



**DEPARTMENT OF
OILS,
OLEOCHEMICALS
AND SURFACTANTS
TECHNOLOGY**

PREFACE



PROF. Dr. RAVINDRA D. KULKARNI

*M. Tech. [Chem. Tech.] Ph. D.
Professor and Head*

“Alumni of this Department have reached very senior and responsible positions in the Indian oil and surfactant industry”

The department was started as Division of Oils, Fats and Waxes in 1943 offering a 2-year course B.Sc. (Tech.) [Technology of Oils, Fats and Waxes] after B.Sc. (Chemistry). The duration of this course was increased to 3 years from 1965. In 1998, this Division was renamed as Division of Oils, Oleochemicals and Surfactants. The undergraduate course was changed to a 4-year course, namely B. Chem. Tech. [Technology of Oils, Oleochemicals and Surfactants]. Students are admitted on the basis of MHCET and AIEEE after 12th Grade. The course is a combination of theory, practicals, seminars, inplant trainings, industrial visits and project work. The course syllabus has been designed keeping in mind the requirement of the industry and international institutions. It is updated from time to time. Nearly 30% of our undergraduate students choose to pursue further education in

top most universities abroad. Some of them opt for jobs in the edible oils, surfactants, cosmetics, perfumery, paints, and related industries. A few of them start their own industries. Students are generally well placed before the completion of their graduate course. The Department also offers a Post Graduate and Doctoral Program. The Department has done pioneering work in the field of Oil Technology. From the time of its inception, faculty members have maintained a close interaction with industry and have been associated with the development of the oil industry. Several short and long term projects instituted by sponsoring bodies for process/product development at this Department have been supervised by faculty as part of their routine research activity. Alumni of this Department have reached very senior and responsible positions in the Indian oil and surfactant industry.

The Department has excellent facilities for research and is equipped with advanced instruments such as: Gas Chromatograph GE17A. Gas Chromatograph-4890D,

UV-Spectrophotometer, Automatic Tensiometer, Karl Fischer Titrino, HPLC, HPTLC, Spray Dryer LSD-48, Lab Pervaporation Unit, Toilet Soap Plant, High Pressure Autoclave, Short Path Distillation Unit, Batch Solvent Extraction Plant, Turg-O-Tometer, Rotary Vacuum Evaporator, Brookfield Viscometer, Pour Point Apparatus, Shear Stability Testing Unit, Rancimate.

MAJOR THRUST RESEARCH AREAS ARE:

- Edible oils and their products
- Oil seed processing and Utilization
- Biodegradable Lubricants and Specialty Products
- Natural Products
- Surfactants and Applications
- Perfumery and Cosmetics



PROF. Dr. RAVINDRA D. KULKARNI

M. Tech. (Chem. Tech.) Ph. D.

Professor and Head

FELLOWSHIPS/ MEMBERSHIPS OF

PROFESSIONAL BODIES

RESEARCH INTERESTS:

- i) Fellow Member, Essential Oil Association of India
- ii) Life Member, Oil Technologists Association of India (No. OTA/LM/300/2013)
- iii) Life Member, Indian Society for Technical Education (LM)
- iv) Life Member, Asian Polymer Society, Delhi (No. L173; www.apa-asia.org)
- v) U. G. C. Fellowship

HIGHLIGHTS OF RESEARCH WORK DONE AND ITS IMPACT:

PUBLICATIONS (PEER REVIEWED) SO FAR: 63

[International: 45, National:18],
12 Communicated

PATENTS : 02 Granted, 05
Filed, 2 Communicated

CONFERENCE

PROCEEDINGS/PAPERS:

127, 71(International) +
56(National)

SEMINARS/LECTURES/ ORATIONS DELIVERED: 61

(6 International + 55 National/
Regional)

Ph.D.S AWARDED AS SINGLE/ CO-GUIDE: 10

MASTERS AWARDED AS SINGLE/ CO-GUIDE: 45

H-INDEX : 12

CITATIONS: 436

SUBJECTS TAUGHT DURING 2016-17

RESEARCH INTERESTS :

Chemical Modification of Fats,
Oleochemicals & Specialty
Surfactants; Essential Oils &
Cosmetics; UV cure Polymers,
Nano and High Performance

Pigments, Eco-friendly
Functional Coatings; Green
Chemistry; Nanotechnology;
Reaction Engg. & Catalysis;
Biolubricants& Tribology;
Environmental Engg.

RESEARCH STUDENTS CURRENTLY WORKING :

P.D.F.- 2RA -

Ph.D. (Tech.) -4

Ph.D.(Sc) - 4

M.Tech. -9

M.Chem.Eng -

M.Sc -

Others (if any) -

RESEARCH PUBLICATIONS:

International- 10

National- 0

PATENTS PUBLISHE: 1

SPONSORED PROJECTS:

Government- 1

Private- 7

RESEARCH PROJECTS

PH.D. (SCIENCE)

No.	Research Scholar (Beginning with Last name)	Previous Institution	Project	Supervisor
1	Hatkar Vinod	NMU Jalgaon	Synthesis and characterization of multifunctional monomers and prepolymers for development of UV cure nanocomposite coatings and adhesives	Prof. R. D. Kulkarni
2	Rajput Yogeshsing	NMU Jalgaon	Green synthesis of Carbohydrate and Fat based Specialty Surfactants for development of milder and Sulphate free Skin, Hair and Oral Care Cosmetic Products.	Prof. R. D. Kulkarni
3	Girase Chetan	NMU Jalgaon	Synthesis of cationic Polymers and their applications	Prof. R. D. Kulkarni
4	Kedar Rahul	NMU Jalgaon	Studies in Nutraceuticals, Lipid excipient and Topical Pharma bases from vegetable oil	Prof. R. D. Kulkarni

M. TECH. / M.CHEM. ENG.

POSTDOCTORAL/PH.D. STUDENTS' RESEARCH PROJECTS::

No.	Research Scholar	Previous Institution	Project	Supervisor
1	Dr. Bhalerao Machindra	Institute of Chemical Technology	A green Chemistry approach to the production of microbial chitosan biopolymer and its studies on its potential applications in the paints industry	Prof. R. D. Kulkarni
2	Dr. Bhagyashri Dandi	NMU, Jalgaon	A green Chemistry approach to the production of microbial chitosan biopolymer and its studies on its potential applications in the paints industry	Prof. R. D. Kulkarni

DETAILS OF SPONSORED PROJECTS – GOVERNMENT AND PRIVATE:

I. Government Agencies:	
Sponsor	DST-WMT, New Delhi
Title	Processing of Vegetable Oil Refinery and Oleochemical Waste Streams for regeneration of Value Added Nutraceuticals and Specialty Chemicals (DST/TDT/WMT/2017/051,13-06-2017)
Duration	2017-18
Total amount	21.18528 lakhs
Principal Investigator	Prof. R. D. Kulkarni
Research Fellows	Pritesh Patil, Dr. MachindraBhalerao
II. Private agencies:	
Sponsor	SYNTHITE, Kolenchery, Kerala
Title	Enhanced Low Temperature Clarity of Sea buckthorn Oil
Duration	Ongoing
Total amount	Rs.3.4 lakh
Principal Investigator	Prof. R. D. Kulkarni
Research Fellows	-
Sponsor	Kumar Metals, Thane
Title	Roseheep Oil seed Extraction
Duration	Ongoing
Total amount	Rs.3.0 lakh
Principal Investigator	Prof. R. D. Kulkarni
Research Fellows	-
Sponsor	SUMWIN Global, Malaysia
Title	Manufacture of Polyol ester
Duration	Ongoing
Total amount	Rs. 11.00 lakh
Principal Investigator	Prof. R. D. Kulkarni
Research Fellows	Pravin Jadhav
Sponsor	Godrej Industries, Mumbai
Title	Cationic Polymers
Duration	Ongoing
Total amount	Rs. 5.90 lakh
Principal Investigator	Prof. R. D. Kulkarni
Research Fellows	-

Sponsor	Transpek-Silox Industry Pvt. Ltd., Vadodara
Title	Explorations of Metallic Soaps for diverse applications in Cosmetics, Polymer, Paint and Rubber Industries: Rs. 5.90 lakh
Duration	Ongoing
Total amount	Rs. 5.90 lakh
Principal Investigator	Prof. R. D. Kulkarni
Research Fellows	-
Sponsor	Ultramarine Pigments, Chennai
Title	<i>Specialty Surfactants, Pigment Concentrates</i>
Duration	Ongoing
Total amount	-
Principal Investigator	Prof. R. D. Kulkarni
Research Fellows	-
Sponsor	Directorate of Revenue Intelligence, Mumbai-20.
Title	Analysis of Samples 'Kolliwax' HCO, 'Kolliphor RH 40' and 'Kolliwax S Fine'
Duration	Sept-Oct 2017
Total amount	0.50/- Lakh
Principal Investigator	Prof. R. D. Kulkarni
Research Fellows	-

