.4.3	Present disposal methods (Treatment Technology) for DSW	15
1.5	Problem Identification (Gap between the Literature Reviews)	17
1.6	Motivation	18
1.7	Scope of the work	19
1.8	Objectives of the work	20
1.9	Organization of the Thesis	20
2. 0	Literature Review	21
2. 1	Existing biological treatment alternatives	23
2. 2	Anaerobic Treatment	25
2. 2. 1	Aerobic Treatment	26
2. 2. 2	Bio-composting	27
2. 3	Fungal Treatment	27
2.4	Electrocoagulation	35
2. 5	Ozone treatment	39
2.6	Ozone assisted electrocoagulation	40
2.7	Hybrid Treatment	40
2.8	Research Gap	44



X