Savitribai Phule Pune University

(Formerly University of Pune)

Pune: - 411 007

Board of Colleges and University Development

ef. No:- OSD /BCUD/392/124 Date:- 11/11/2016

To,
The Principal
Dr.Vitthalrao Vikhe Patil Foundation's
College of Engineering, Ahmednagar,
Vilad Ghat MIDC Post Office, Ahmednagar - 414 111

Subject: - Sanction of BCUD research Proposals for 2016-17 to 2017-18.

Dear Sir /Madam,

With reference to the acceptance letter and revised budget of the research proposal received from Principle Investigator, the University authorities are pleased to approve the project submitted by the following Principle Investigator/s along with the sanctioned amount shown against their name/s for year 2016-17 to 2017-18.

Sr. No.	Full Name	Sanction Amount
1	Manoj Pandurang Wagh	190000/-
2	Ravindra Rambhau Navthar	170000/-
	Total	**360000/-**

The 1st Installment of the sanction research project has been released. The Project period will be two year from the sanction date of the proposal. The 1st Audit of the sanctioned project will be conducted in month of March 2017. You are requested to inform the concerned teacher.

The amount should be released to Principal Investigator within eight days after receiving of the 1st installment. The Utilization of the grant should be done as per the guidelines.

Details about the Norms and Guidelines can be download from www.unipune.ac.in

Dr. Ravindra G. Jaybhaye
OSD/BCUD

Dr. V. B. Gaikwad
Director, BCUD

Dr. V.V.PATIL COLLEGE OF ENGINEERING Ahmednagar

PRINCIPAL
Dr. Vithalrao Vikhe Patil
College of Engineering
Ahmednagar

Part B

Online proposal No: 15ENG001330

1. **i) Project Title: "Application of DIC (Digital Image Correlation) for Displacement and Strain Measurement of composite material"**

ii) Introduction:

Digital Image Correlation (DIC) is an upcoming experimental stress analysis technique and has certain advantages over others. DIC can be tested on almost every material with a large area of inspection and no pre-surface treatment as compared to other optical methods. DIC uses the principle of image correlation and produces strain contours by analyzing the movement of marked points on the subject.

Digital Image Correlation uses the principle of image correlation to plot the strain contour and thereby stress contour on a body under any load. A body is sprayed with paint forming a speckle pattern which acts as nodal points for image correlation. For better contrast, white and black are the preferred background and foreground paints (or vice-versa) to be used. The images are first reconstructed into a continuous pattern for better analysis as discrete intensity points are not advantageous for strain contour mapping. This reconstruction can be carried out at various orders (nearest neighbor – zero order, bi-linear – first order, polynomial – nth order) [1, 2]. Deformation is studied using image correlation. Consider a small subset of the object centered at P before deformation, as shown in Fig. 1. After deformation, the subset center moves to a new point P* and the subset deforms. Fig. 2 shows a small subset on the object surface centered at P, together with its deformed shape centered at P*. If one assumes that the subset is sufficiently small that straight lines remain straight after deformation, the eq. describing the position of point Q* is: [3]

$$f^*[Q^*] = f\left[x + u(P) + \frac{\partial u}{\partial x}(P)dx + \frac{\partial u}{\partial y}(P)dy + dx,\quad y + v(P) + \frac{\partial v}{\partial x}(P)dx + \frac{\partial v}{\partial y}(P)dy + dy\right] \quad \text{-(1)}$$

Thus, if one knows the displacement of the Center point P of a subset and if one obtains the derivative terms $\partial u/\partial x(P)$, $\partial u/\partial y(P)$, then the position of any nearby point Q*' is

determined. Conversely, if one assumes values for u(P), v(P), $\partial u/\partial x(P)$, $\partial u/\partial y(P)$ $\partial u/\partial x(P)$, and $\partial u/\partial y(P)$, then one can compute estimates for the positions of points P* and all points Q* that are within the small subset surrounding P*. This latter statement forms the foundations for the numerical computation of local deformation.

DIC is better than other optical stress analysis methods because of larger area of inspection, analysis on any type of material and minimal surface preparation.