PUBLICATIONS

No.	Title and authors	Journal	Vol./Page	Year
1	Ravindra D. Kulkarni , Vikas V. Gite Utilisation of sebacic acid and nano hydroxyapatite in polyurethane nano-composite coating Abhijeet Anand,	Green Materials	Accepted	2018
2	V J Patil, Y E Bhoge, TD Deshpande, RD Kulkarni Synthesis and anticorrosive performance evaluation of Zinc vanadate pigment	Vacuum DOI:10.1016/j.vacuum.2017.08.047	145C, pp. 290-294	2017
3	Hatkar VM, Patil VJ, Bhoge YE, Narkhede JS, Patil UD, Kulkarni R D Solution spray synthesis and surface modification of SiO ₂ nanoparticle for development of UV curable concrete coatings	Vacuum, DOI:10.1016/j.vacuum.2017.10.021	147, pp. 158-162	2018

4	Chandrashekhar K. Patil, Sandip D. Rajput, Ravindra J. Marathe, Ravindra D. Kulkarni , Hemant Phadnis, Daewon Sohn, Pramod P. Mahulikar, Vikas V. Gite Synthesis of bio-based polyurethane coatings from vegetable oil and dicarboxylic acids	Progress in Organic Coatings http://dx.doi.org/10.1016/j.porgcoat.2016.11.024	106, pp. 87-95	May 2017
5	Uday Bagle, Parag Gogte, Bharat Bhanawase, R. D. Kulkarni , Shirish Sonawane Green Synthesis of nanocapsules for self-healing anticorrosion coating using ultrasound assisted approach	Green Processing and Synthesis (GREENPS)	Accepted	2017
6	Bagle, Desle, R. D. Kulkarni , Shirish Sonawane An active corrosion inhibition coating of two pack epoxy polyamide system using halloysite nanocontainer	Protection of Metals and Physical Chemistry of Surfaces	54:1	78-84
7	V J Patil, Y E Bhoge, TD Deshpande, UD Patil, RD Kulkarni Room temperature solution spray synthesis of Bismuth Vanadate nanopigment and its utilization in formulation of industrial OEM coatings	Vacuum	127, pp. 17-21	2016
8	Y E Bhoge, V J Patil, TD Deshpande, UD Patil, RD Kulkarni Synthesis of Mica Doped Calcium Carbonate Filler for Partial Replacement of TiO ₂ in Decorative Paint	International Journal of Engineering Trends and Technology	279-282	2016
9	Abhijeet Anand, Ravindra D. Kulkarni , Chandrashekhar Patil Vikas V. Gite Utilization of renewable bio-based resources viz. sorbitol, diol, and diacid in the preparation of two pack PU anticorrosive coatings	RSC Adv.	online DOI: 10.1039/C5RA17202K	2016
10	Virendra J. Patil, Ujwal D. Patil, Ravindra D. Kulkarni, Nippon Ghosh Synthesis of nano CaCO ₃ /acrylic co-polymer latex composites for interior decorative paints	Polymer Composite Journal	DOI: 10.1002/pc.24075	2016

PATENTS:

No.	Inventors	Title	Country	Funding agency
1	S. H. Sonawane, R. D. Kulkarni , Uday Bagle,	“Improved Self Healing Corrosion Inhibition Coating Based OnNanocapsule Using Sonochemical Approach”		

SEMINARS/LECTURES/CONFERENCES/SYMPOSIA/WORKSHOPS/SUMMER OR WINTER TRAINING SCHOOLS ATTENDED/ORAL OR POSTER PRESENTATIONS:

Sr. No	Title of Talk	Programme	Organiser	Date
1	Lipids as Phase Changing Material in Solar Thermal Energy Storage	AICTE STTP on Solar Energy'	SGGS Institute of Engg& Tech, Nanded	March 31, 2018
2	Green Synthesis of MultifunctionalPhotoinitiators	Plenary Lecture in Two days UGC-SAP Sponsored National Conference ICLS-2018	School of Chemical Sciences, North Maharashtra University, Jalgaon, MS	March 5-6, 2018
3	Solution spray synthesis of Bismuth Vanadate and Iron Oxide nanopigments and formulation of Special Purpose Coatings	Seventh Conference on 'Recent Advances in Polymer Technology' (RAPT)	UICT, North Maharashtra University, Jalgaon, MS	Feb. 16, 2018
4	Preparation of High Performance Copper Phthalocyanine Pigment Concentrates and Modelling studies	National Conference on Trends and Challenges in Architectural Coatings	Society for Industrial Chemistry in association with Dept of Polymer & Surface Engg, ICT, Mumbai	Feb. 10, 2018
5	Recent Trends in Science and Technology	Expert Talk	AMITY University, Panvel, MS 410206	Feb. 02, 2018
6	Nutritional Properties of Palm & Other Oils	Workshop on Palm Oil	SNDT Campus, Juhu, Palm Oil Council, Malaysia& OTAI	Jan. 22, 2018

7	Surfactant Mediated Reactive Crystallization for Polymorph Selective Synthesis of Nanomaterials	Twinning Programme under TEQIP-III	BITS-MESRA, RANCHI	Jan. 17, 2018
8	Beyond traditional applications: examining new opportunities for Soaps, Surfactants and Detergents	SCODET Asia Seminar on "RESOURCES OPTIMIZATIONS IN SCODET INDUSTRY"	Nehru Centre, Worli, Mumbai, Oil Technologists' Association of India	Dec 21-22, 2017
9	Basic Oleochemical Transformations-Esterification, transesterification, hydrogenation, polymerization, oxidation	Certificate Course on Oleochemicals: Basic Chemistry, Derivatives and Applications	Dept. of Oils, Oleochemicals & Surfactants Tech., ICT, Mumbai & OTAI (WZ), India	March 16 & 17, 2017
10	Oleochemicals in Food, Polymer and Plastics Industries			
11	Surfactant Mediated Green Protocols for Polymorph Selective Synthesis of Nanomaterials	2nd National Conference on Surfactants and Colloids	Society for Industrial Chemistry and Indian Society for Surface Science & Technology	Feb. 10, 11, 2017
12	Process Modeling and Optimisation Studies: Selective Hydrogenation Dispersion Stabilisation of high performance Pigments	MHRD-TEQIP STTP on 'Process Design & Intensification: Fundamentals to Applications'	UICT, NMU, Jalgaon	Jan. 02, 2017
13	Pressure Driven Membrane Separation Techniques for Drinking Water and Effluent Treatment	MHRD-TEQIP STTP on 'Hygienic Drinking water'	SGGS Institute of Engg& Tech, Nanded	Dec. 20, 2016
14	Polymorph Selective Synthesis of Nanomaterials and Reactive Crystallisation and Engineering	Joshi Memorial IPI Presentation	College of Engineering and Technology, Akola	March 29, 2016
15	Surfactant Mediated Polymorph Selective Solution Spray Synthesis of Nanopigments and their Characterisations	National Conference on Synthesis of Nanomaterials	G.T. P. College (UGC SAP), Nandurbar	Feb. 09, 2016

INDUSTRIAL CONSULTANCY:

Sr. No.	Company
1	SYNTHITE, Kolenchery, Kerala
2	Kumar Metals, Thane
3	SUMWIN Global, Malaysia
4	Godrej Industries, Mumbai
5	Ultramarine Pigments, Chennai
6	Transpek-Silox Industry Pvt.Ltd., Vadodara

DETAILS OF POST-GRADUATE/PH.D. STUDENTS WHO PASSED OUT:

Name	Course	Title
Shaikh Mohd.Aizaz	M. Tech.	Green Synthesis Of Cationic And Amphoteric Surfactants And Their Application.
Deshpande Shriya	M. Tech.	Surfactants Assisted Synthesis Of Zinc Oxide Nanomaterials And Graphene Nanocomposites For Explorations In Cosmetics And Ammonia Sensor Application
LembheAkshay	M. Tech.	Chemical Modification Of Oleochemicals And Its Application In Lubricant Industry.
Dr. Abhijit Anand	Ph.D	Synthesis of renewable polyols and formulation and characterization of 1K and 2K PU nano-composite coatings
Dr. Yogesh Bhoge	Ph.D	Synthesis and crystal design of high performance pigments for development of special effect coatings
Dr. Hansraj Patil	Ph.D	Synthesis and characterization of Surfactants as Micro heterogeneous System for Wet Chemical Synthesis of Nanoparticles
Dr. Virendrasing Patil	Ph.D	Synthesis and characterization of Surfactants as Micro heterogeneous System for Wet Chemical Synthesis of Nanoparticles
Dr. Shashikant Pardeshi	Ph.D	Studies on Calibration and Standardization of Physico-Chemical Analysis of lipids.
Dr. Miss Kalpana Shimpi	Ph.D	Techno Commercial and Environmental Evaluation of Biodiesel as Engine fuel
Dr. Badgujar Nilesh	Ph.D.	Physicochemical characterisation, process Engg. and mathematical modeling of Pigmented Dispersion for formulation of Coatings



Dr. AMIT P. PRATAP

Ph. D. (Tech.)

Associate Professor

FELLOWSHIPS/ MEMBERSHIPS OF PROFESSIONAL BODIES RESEARCH INTERESTS:

- Hon. Jt. Secretary of The Oil Technologists' Association of India – Western Zone.
- “Life member” of The Oil Technologists' Association of India – Western Zone
- “Life member” of Alumni Association of UDCT
- “Life member” of Indian Society for Surface Science and Technology (ISSST)
- “Life member” of Indian Association Nuclear Chemists' and Scientists (IANCAS)
- “Life member” of Chromatographic Society of India

HIGHLIGHTS OF RESEARCH WORK DONE AND ITS IMPACT:

Surfactants

Reaching the benefits of Technology to rural and urban population through understanding science at work and designing products to meet the needs of the masses. One of the aims of our Institution has been to help the chemical industry to maximize their output so that

the benefits finally reach the end user. A case in point is the pioneering work done by this division several years ago in understanding non-traditional oil as a source not only as an oleochemical for use in the soap and allied industries but also for edible purposes. The author believes that the division can contribute significantly to the industry and society at large by taking up technical issues relevant to the surfactant and related industry by helping provide innovative solutions to problems peculiar to this and other developing geographies. This is illustrated, in the following example:

Some decades ago a quiet revolution took place in our daily lives when the soap used in washing was replaced by synthetic detergents. This had two consequences. It freed up scant resource of oil for edible / toilet soaps and took the level of cleaning broadly to a higher level. However, these benefits did not reach grass roots of the society till someone came along to make it affordable to the masses.

The success of this transformation was in part due to the “helping hand” of the government and more importantly a clearly visible

benefit to the consumer through a change in the existing habit. Today there are 5000 small scale units engaged in the manufacture of synthetic detergents in our country. It will be recognized for those in the business that a predominant number of these products are simple, having surfactant and a significant amount of Soda ash (that acts as a precipitating builder and provides alkalinity). Opportunities exist in the improvement of these types of products with consequent savings by focusing (initially) in three-four areas.

1. By having a non-ionic / cationic co-surfactant a significant reduction in overall surfactant concentration of up to ten per cent is possible through improved hardness tolerance and soil removal. Assuming about ten thousand tons of LAS is replaced this works out to a saving of -Rs. 400 M.
2. Through Polymers that can help prevent crystal growth of the inorganic Carbonate in hard water, leading to significant reduction in the total soda ash used. Unfortunately current manufactures “cannot” afford these

materials as cost benefit is not immediately seen. However, by incorporating the polymer in Soda ash at the manufacturers end (as in Iodized salt) and making it mandatory for small scale manufacturers to use this material, a significant change can be visualized.

3. Polymers that are of natural origin and specific to this country such as Guar gums are available in significant quantities. Several modifications can be envisaged for making polymers that could be viscosity modifiers, soil dispersing agents, soil release polymers for use in detergent formulations in different forms. Such modifications can add huge value to these natural polymers and replace those polymers derived from petroleum sources.
4. Photo bleaches (such as Zinc/Si/Al Phthalocyanine Sulphonates) can be cost effective ingredients that can significantly improve cleaning and this is in sync with the current consumer habits.
5. Use of Polymeric materials that help in removal of soil peculiar to developing geographies (eg-Carbon in the atmosphere due to vehicular pollution and clay soil encountered in the rural areas). Through the above one can realize a saving of at least 10 per cent in the cost of Raw materials in the inexpensive detergent

industry segment.

6. Currently there is a project that is being undertaken by the section to look at developing value added products from by products of the fatty alcohol industry through Guerbet chemistry. When successful scaled up this could be the forerunner of many other similar products.

Bio – Diesel (Alternative Fuels Of Biological Origin)

Fuel is a substance, which gives energy on combustion i.e. oxidation, where the oxygen from air plays a major role. Conventionally used fuels are solid (coal, coke, wood, paper etc.), liquid (kerosene, gasoline, low molecular weight alcohols, vegetable oils etc) and gaseous (methane, LPG, CNG, water gas, producer gas) in nature. The radioactive isotopes could be thought for the peaceful use of atomic energy that can be utilized as a fuel. Many of the above mentioned fuels namely natural gas, kerosene, gasoline etc. are derived from crude oil, which is diminishing very fast from earth's crust. It is predicted that these reserves (existing as of now and which will be found in near future) will be depleted in another 25 to 30 years. Day by day the rift between demand and supply is expected to be widened, which will lead to the unexpected hike in the price of fuels, which also reflects in the price of the crude oil as on today, which is at 70 \$ per barrel. By looking at these aspects, the time has come to explore the new source of fuels. Fuels derived from renewable

biological resources for use in diesel engines are known as biofuels. This could be thought to partly cope up with fuels such ethanol, fatty acid methyl esters popularly known as biodiesel. The name "biodiesel" was introduced in the United States in 1992 by the "National Soydiesel Development Board" (now the "National Biodiesel Board"), which has pioneered the commercialization of biodiesel in the U.S. Chemically, biodiesel is referred to as the mono alkyl esters (methyl or ethyl) of long chain fatty acids or ester-based oxygenated fuels derived from renewable lipid sources. It can be used in compression-ignition (diesel) engines with little or no modifications. Pure biodiesel is biodegradable, nontoxic and essentially free of sulfur and aromatics.

This molecule (fatty acid methyl ester) has attracted the attention of many technologists and scientists across the globe. Major advantage of it includes renewability, better quality gas emissions and biodegradability. Biodiesel readily blends with diesel fuel in any percent. The blend level is a function of economics, the desired emissions profile, material compatibility, and combustion characteristics. The focus at the moment is on a 20 % (Vol.) blend of biodiesel in petrodiesel. India is a country with vast resources of inedible oils, some of which are derived from plants that grow in the wild. Yet, the development activity on biofuels in our country is at a primary stage. In this background, it is important

that in order to harness the country's nonedible vegetable oil resources like neem, karaja, jatropa, mahua etc. towards renewable raw materials, development work on products, processes and technologies related to this vital field must be accelerated. Some of the comparatively cheaper sources those need a special attention are soap stock, acid oil, waste cooking oil etc.

An organized program of social forestry can generate enormous benefits to rural areas in terms of employment for collection of seeds and processing. The globalization has opened up opportunities to Indian oleochemicals industry in an unprecedented measure. Added to this, a wide scale introduction of biodiesel has brought to for the supply of glycerol, magnitude of which may likely to question the very economical viability of the oleochemical industry. Selection of a suitable topic on the utilization of glycerol will be made after preparation of a review report.

Biosurfactants

From the global viewpoint chemical, pharmaceutical, environmental and petrochemical industries have recognized the potential of living cells in pretreatment of raw materials, processing operations, product development, waste management, energy recycling and conservation. In this context, surfactants are increasingly recognized for their range of uses. The total quantity of biological and

chemical surfactants all over the world is estimated at more than 25 billion pounds and 10 billion pounds respectively. The enormous market demands of 3 million tones per annum are currently met by synthetic, petroleum based surfactants. These surfactants are toxic to the environment and non biodegradable. The tightening environmental regulation and increasing awareness to protect ecosystems have therefore resulted in increasing interest in biosurfactants during past decade. The requirement of surfactant-based products is increasing at rate of 5% annually.

Biosurfactants are biologically synthesized surface-active agents produced as metabolic byproducts through microbial transformation of organic substrate. Besides their classical application as emulsifiers of hydrocarbons, they can be used in environmental protection, crude oil recovery, food processing industries, in various fields of biomedicine (antibacterial, antiviral and antifungal), textiles manufacturing, metal treatment, cosmetics, agriculture, paint industries and in paper and pulp processing. India being an agricultural country has enough availability of substrates like molasses, baggasse, glycerol, used oil and deoiled cake for production of biosurfactants. They have advantages over conventional surfactant in toxicity, biodegradability and the availability of renewable raw materials. Biosurfactants are also effective

at wide temperatures, pH and salinity. Among the different types of biosurfactants, the glycolipids (e.g. rhamnolipids, sophorolipid, mannosylerythritol, surfactin) and polysaccharide lipid complex have broad spectrum of applications. In the production of these biosurfactants, it has been estimated that raw material accounts for about 30% of overall cost where as downstream processing accounts for about 60% cost. Therefore further significant improvements in upstream as well as downstream processing by exploring system biology for strain improvement, fermentation engineering, integrated product recovery and reactor design are required. Attempt to characterize and to increase the number of applications is also desirable. It is aimed at developing technology that would use waste carbon sources such as used oils, de-oiled cakes, and glycerol for the production of biosurfactants through fermentation, over-expression of glycolipids (rhamnolipids, sophorolipid and mannosylerythritol), Phospholipids, Polymeric Surfactants based on Carbohydrate-protein-lipid, Lipopeptide and Lipoproteins (Peptide-lipid and Surfactin) etc.

The proposed project will involve selection and development of strains aimed at producing select biosurfactants. Further, focus will be at identification and physico-chemical characterization

and devising new strategies for purification of selected biosurfactants to give products that meet international specifications in terms of purity, safety profile etc. The work will also involve studies in kinetics of biosurfactants production in bioreactors and scale up. Biosurfactants, which is currently in its state of infancy, could get a further boost if larger numbers of applications are identified. This would also create technical expertise and ameliorate the availability of skilled manpower in the said field. The technology developed through this proposal will be patented according to intellectual property rights. Further the proposed process will scaled up to pilot scale production and will be offered to industries for commercialization.

Triboapplications Of Oils And Fats

Over the last fifty years, urgency to find renewable alternatives for petroleum in lubricants has been acutely felt, primarily due to the serious environmental hazards related to the indiscriminate use of petroleum in lubricant formulations. In many countries, legislations have been enforced, making the use of environment friendly lubricants mandatory in certain sensitive high risk applications. In the era of modern technology, the gradual change-over from Petroleum based to Vegetable oil based environment friendly lubricants is inevitable.