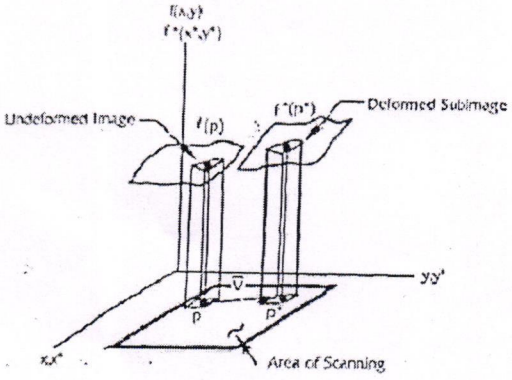


Fig.1 Local Motion and Distortion of Subset Image

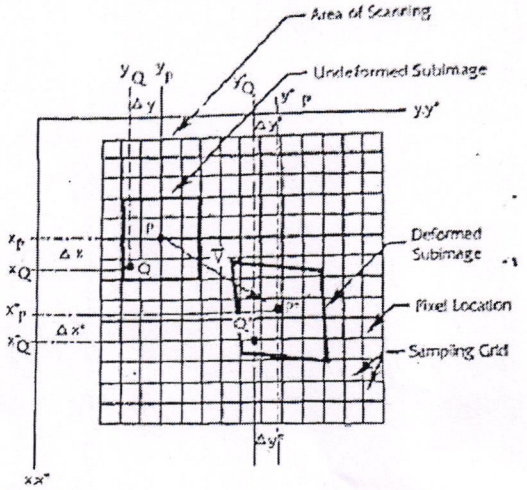


Fig. 2 Deformation of Sub-image in sampling Grig.

Origin of the research problem:

The automobile industry has an increasing demand for lightweight components, improved product performance, efficiency and increased safety. To optimize the design and manufacturing of these components, detailed measurement of critical material properties such as strain limit, strength coefficients, anisotropy coefficients et al. are required. The most commonly used method for finding the material properties is tensile test with extensometer. But this system on ly provides an average strain over the specimen gauge length and is not applicable to post diffuse necking. The Digital Image Correlation (DIC) is a state of art technique that can be used for accurate strain measurement.

Because of its capability for fast data acquisition, this technique is well suited for the characterization of material properties both in the elastic and plastic ranges. It also has advantages of full field, non-contact, and considerately high accuracy for displacement and strain measurements. The modern manufacturing industryrequires higher strength materials for more

A

Research Report

ON

Treatment of Distillery Spent Wash Using Electro Coagulation by Al / Fe Electrodes and Chitosan Granules

By

Dr. Manoj Pandurang Wagh,

Principal Investigator, Dr.Vithalrao Vikhe Patil College of Engineering Ahmednagar. Civil Engineering Department

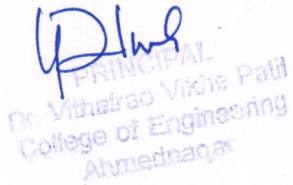
Mr. Chandu Tukaram Hajare

Co- Investigator, Dr.Vithalrao Vikhe Patil College of Engineering Ahmednagar. Chemistry Department

In partial fulfillment of the first progress report of minor research project

SAVITRIBAI PHULE PUNE UNIVERSITY, PUNE

2019



ABSTRACT

Distilleries are one of the backbone industries of India contributing a fair amount to nations GDP. Distillery industry devours 12-15 L of soft water for one L of alcohol production, generating 4.04 x 10^{10} L of unwanted Effluent from distilleries, known as spent wash, leads to extensive soil and water pollution. Removal of pollutants and colour from distillery effluent is becoming increasingly important from environmental and aesthetic point of view. Effluent from distillery contains certain recalcitrant compounds, cumbersome, intensive, dark brown unwanted effluent. Extremely high chemical oxygen demand (COD) and Biochemical Oxygen demand (BOD). Most of distilleries in India use biomethanation process to treat the spent wash generated during the alcohol process. To make sure the competent treatment all distillery industries allow 1- 3 times dilutions which causes enormous quantity of effluent generation. Ethanol production in distillery industries are 8 to 15 % by volume, it shows 85 to 92 % distillery spent wash generated by volume. Therefore distillery industries comprise an enormous unpleasant impact on the surroundings. Numbers of clean up techniques have been worked out to competently treat the distillery spent wash. The current research work gives the information about the Indian scenario of distillery spent wash and its production and study of various characteristics of spent wash such as colour, pH, COD, BOD, temperature, conductivity, turbidity, total solids as per standard methods. The current study was accomplished to find out pollution reduction potential using electro coagulation (EC) by Al/ Fe electrodes and Chitosan granules. The study is mainly focused on the treatment of distillery spent wash by electro coagulation method using Al-Al electrode with monopolar parallel (MP-P) connection. MP-P connections enhance the COD removal rate by 4.16 % to 8.06 %. Optimum chemical oxygen demand degradation was 77.29% at pH 3 and decolourization was 76.55% at pH 8. Continuous electro coagulation process removes COD up to 97.27 % and colour 98.72 %. To explore the result sludge analysis were carried out. To confirm the degradation of distillery spent wash high performance liquid chromatography (HPLC) analysis and XRD were performed. Chitosan granules act as adsorbent and plays key role to reduce the basic parameters of distillery spent wash.