India is a country with vast resources of inedible oils, some of which are derived from plants that grow in the wild. Yet, the development activity on vegetable oil based lubricants in our country is almost non-existent. In this background, it is important that in order to harness the Country's inedible vegetable oil resources towards viable alternative lubricants, development work on products, processes and technologies related to this vital field must be accelerated. It is believed that the Oils and Fats Department of UICT, with its long experience and strong expertise in the field of Vegetable oils, can play an important part towards achievement of this objective by taking on an intensive long term project aimed at standardizing various aspects of this emerging and strategically important technological field. Some of the candidate Indian inedible vegetable oils, which can be considered for the study, include Jatropa, Mahua, Pilu, Castor and other tree borne oils. Studies will also be carried out on superior genetic varieties of Sunflower, Rapeseed and Soybean oils to generate comparative data.

PUBLICATIONS (PEER REVIEWED) SO FAR: 38

PATENTS : 15 (APPLIED)

CONFERENCE

PROCEEDINGS/PAPERS: 50

SEMINARS/LECTURES/ ORATIONS DELIVERED: 35

Ph.D.S AWARDED AS SINGLE/ CO-GUIDE: 08/02

MASTERS AWARDED AS

SINGLE/ CO-GUIDE: 55

H-INDEX : 08

CITATIONS: 205

SUBJECTS TAUGHT DURING 2016-17

Technology of Oil and Fat Production, Processing of Oils and Waxes, Production of soaps, surfactants and detergents, Triboapplications Laboratory, Cosmetics Formulations, Byproducts Utilization and Waste Management, Functional Fluids and Performance Chemicals

RESEARCH INTERESTS :

Vegetable oil based lubricants, additives, biosurfactants and specialty products

RESEARCH STUDENTS CURRENTLY WORKING :

RA - 02

Ph.D. (Tech.) -08

Ph.D.(Sc) - 04

M.Tech. 16-

RESEARCH PUBLICATIONS:

International- 39

National- 12

PATENTS:

Indian - 15 (Applied)

SPONSORED PROJECTS:

Government- 0

Private- 0

PROFESSIONAL ACTIVITIES

Government- 11 (Completed and ongoing)

Private- 20 (Completed and ongoing)

(MEMBERSHIP OF IMPORTANT COMMITTEES):

- Hon. Jt. Secretary of The Oil Technologists'

- Association of India – Western Zone.
- “Life member” of Oil Technologists’ Association of India – Western Zone
- “Life member” of Alumni Association of UDCT
- “Life member” of Indian Society for Surface Science and Technology (ISSST)
- “Life member” of Indian Association Nuclear Chemists’ and Scientists (IANCAS)
- “Life member” of Chromatographic Society of India

DETAILS OF SPONSORED PROJECTS – GOVERNMENT AND PRIVATE:

I. Government Agencies:	
Sponsor	RGSTC, Mumbai
Title	Pilot Study and Evaluation of Production of Green Surfactants from Non-edible/Edible Oils and Treated Oil Seed Meals
Duration	2016-19
Total amount	2,45,78,000/-
Principal Investigator	Dr. Amit P. Pratap
Research Fellows	Ms. Jagruti Jadhav and Mr. Bhavin Patel
Sponsor	TEQIP-II funded by World Bank under INN
Title	Catalytic Pyrolysis of Waste Plastics
Duration	2016-17
Total amount	5,63,000/-
Principal Investigator	Dr. Amit P. Pratap
Research Fellows	Mr. Deepak Sonawane and Mr. Deepak Kapile
Sponsor	Naval Materials Research Laboratory (DRDO)
Title	Scale Up Studies for Production of Biosurfactant from Hydrocarbon Utilising Bacteria & Product Characterisation
Duration	2017-19
Total amount	13,70,770/-
Principal Investigator	Dr. Amit P. Pratap
Research Fellows	Mr. Ninad Mhatre
II. Private agencies:	
Sponsor	M/s Bio Sols India Pvt. Ltd., Mumbai
Title	Novel Oleochemicals and its Applications
Duration	2017-21
Total amount	31,39,040/-
Principal Investigator	Dr. Amit P. Pratap
Research Fellows	Ms. Kirti Datir

Sponsor	M/s Anshika Polysurf Ltd., New Delhi
Title	Synthesis and Applications of Newer Novel Surfactants
Duration	2017-20
Total amount	23,54,280/-
Principal Investigator	Dr. Amit P. Pratap
Research Fellows	Mr. Rohan Mestri
Sponsor	M/s Kedia Organic Chemicals Pvt. Ltd., Navi Mumbai
Title	Biofuel and Natural Wax Related Products
Duration	2017-21
Total amount	31,39,040/-
Principal Investigator	Dr. Amit P. Pratap
Research Fellows	Mr. Ronak Parmar
Sponsor	M/s Godrej Industries Ltd., Mumbai
Title	Guerbet/ Branched Alcohols
Duration	2017-18
Total amount	2,95,000/-
Principal Investigator	Dr. Amit P. Pratap
Research Fellows	Mr. Bhushan Patare

PUBLICATIONS

No.	Title and authors	Journal	Vol. No.	Pages	Year
1	<u>Diester-containing zwitterionic gemini surfactants with different spacer and its impact on micellization properties and viscosity of aqueous micellar solution</u> by Sachin Patil, Sanyukta Patil and Amit Pratap	Journal of Oleo Science	65: 9	759-773	2016
2	<u>Synthesis and performance properties of cationic fabric softeners derived from free fatty acid of tallow fat</u> by Mithun Mondal and Amit Pratap	Journal of Oleo Science	65:8	663-670	2016
3	Choline chloride catalysed selective amidation of fatty acid ester to monoethanolamide: A Green approach by Pramod Patil and Amit Pratap	Journal of Oleoscience	65:1	75-79	2016
4	<u>Preparation of zirconia supported basic nanocatalyst: A physicochemical and kinetic study of biodiesel production from soybean oil</u> by Pramod Patil and Amit Pratap	Journal of Oleoscience	65:4	331-337	2016

5	Utilization of sunflower acid oil for synthesis of alkyd resin by Pranali Chiplunkar, and Amit Pratap	Progress in Organic Coatings	93	61-67	2016
6	<u>Synthesis and Application of Palm Fatty Acid Distillate Based Alkyd Resin in Liquid Detergent</u> by Pranali Chiplunkar, Vinita Shinde and Amit Pratap	Journal of Surfactants and Detergents	20:1	137-149	2017
7	Rice bran oil: A versatile source for edible and industrial applications by Yogita Pal and Amit Pratap	Journal of Oleo Science	66:6	551-556	2017
8	Synthesis and properties of esterquats as antibacterial agent and fabric softener by Mithun Mondal and Amit Pratap	Tenside, Surfactants, Detergents	54:1	78-84	2017
9	Comparative studies between conventional and microwave assisted extraction for rice bran oil by Himanshu Shukla and Amit Pratap	Journal of Oleo Science	66:9	973-979	2017
10	Studies on emulsification properties of Glycolipids biosurfactants by Harshada Patil and Amit Pratap	Tenside, Surfactants, Detergents	54:4	315-321	2017
11	Enzymatic Synthesis and Characterization of Sucrose Erucate (TS110528) by Jagruti Jadhav and Amit Pratap	Tenside, Surfactants, Detergent	54: 6	539-545	2017
12	Ultrasound Assisted Synthesis of Hydroxylated Soybean Lecithin from Crude Soybean Lecithin as an Emulsifier by Pranali Chiplunkar, Vinita Shinde and Amit Pratap	Journal of Oleo Science	66:10	1101-1108	2017
13	Ultrasound-assisted lipase catalyzed hydrolysis of aspirin methyl ester by Chiplunkar, P.P., Zhao, Tomke, P.D., Pratap, A.P., Cavaco-Paulo, A.	Ultrasonics Sonochemistry	40	587-593	2018
14	Fermentative production of Rhamnolipid and purification by adsorption chromatography by Jagruti Jadhav, Sruba Dutta, Sandeep Kale and Amit Pratap	Journal of Preparative Biochemistry and Biotechnology	48:3	234-241	2018
15	Production and Quantitative Analysis of Trehalose Lipids Biosurfactants by High Performance Liquid Chromatography by Harshada Patil and Amit Pratap	Journal of Surfactants Detergents	21:	553-564	2018
16	Fermentative production of Sophorolipid and purification by adsorption chromatography by Jagruti Jadhav, Pinky Samtani, Sandeep Kale and Amit Pratap	Tenside, Surfactants, Detergent	55(6),	467-476	2018

MEMBERSHIP OF IN-HOUSE COMMITTEES:

- Member, Postgraduate Admission Committee
- Member, Merit cum means scholarship committee
- Member, Golden Jubilee Travel Grant Committee

SEMINARS/LECTURES/CONFERENCES/SYMPOSIA/WORKSHOPS/SUMMER OR WINTER TRAINING SCHOOLS ATTENDED/ORAL OR POSTER PRESENTATIONS:

1. Workshop on “Polymer and Polymer Nano Composites Processing” organized by R. V. College of Engineering, Bengaluru under TEQIP-II during June 27, 2016 to July 02, 2016
2. Training Programme on “Mentoring for Faculty of Engineering and Faculty of Institutes” organized by Department of Pharmaceutical Sciences and Technology under TEQIP-II during December 12-16, 2016 at ICT
3. AICTE (Under QIP) Sponsored One Week Faculty Development Programme on Wave Theory & Applications” organized by Electrical Engineering Department during January 2 – 7 January 2017 at VJTI, Mumbai
4. Finishing School cum Training Program on “Preparative Processing and Analysis of Biochemicals & Bio/Pharmaceuticals” organized by DBT-ICT CEB during March 14-18, 2017 at ICT, Mumbai.
5. One Week Training Program on “Patent Filing procedure Proceedings of Patents, Introduction to Patent specification, Patent Search with exercise, Trademarks, GI filing procedure” Organized by The Rajiv Gandhi National Institute of Intellectual Property Management (RGNIIPM – Central Government Institute under the Ministry of Commerce & Industry during 28/08/2017 to 01/09/2017 at Nagpur
6. One week short term programme under QIP on “Advanced Textile Materials – Textile Composites and Nanotechnology in Textiles” held at Textile Manufactures Department, VJTI during 30th October 2017 to 04th November 2017
7. One week short term Course under QIP on “Industrial Tribology” held at Mechanical Engineering Department, VJTI during December 11-5, 2017
8. One Week Training Program on “Pedagogy and Management Capacity Enhancement Programme for Teaching Staff” Organized by Engineering Staff College of India (ESCI), during 25/02/2018 to 01/03/2018 at Goa.
9. One week short term Course under QIP on “Research Methodology for Engineering and Management Research” Organized by Production Engineering Department, VJTI during July 9-14, 2018
10. National Workshop on “NBA and NAAC Accreditation for TEQIP-III funded Universities and Institutions” Organized by Engineering Staff College of India (ESCI), during July 18-22, 2018 at Lonavala, Maharashtra
11. One week short term Course under TEQIP on “Tailoring Technologies for Rural Sector: Development and Dissemination” sponsored by Ministry of Human Resource Development, Govt. of India organized by Centre for Educational Technology (CET) held at Indian Institute of Technology Guwahati (IITG) during 29/10/2018 to 02/11/2018

Papers Presented during International Conferences

1. Research paper entitled “Green Functional Fluids from Castor Oil” by Amit P. Pratap at International Scientific Academy of Engineering & Technology Conferences (ISAET-2016) held during April 28-29, 2016 in Pattaya (Thailand)

- Invited Lecture on “Novel/ Advanced Methods of Vegetable Oil Processing” by Amit P. Pratap at FILTECH 2016 held during October 11- 13, 2016 in Cologne, Germany
- Paper entitled “Rice Bran Oil and Wax: Healthy and Sustainable Choice for Edible and Industrial Applications” by Amit P. Pratap during 3rd International Conference on Rice Bran Oil (ICRBO 2016) held on October 24-25, 2016 in Tokyo University, Japan
- Paper on “Biobased Functional Fluid and Lubricants” by Amit P. Pratap at The 5th Asian Oleochemicals Conference Building market success in challenging times: addressing overcapacity and examining growth opportunities across the value chain held during January 11 – 12, 2017 in Kuala Lumpur, Malaysia
- Research paper entitled “Microbial Biosurfactants from Tree Borne Oils” by Amit P. Pratap at International Association, International Conference on Chemical, Agricultural, Biological and Medical Sciences (CABMS-17) organized during January 23-24, 2017 at Manila, Philippines.

EVENTS ORGANIZED :

- A Training Programme ON “NBA” under TEQIP-II at CE Conference Room, ICT, Mumbai, December 4-5, 2015 for NBA Co-Ordinators of All Departments of ICT
- SCODET Asia 2016 Exhibition, Conference on “Transformative Technologies & Market Innovations in HPC Industry” and Workshop on “Risk Mitigation in the personal Care Industry” during January 13-15, 2016 at Nehru Centre, Mumbai
- A Training Programme ON “NBA” under TEQIP-II at Lecture Room CE, ICT, Mumbai, February 5-6, 2016 for All Faculty Members of ICT.
- Certificate Refresher Course on Oleochemicals: Basic Chemistry, Derivatives and Applications during March 16-17, 2017 at ICT, Mumbai
- A National Conference on “Innovative Trends In Oleochemicals, Surfactants And Personal Care Products” under TEQIP-II on March 06, 2017 At Prof. K. V. Auditorium, ICT, Mumbai

INDUSTRIAL CONSULTANCY :

- M/s Godrej Industries Ltd.
- M/s Hindustan Unilever Ltd.
- M/s Indus Chemicals Ltd.

DETAILS OF POST-GRADUATE/PH.D. STUDENTS WHO PASSED OUT :

Name	Course	Title
Shri Akash P. Bhangale	Ph. D. (Tech.)	Microbial Production and Isolation of Biosurfactants
Mr. Sachin Patil	Ph. D. (Tech.)	Gemini Surfactants from Renewable Resources
Mr. Chetan Waykole	Ph. D. (Tech.)	Value Addition to Biodiesel via Biolubricants
Mr. Pramod Patil	Ph. D. (Science)	Structural Modifications of Fatty Materials
Mr. Mithun Mondal	Ph. D. (Science)	Nitrogen Derivatives of Fatty Materials
Ms. Pranali Chiplunkar	Ph. D. (Science)	Value Addition to the Byproducts from Vegetable Oil Industry
Mr. Amol Kadam	Ph. D. (Science)	Studies in Isolation and Purification of Bioactives from Natural Spices
Mr. Sachdeo H. Daware	Ph. D. (Science)	Chemical Strategies for Derivatization of Natural Products



Dr. JYOTSNA WAGHMARE

Ph. D. (Tech.)

Associate Professor

FELLOWSHIPS/ MEMBERSHIPS OF PROFESSIONAL BODIES RESEARCH INTERESTS:

- Secretary of Oil Technologist Association of India.
- Member of Indian society for surface science and Technology.
- Member of American oil chemist society, USA.
- Member of Society of Chemical Industry, UK.

HIGHLIGHTS OF RESEARCH WORK DONE AND ITS IMPACT:

PUBLICATIONS (PEER
REVIEWED) SO FAR: 61

PATENTS : 1

CONFERENCE

PROCEEDINGS/PAPERS: 35

SEMINARS/LECTURES/
ORATIONS DELIVERED: 5

Ph.D.S AWARDED AS
SINGLE/ CO-GUIDE: 1

MASTERS AWARDED AS
SINGLE/ CO-GUIDE: 24

H-INDEX : 0

CITATIONS: 0

SUBJECTS TAUGHT
DURING 2016-18:

Technology of oils and fat based
products,

Nutraceuticals, Technology
and science of Essential oils,
Nutraceuticals, Advances in oils
and fats, Analysis of Oilseed,
oils and raw materials of oils
and soap industries, Analysis of
Surfactants, Oil Tech Lab I, Oil
and fat production and edible
oil processing

RESEARCH INTERESTS:

Nutraceuticals, Oxidation
studies, Structure lipids,
Designer lipids, Application of
surfactant, Cosmetics, Perfume,

Flavor and Fragrances,
Enzymology, Biofuel and
emulsion, surfactants, designer
lipids

RESEARCH STUDENTS
CURRENTLY WORKING :

Ph.D. (Tech.) -4

Ph.D.(Sc) - 1

M.Tech. -5

RESEARCH PUBLICATIONS:

International- 55

BOOKS CHAPTER: 03

PATENTS:

International - Indian - 1

SPONSORED PROJECTS:

Government - 1

Private- 1

PROFESSIONAL
ACTIVITIES (MEMBERSHIP
OF IMPORTANT

COMMITTEES): Member of
Handbook committee

DETAILS OF SPONSORED PROJECTS – GOVERNMENT AND PRIVATE:

I. GOVERNMENT AGENCIES:

Projects		
a	Personal / Departmental	Personal
b	Principle Investigator	Dr.Jyotsna Waghmare
c	sponsor – Govt./ Private	Government
d	Name of sponsor	TEQIP
e	Date of sanction	-
f	Title	Develop a viable process for preparation of indigenous oil seed protein isolate for food application and surfactant synthesis
g	Duration (from – to-)	2018-2020
h	Amount sanctioned, in Rs.	-

Projects		
a	Personal / Departmental	Personal
b	Principle Investigator	Dr.Jyotsna Waghmare
c	sponsor – Govt./ Private	Government
d	Name of sponsor	TEQIP
e	Date of sanction	-
f	Title	Spices as Biopesticide
g	Duration (from – to-)	2016
h	Amount sanctioned, in Rs.	-

Projects		
a	Personal / Departmental	Personal
b	Principle Investigator	Dr.Jyotsna Waghmare
c	sponsor – Govt./ Private	Private
d	Name of sponsor	HUL
f	Title	Identify and Validate solutions within and without surfactant space such that the proposal delivers parity performance on Sensorials (Lather, speed of lather, stability of lather etc)
g	Duration (from – to-)	2016-2018
h	Amount sanctioned, in Rs.	1200000

Projects		
a	Personal / Departmental	Personal
b	Principle Investigator	Dr. Jyotsna Waghmare
c	sponsor – Govt./ Private	Private
d	Name of sponsor	HUL
f	Title	Surfactant
g	Duration (from – to-)	From 2018
h	Amount sanctioned, in Rs.	-