Avishkar

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TITLE OF PROJECT

Design & Analysis of Sewage treatment plant by using Membrane Bio-Reactor [MBR] Recycling

APPID : 1194136. Presented by: Mr. Kale Ashutosh Goyal Pushpak Santosh **Guide: Dr. M. P. Wagh**

ABSTRACT

The Dr. Vitthalrao Vikhe Patil College of Engineering, Ahmednagar is one of the most important educational institutes in the state of Ahmednagar with a large number of people residing in its campus consisting of a number of laboratories of various departments, residential units, academic blocks and number of hostels. A study on domestic waste water characterization has been performed followed by the design of sewage treatment plant. The present study involves the analysis of pH value, total solids, total suspended solids, hardness, acidity, alkalinity, BOD, DO.

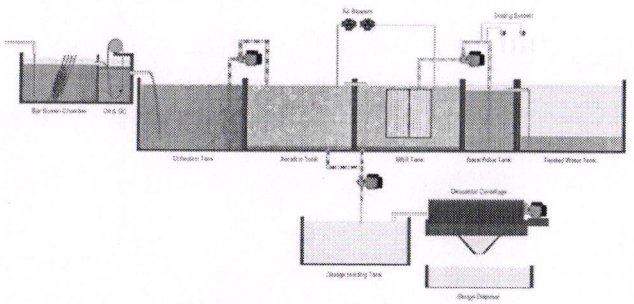
INTRODUCTION

Sewage/Wastewater are essentially the water supply of the community after it has been fouled by a variety of uses. From the standpoint of sources of generation, wastewater may be defined as a combination of the liquid (or water) carrying wastes removed from residences, institutions, commercial and industrial establishments, together with such groundwater, surface water and storm water as may be present. Generally, the wastewater discharged from domestic premises like residences, institutions and commercial establishments is termed as "Sewage/Community wastewater". It comprises of 99.9% water and 0.1% solids and is organic because it consists of carbon compounds like human waste, paper, vegetable matter etc. Besides community wastewater/sewage, there is industrial wastewater in the region. Many industrial wastes are also organic in composition and can be treated physiochemically and/or by micro-organisms in the same way as sewage.

OBJECTIVE

- To minimize the parameters of sewage i.e. pH, TDS, TSS, BOD, COD, Turbidity, etc.
- Comparison with the prescribed standard.
- Design of the sewage treatment plant for domestic waste water generated in D.V.V.P.C.O.E, AHMEDNAGAR

DESIGN OF SEWAGE TREATMENT PLANT



Membrane Bio Reactor (MBR) Technology

Membrane Bioreactors (MBR)

A membrane bio reactor is combination of suspended growth activated sludge biological treatment and membrane filtration equipment performing the critical solid/liquid separation function that is traditionally accomplished using secondary clarifier and filters. A membrane bio reactor is essentially a version of the conventional activated sludge (CAS) system.