PUBLICATIONS

No.	Title & Authors (INDICATE Corresponding author by * and Co-author faculty by #)	Journal		
		Vol.	Page	Year
1	Jyotsna Waghmare Asma Fakir , Watermelon waste: A potential source of omega-6 fatty acid and protein, International journal of Chem Tech research	10		2018
2	Jyotsna Waghmare, Fakir A, Application of Microencapsulated Fish oil in Instant soup mix as a source of omega-3 fatty acids, International journal of Pharmtech research	11	305-313	2018
3	Jyotsna Waghmare, Snehal More, Parag Gogate Intensification of acid catalyzed synthesis of tricaprolylin using ultrasound pretreatment Chemical Engineering and Processing: Process Intensification	120	317-329	2017
4	Jyotsna Waghmare, Snehal B. More, Parag R. Gogate, Ultrasound pretreatment as a novel approach for intensification of lipase catalyzed esterification of tricaprolylin Ultrasonics Sonochemistry	36	253-261	2017
5	Jyotsna Waghmare, Sadanand S. Kadam Snehal More, <i>Trachyspermum Ammi</i> : Natural pesticides, JBIOPest	10(2)	90-98	2017
6	Jyotsna Waghmare, Snehal B. More, Parag R. Gogate, Improved synthesis of medium chain triacylglycerol catalyzed by lipase based on use of supercritical carbon dioxide pretreatment,			2018

SEMINARS/ LECTURES/ CONFERENCES/ SYMPOSIA/ WORKSHOPS/ SUMMER OR WINTER TRAINING SCHOOLS ATTENDED/ORAL OR POSTER PRESENTATIONS :

Name of the Course/ Workshop/ Summer or Winter School	Place	Duration	Sponsoring Agency
Lecture on Wonderland of Oils and fats	SNDT, Juhu	22 Jan 2018	OTAI , MPOC & SNDTWU
Workshop on Creative and Formulation of Natural and Organic Cosmetics	Courtyars by Marriot Mumbi	28th-29th of November 2018	ISCC



Dr. CHANDU S. MADANKAR

M Tech, PhD

*J.G. Kane Assistant Professor, Department of
Oils, Oleochemicals and Surfactants
Technology*

FELLOWSHIPS/ MEMBERSHIPS OF PROFESSIONAL BODIES RESEARCH INTERESTS:

- S.R. Bhatnagar Memorial Research award, 2013 by the Oil Technologist Association of India
- Canadian Commonwealth Scholarship by the Canadian Bureau for International Education (CBIE) on behalf of Foreign Affairs and International Trade Canada (DFAIT) in Department of Chemical Engineering, University of Saskatchewan, 2011-12.
- Life Member of Oil Technologist Association of India (OTAI)
- Life Member of Tribological Society of India (TSI)

HIGHLIGHTS OF RESEARCH WORK DONE AND ITS IMPACT (MAXIMUM TWO SINGLE- SPACED PAGES WITH FIGURES/DIAGRAMS ETC.):

1. Carried out research on process development of biodegradable lubricants from castor oil in supercritical CO₂

1. Worked on extraction, synthesis and value addition of products from essential oils and Indian spices

**PUBLICATIONS (PEER
REVIEWED) SO FAR: 10**

PATENTS :

CONFERENCE

PROCEEDINGS/PAPERS: 11

**SEMINARS/LECTURES/
ORATIONS DELIVERED: 07**

**Ph.D.S AWARDED AS
SINGLE/ CO-GUIDE:**

**MASTERS AWARDED AS
SINGLE/ CO-GUIDE: 04**

H-INDEX : 04

CITATIONS: 181

**SUBJECTS TAUGHT
DURING 2016-17**

Chemistry of Oils and Lipids, Technology of Oleochemicals, Essential Oils Natural products and their applications, Cosmetics Science, Chemistry and Technology of Castor and Nonconventional Oils, Microbiology and Biochemistry Lab I, Microbiology and Biochemistry Lab II

RESEARCH INTERESTS :

Biolubricants, Biosurfactants, Extraction and value added products from essential oils

and spices, Supercritical CO₂ technology.

**RESEARCH STUDENTS
CURRENTLY WORKING :**

P.D.F.-

RA -

Ph.D. (Tech.) -

Ph.D.(Sc) -

M.Tech. - 07

M.Chem.Eng -

M.Sc -

Others (if any) -

RESEARCH PUBLICATIONS:

International- 03

National-

National-

Peer-reviewed- Conference
proceeding- 02

Books-

PATENTS:

International -

Indian -

SPONSORED PROJECTS:

Government- Applied to
SERB DST

**PROFESSIONAL
ACTIVITIES (MEMBERSHIP
OF IMPORTANT
COMMITTEES):**

Life Member of Oil
Technologist Association of
India (OTAI)

Life Member of Tribological
Society of India (TSI).

UNDERGRADUATE STUDENTS' SEMINARS

No.	Name of the Student (Beginning with Last name)	Topic
1	Kakar Rishabh	Biosurfactants
2	Bhalerao Sammed	Water based Alkyd resins
3	Sanap Prasad	Polyurathanes from vegetable oils

PROJECT / HOME PAPER

No.	Name of the Student (Beginning with Last name)	Topics
	Jalan Aashna Shah Arjun Patel Bhargav Navandar Anay Umathe Anishka Singh Manjot	Studies of value added products from Rosemary essential oil and its applications

POST GRADUATE STUDENTS' SEMINARS

No.	Name of the Student (Beginning with Last name)	Topic
1	Pawar Prasanjet	The prospects of bio-lubricants as alternatives in automotive applications
2	Bakhal Meera	Novel Antioxidant in Food Quality Preservation and Health Promotion
	Sanap Prasad	Polyurathanes from vegetable oils
3	Nair Aishwarya	Novel Antioxidant in Food Quality Preservation and Health Promotion
4	Bairagi Tilottama	Extraction of cucumin by supercritical carbondioxide from turmeric
5	Barage Suraj	Studies on derivatives of castor oil
6	Naik Bharati	Importance of antioxidant in vegetable oil and its benefits in diet

No.	Research Scholar (Beginning with Last name)	Previous Institution	Project	Supervisor
1	Sahare Pragya	Pune University	Extraction of Rosemary Essential Oil, Antioxidant Extract and its value addition Products	Dr. CS Madankar
2	Agarwal Suamya	Bharti Vidyapeeth College of Engineering	Synthesis of biolubricant using vegetable oil and study of its tribological applications	Dr. CS Madankar
3	Shahane Swapna	Mumbai University	Synthesis of Modified Alkyd Resin and its Applications	Dr. CS Madankar
4	Thakur Parul	NIT Raipur	Studies on steviol glycosides and gymnemic acid for therapeutic implications in functional foods	Dr. CS Madankar
5	Nair Aishwarya	Mumbai University	Development of Stable Formulations of Ginger Oleoresin for Applications in Microemulsion based Topical Drug Delivery	Dr. CS Madankar
6	Pawar Prasanjeet	BATU Lonere	Studies of extraction, characterization, and value-added products from Calotropis procera seeds oil	Dr. CS Madankar
7	Bakhal Meera	VNMKV University	Studies of Value Added Products From Date Seed Oil And its Application	Dr. CS Madankar

DETAILS OF NATIONAL AND INTERNATIONAL COLLABORATIONS: PUBLICATIONS

No.	Title and authors	Journal	Vol. No.	Pages	Year
1	Patil A D, Baral S S, Dhanke P B, Madankar C S, Patil U S., Parametric studies of methyl esters synthesis from Thumba seed oil using heterogeneous catalyst under conventional stirring and ultrasonic cavitation	Materials Science for Energy Technologies	1	106-16	2018
2	Madankar C.S., Sharma R.V., Dalai Ajay, Naik S.N., Epoxidation of Canola Oil for the production of biolubricant using silica-titania TiSBA-15 heterogeneous catalysts	Catalysis in Green chemistry and Engineering	1	51-63	2018
3	Sahare P. and Madankar C.S., Encapsulation of Rosemary Oil: Mini Review	Organic and Medicinal Chemistry International Journal,	2	1-5	2017

SEMINARS/LECTURES/CONFERENCES/SYMPOSIA/WORKSHOPS/SUMMER OR WINTER TRAINING SCHOOLS ATTENDED/ORAL OR POSTER PRESENTATIONS:

1. Attended one month UGC sponsored orientation programme in Human Resource Development Centre, in Nagpur university, Nagpur from 22/06/2017 –19/07/2017.
2. Invited lecture on “Applications of Oleochemicals in lubricants, paints, coatings and others” in “Certificate Refresher course on Oleo-chemicals; Basic chemistry, Derivatives & Applications” 16-17 March 2017, in ICT Mumbai.
3. Organized in association with OTAI “Certificate Refresher Course on Oleo-chemicals; Basic chemistry, Derivatives & applications” at ICT Mumbai, 16-17 March 2017
4. Attended Two weeks training programme on Intellectual Property procedures, Rajiv Gandhi National Institute of Intellectual Property Management, Nagpur, India, 19/08/2016-30/08/2016
5. Attended One week training programme on **Patenting System in India**, Rajiv Gandhi National Institute of Intellectual Property Management, Nagpur, India, 01/02/2016-05/02/2016

EVENTS ORGANIZED :

1. Organized TEQIP II Supported National conference on Innovative Trends in Oleochemicals, Surfactants and personal care products, at ICT Mumbai, March 06, 2017.
2. Organized in association with OTAI “Certificate Refresher Course on Oleo-chemicals; Basic chemistry, Derivatives & applications” at ICT Mumbai, 16-17 March 2017
3. Organized **10 SCODET ASIA 2016** at Nehru centre, Worli, Mumbai 13-15 January 2016



Dr. PARAG R. NEMADE

B. Chem. Eng., M. S., Ph.D.

UGC Assistant Professor

FELLOWSHIPS/ MEMBERSHIPS OF PROFESSIONAL BODIES RESEARCH INTERESTS:

- Member, Indian Membrane Society
- Member, Oil Technologists Association of India
- Member, Indian Institution of Chemical Engineers

PUBLICATIONS (PEER REVIEWED) SO FAR: 10

PATENTS : 5 (filed)

CONFERENCE PROCEEDINGS/PAPERS:

SEMINARS/LECTURES/
ORATIONS DELIVERED: 02

Ph.D.S AWARDED AS
SINGLE/ CO-GUIDE: 0

MASTERS AWARDED AS
SINGLE/ CO-GUIDE: 13

POST DOCTORAL FELLOWS
SUPERVISED: 0

AWARDS/HONORS:

National - 1

International - 1

H-INDEX : 05

CITATIONS: 272

SUBJECTS TAUGHT DURING 2016-17

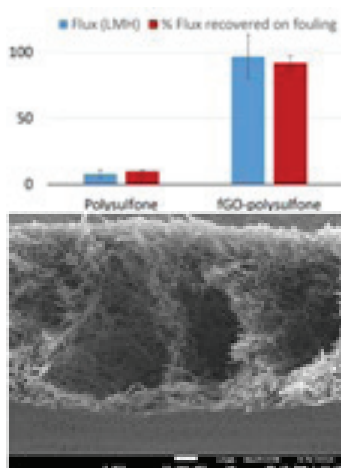
Advanced Momentum Transfer, Nanotechnology, Advanced Membrane Separation Processes, Chemical Engineering Laboratory

RESEARCH INTERESTS :

Membrane Separations, Catalysis, Sensors, Sustainability Engineering

HIGHLIGHTS OF RESEARCH WORK DONE AND IT'S IMPACT

MEMBRANES



Many operations in oils industry are solvent based wherein the solvent is recovered, usually by distillation at lower pressures. These vacuum based distillations are quite sensitive to leakages and lead to off spec products. Our endeavour is to develop pervaporation based membrane processes to replace or reduce the reliance of industry on vacuum distillation. Further, with increasing efforts towards zero-discharge, efficient use and reuse of water is paramount.

Use of membrane technologies such as ultrafiltration and reverse osmosis could significantly aid these efforts to reclaim water as well as carry out process separations more efficiently. The research focuses on developing new membranes for use in process liquids and gases separation including pervaporation, reverse osmosis, anti-fouling ultrafiltration membranes. Another focus of research in membranes is development of ultrathin barrier films for packaging applications. Currently, polymeric membranes are being developed using polymers such as polyethersulfone, polyvinylidene fluoride, cellulose acetate, etc. The membranes are then coated with high performance coating to achieve desired properties. The research is based both on developing better membranes and to improve the performance of the membranes with new coatings.

WASTE MANAGEMENT

Our group has been active in development of abatement techniques for industrial wastes such as copper smelter sludges, gypsum, fly ash, red mud, etc. We have recently developed a gypsum based water resistant plaster that is currently

being evaluated for potential commercialization. We are also working on developing a robust water free toilet systems for improving urban sanitation. Our concept of water free toilet was selected for award of Reinvent The Toilet Challenge (RTTC), a flagship initiative of DBT in collaboration with Bill and Melinda Gates Foundation. Graphene and graphene oxides

We are looking to develop formulations with antioxidant, anti-ultraviolet nanoparticles for use in cosmetics, self-healing plastics etc. We also looking to develop thin barrier films using inorganic nanoparticles, platelets for long term storage of materials for improved packaging. Carbon nanomaterials are also been investigated in the development of high performance lubricants. We are also working on developing catalysts based on carbon nanomaterials. Some of the catalysts developed in our labs can carry out selective oxidation of benzylic

alcohols to aldehydes without overoxidation to carboxylic acids, this route is not employed in the industry currently as further oxidation of products cannot be prevented in the processes currently used. Efforts are on to study the catalytic effect for other substrates such as fatty alcohols. We were able to replace Lewis acid catalyst used in antibiotics synthesis and perform the reaction at room temperature with high yields, with efforts being directed to carry out the reaction in absence of organic solvent.

SENSORS

There is an acute need for simple sensors for detecting adulteration in everyday food stuffs such as milk, oils, ghee, water, etc. If the general populace is armed with awareness, knowledge and tools to identify pollution and adulteration, menace of pollution and adulteration can be tackled more effectively. Our focus is on developing facile techniques for detection

of adulteration, pollutants, and unwanted chemicals. Our efforts are currently focussed on developing a facile, inexpensive sensor for detection of arsenic and pesticides in ground water, detection of milk and oil adulteration for mass usage.

RESEARCH STUDENTS CURRENTLY BEING SUPERVISED:

P.D.F. - 0, RA - 2
Ph.D. (Tech.) - 3, Ph.D.(Sc) - 2
M.Tech. - 8, M. Chem. Eng- 2
M.Sc - 0, Other (if any) – 0
Undergraduate Summer Fellows (if any) - 3
Teacher summer Fellows (if any) - 0

RESEARCH PUBLICATIONS:

National - 0, International - 02 (Peer-reviewed) - 08
Conference proceeding -
Books (if any) - 0

PATENTS:

International -
Indian : 2 (filed)

SPONSORED PROJECTS:

Government- 0
Private- 0

BEST REPRESENTATIVE PUBLICATION/PATENTS:

No.	Title and authors	Journal	Vol. No.	Pages	Year
1	Synthesis, characterization and application of γ -MnO ₂ /graphene oxide for the selective aerobic oxidation of benzyl alcohols to corresponding carbonyl compounds by MM Kadam, KB Dhopte, N Jha, VG Gaikar, PR Nemade*	New Journal of Chemistry	40 (2)	1436-1442	2016
2	Role of graphene oxide as a heterogeneous acid catalyst and benign oxidant for synthesis of benzimidazoles and benzothiazoles by KB Dhopte, RS Zambare, AV Patwardhan, PR Nemade*	RSC Advances	6 (10)	8164-8172	2016
3	Solvent assisted extraction of oil from Moringaoleifera Lam. Seeds by PR Bhutada, AJ Jadhav, DV Pinjari, PR Nemade, RD Jain	Industrial Crops and Products	82	74-80	2016



Dr. DIPAK VITTHAL PINJARI

B. Tech. (Polymer Engineering and Technology), M. Tech. (Polymer Engineering and Technology), Ph. D (Tech) in Chemical Engineering

DST-Inspire Faculty (Assistant Professor Grade)

FELLOWSHIPS/ MEMBERSHIPS OF PROFESSIONAL BODIES RESEARCH INTERESTS:

- DST-INSPIRE Assistant Professor Grade (April 2013 - March 18)
- CSIR Senior Research Fellow (2007-2012)

HIGHLIGHTS OF RESEARCH WORK DONE AND ITS IMPACT:

- **Solar Assisted Intensification of Chalcone : Advantage over conventional route**

Summary:

Present invention relates to the synthesis of Chalcone by the condensation of 4-methoxyacetophenone with 4-fluorobenzaldehyde by using Concentrated Solar Radiation (CSR) method, photochemical (UV radiation), thermal (600C) method and conventional (ambient temperature) method with Potassium hydroxide as a catalyst. The synthesized Chalcone derivative was characterized by using FTIR and LCMS to evaluate its performance. The results were found to be excellent over the photochemical, thermal

and conventional (ambient temperature) method in terms of saving in reaction time and total energy requirement. Through CSR method, we obtained 88% yield in 2 mins and conventional (ambient temperature) method, it took 4 hours to complete the reaction and obtained 85% yield. CSR method creates greener protocol toward organic synthesis.

- **Ultrasonically created rectangular shaped zinc phosphate nanopigment: Synthesis, Characterization and its anticorrosive performance**

Summary:

In the present study, the performance of zinc phosphate nanopigment (ZPn) embedded in epoxy resin meant for corrosion protection of mild steel has been investigated. A study was performed with epoxy resin at various concentrations of ZPn from 0 to 16 W/V % of the total paint composition. ZPn as well as the coatings were characterized using SEM, XRD, Particle size analysis and FTIR spectroscopy. Corrosion tests were conducted

using two different methods, such as dip test and salt spray test. Dip test was carried out in three different corrosive media such as acidic, basic and salty solutions. Salt spray test was carried out to create a corrosive attack on the coated samples in order to predict its suitability for use as a protective marine finish. It was found that synthesized ZPn when added to in epoxy resin provides better corrosion resistance at 12% W/V concentration levels.