Features	Membrane Treatment	Conventional Treatment
Technology	Modern and continuously improving	Developed in 1800's
Footprint	Extremely compact	Large land requirement
Separation process	Physical barrier = reliable filtration	Gravity driven with coarse filtration
Operation	Fully automated with minimum chemical use	Labor and chemical intensive
High MLSS	10,000-12,000 mg/l	2000-4000 mg/l

Benefits of MBR

- The Highest, Consistent Effluent Quality.
- BOD < 5 mg/L.
- TSS < 2 mg/L.
- Turbidity < 0.5 NTU.
- Simple to operate (compared to other processes trying to achieve same effluent quality)

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Avishkar

2019

TITLE OF PROJECT

Moringa Oleifera as a Natural Coagulant to Treat Dairy Industry Wastewater

APPID: 1915003859 Presented by: Mr. Yashwant Aher and Anit Mandalik. Guide: Dr. M. P. Wagh

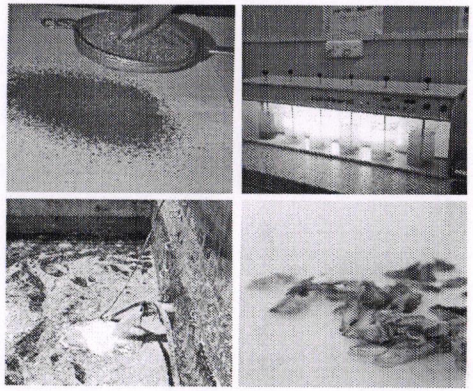
ABSTRACT

The Dairy Industry is one of the huge food processing industry in the world. The amount of wastewater produce is very high and is treated with many natural coagulants instead of chemical coagulants. Well known natural coagulant *Moringa oleifera* is used for dairy wastewater treatment which is having coagulant property of about 80% to85%. *Moringa oleifera* (MO) is a multipurpose, medium or small-sized tree, from regions of North West India and indigenous to many parts of Asia, Africa, and South America. The main objective of this work was to use the MO seeds as a natural adsorbent for the treatment of dairy industry wastewater (DIW).

OBJECTIVE

- General characteristics of dairy wastewater.
- Applying dose of *moringa oleifera* as per review paper.
- Analysis of dairy waste water after the application of moringa *oleifera* powder.
- Determine various characteristics DWW such as COD, BOD, TDS, TSS, pH, turbidity, hardness, etc.
- Comparing different Natural coagulant with *moringa oleifera* and their efficiency removal.

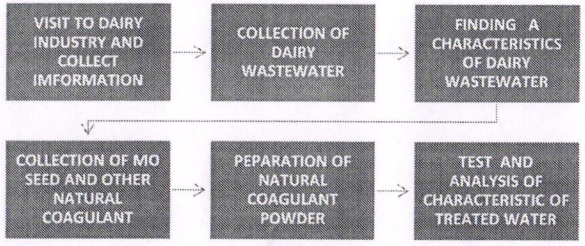
PREPARATION OF MO POWDER



INTRODUCTION

The dairy industry is consider to be a largest source of waste water producing industry in food processing industries in the many countries. Because of demand of milk is rises day by day in rural area as well as urban area also. This had been led to huge growth in the dairy industries in most countries. The waste produced by a dairy industry is about 2 to 3 liters of waste water per liter of milk processed. This waste contains high detergents and sanitizing agents which affect aquatic life. It also contains high concentration of organic matters such as fats, proteins, carbohydrates, grease. Chemical coagulants like aluminium sulphate (alum), polyaluminium chloride (pacl) are used in dairy waste water treatment plant for purification process. This excess use of amount of chemical coagulants can affect human health. the natural coagulant like moringa oleifera is used in dairy waste water treatment for reduced the charactertics of dairy waste water like (BOD,COD,TDS,TSS etc.)

METHODOLOGY



Membrane Bioreactors (MBR)

Moringa oleifera Lam is a perennial plant that grows very fast, with flowers and fruits appearing within 12 months of planting. They grow up to a height of 5-12 meters and pods 30-120 cm long and are harvested up to two times a year in India. The natural coagulant found in *Moringa oleifera* is present in 6 of the 14 species of *Moringa* growing in Africa, Madagascar, India and Arabia.

SCOPE OF THE TREATMENT

The dairy industry is generally considered to be largest source of food processing. These industries wastewater is characterized by high COD, BOD, nutrients etc. Such wastewater is to be treated natural coagulants and then tests are to be carried to check the water characteristics like BOD, COD, pH and turbidity.

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