- **Method of Preparation of Doped Zinc Phosphate nanocontainer and composition thereof**

Summary:

The present invention relates to a method for preparation of doped zinc phosphate nanocontainer. It further relates to synthesis of zinc phosphate nanoparticles and doping of N-octyl phosphonic acid on the surface of it to form zinc phosphate nanocontainer. Doped zinc phosphate nanocontainer was prepared by ultrasonication method. It further leads to doped zinc phosphate nanocontainer with high yield and enhancement

of corrosion inhibition. The present invention provides a method for manufacturing doped zinc phosphate nanocontainer, which can be indifferently have large application, ranging from doped zinc phosphate nanocontainer is good candidates for coating industry especially anti-corrosion due to its low solubility in water/ biological environment and water repellent activity. Doped zinc phosphate nanocontainer can be used as highly effective corrosion inhibitor with high yield production. The method according to the present invention for preparing zinc phosphate nanoparticles comprising precursor used as zinc chloride and potassium dihydrogen phosphate and reaction is carried out by ultrasonication method to form nanoparticles of zinc phosphate and then resultant nanoparticles of zinc phosphate doped with N-octyl phosphonic acid at various concentration to form nanocontainer of doped zinc phosphate. The method has advantage of less toxic, simple, high yield with less time of reaction.

- **Synthesis of zinc molybdate and zinc phosphomolybdate nanopigments by an ultrasound assisted route: Advantage over conventional method**

Summary:

In the present study, zinc

molybdate (ZM) and zinc phosphomolybdate (ZMP) nanoparticles of white color were synthesized using conventional and innovative sonochemical co-precipitation method without any emulsifier. This new class of pigment is environmental friendly which can be used as an alternative to lead, cadmium and chromium pigment which contain carcinogenic species. Zinc chloride and sodium molybdate precursors were used during synthesis of ZM, and ZMP nanoparticles synthesis was accomplished using sodium molybdate, zinc sulfate and potassium dihydrogen phosphate. The synthesized materials were characterized by XRD, FTIR and TEM to determine the structure, the general type of atom bound in the compound and the morphology of the formed compounds respectively. The rapid saturation of the Zn^{2+} ions takes place during the synthesis of ZM and ZMP nanoparticles due to ultrasonic irradiation, leading to a faster nucleation of ZM and ZMP nanoparticles with improved solute transfer rate. The average particle size is found to be significantly lower in case of ultrasound assisted synthesis compared to conventional precipitation method. The possible reasons are, improved solute transfer rate and rapid nucleation in the presence of cavitations generated by ultrasonic irradiations.

- **Intensified Release of Benzotriazole from Layer-by-Layer Assembled Zinc Molybdate Nanocontainers: Release Kinetics**

Summary:

In the current study, synthesis of zinc molybdate (ZM) using sonochemical precipitation method and ZM nanocontainer with the layer by layer doping of oppositely charged groups on the exterior of ZM nanoparticles was accomplished. In order to achieve compatibilization of ZM nanoparticles with polymers, the synthesized ZM nanoparticles were surface modified with a Myristic acid (MA). The loading of corrosion inhibitor (benzotriazole) was carried out in between two layers of polyelectrolyte i.e. polyaniline and polyacrylic acid. The mean particle size of sonochemically synthesized ZM nanoparticles was found less than 100 nm, which is attributed to micromixing and faster nucleation rate caused by acoustic cavitation. Results of XRD, PSD, FTIR, zeta potential and TEM analysis reports the successful formation of the layered structure of ZM nanocontainer particles with ZM nanoparticles at the core. The release rate of benzotriazole in water as a function of time at various pH values was quantitatively estimated using UV-vis spectroscopy. The effect of pH on responsive

release of benzotriazole form ZM nanocontainers was investigated. Different semi-empirical models were examined to predict the release mechanism of the benzotriazole. These results signify the use of ZM nanocontainer in the multifunctional anticorrosion coating formulations.

- **Synthesis of Molybdenum disulphide by using ultrasound and conventional method: Comparison of effect of Calcination temperature on crystal properties of Molybdenum disulphide.**

Summary:

In the present study Molybdenum disulphide (MoS₂) was synthesized by using ultrasound and conventional method. Synthesis of MoS₂ takes three steps; ultrasonically and conventionally synthesized MoS₂ was calcined in a muffle furnace at temperatures ranges from 150 °C to 650 °C in equal intervals of 100 °C to observe the changes in crystal structure and absorbance under UV-Visible light. Synthesized MoS₂ samples were characterized using XRD, SEM, elemental analysis and FTIR spectroscopy. It was found that crystallinity of MoS₂ synthesized by using ultrasound method was increased significantly along with major increase in absorbance under UV light than MoS₂ synthesized by using conventional method.

- **Ultrasound assisted manufacturing of paraffin wax nanoemulsions: Process optimization**

This work reports on the process optimization of ultrasound-assisted, paraffin wax in water nanoemulsions, stabilized by modified sodium dodecyl sulfate (SDS). This work focuses on the optimization of major emulsification process variables including sonication time, applied power and surfactant concentration. The effects of these variables were investigated on the basis of mean droplet diameter and stability of the prepared emulsion. It was found that the stable emulsion with droplet diameters about 160.9 nm could be formed with the surfactant concentration of 10 mg/ml and treated at 40% of applied power (power density: 0.61 W/ml) for 15 min. Scanning electron microscopy (SEM) was used to study the morphology of the emulsion droplets. The droplets were solid at room temperature, showing bright spots under polarized light and a spherical shape under SEM. The electrophoretic properties of emulsion droplets showed a negative zeta potential due to the adsorption of head sulfate groups of the SDS surfactant. For the sake of comparison, paraffin wax emulsion was prepared via emulsion inversion point method and was checked its intrinsic stability. Visually, it was found that the emulsion

get separated/creamed within 30 min. while the emulsion prepared via ultrasonically is stable for more than 3 months. From this study, it was found that the ultrasound-assisted emulsification process could be successfully used for the preparation of stable paraffin wax nanoemulsions.

- **Development of Smart Nanocontainers With A Zinc Phosphate Core and A pH-Responsive Shell for Controlled Release of Imidazole**

Summary:

A simple and flexible method has been developed to fabricate reversibly switchable nanocontainers (by layer by layer assembly) using zinc phosphate (ZP) nanoparticles as a core material and subsequent deposition of oppositely charged species of polyelectrolyte (polyaniline and polyacrylic acid) and organic corrosion inhibitor (imidazole). Imidazole was entrapped between polyaniline (PANI) and polyacrylic acid (PAA). The PAA nanovalve can control the access of imidazole molecules to and from the nanocontainers. The average particle size of the synthesized nanocontainer was found to be in the range of 250–500 nm. X-ray diffraction (XRD), particle size analysis (PSA), zeta potential, and fourier transform infrared spectroscopy (FTIR) analysis confirms the successful formation of the layered

structure of nanocontainers. UV-vis spectroscopy was used to analyze the release rate of imidazole in media of different pH as a function of time. This core-shell nanostructure can have potential applications in corrosion inhibition paint formulation.

PUBLICATIONS (PEER REVIEWED) SO FAR: 55

PATENTS : 06

CONFERENCE PROCEEDINGS/PAPERS:

SEMINARS/LECTURES/ ORATIONS DELIVERED: 14

Ph.D.S AWARDED AS SINGLE/ CO-GUIDE: 01

MASTERS AWARDED AS SINGLE/ CO-GUIDE: 06

H-INDEX : 18

CITATIONS: 923

SUBJECTS TAUGHT DURING 2014-15

Introduction to Polymer Engineering, Pharmaceutical Engineering.

RESEARCH INTERESTS :

Sustainable Engineering,
Cavitation Technology,
Nanomaterials, Polymer and
Paints, Anticorrosion Coatings

RESEARCH STUDENTS CURRENTLY WORKING :

P.D.F.- 0

RA - 03

Ph.D. (Tech.) - 04

Ph.D.(Sc) - 02

M.Tech. -07

M.Chem.Eng -01

M.Sc -

Others (if any) -

RESEARCH PUBLICATIONS:

International- 60

National- 03

Peer-reviewed-

Conference Proceeding- Nil

Books- 04

PATENTS:

International - Nil

Indian - 06

SPONSORED PROJECTS:

Government- 01

Private- 07

PROFESSIONAL ACTIVITIES (MEMBERSHIP OF IMPORTANT COMMITTEES): Nil

SPECIAL AWARDS/ HONOURS:

- **INAE Young Engineer Award 2016** by The Indian National Academy of Engineers, New Delhi, India
- **Finalist, INSA Medal for Young Scientist 2015 and 2016**
- **Finalist, NASI Young Scientist Awards 2014 and 2015**
- Awarded **Fulbright OLF Award 2015** by OIE and CIES (State Departments, US Federal Government, Washington, USA)
- Awarded **Young Engineers Award 2014-2015** by The Institution of Engineers (India)
- Awarded **Wipro Earthian Award 2013** by Wipro foundation, Bangalore (India)
- **Young Associate, Maharashtra Academy of Science (2013)**
- Awarded **M. P. Chary Memorial Award 2013** for research and technological contribution (below 35 years). The M P Chary Memorial Award was constituted by Indian Institute of Chemical Engineers (IChE), India.
- Selected for the **Swiss Government Excellence Scholarship program 2013-2014.**
- Awarded **Dr. K. H. Gharda Best PhD Thesis Award 2013.**
- Awarded **Ambuja Cement Best Thesis Award 2013.**
- Awarded Department of Science and Technology **Inspire Faculty Award 2013-2018.**
- Awarded University Grant Commission, Government of India **D S Kothari Postdoctoral Fellowship 2013-2016.**
- Selected for **Fulbright Nehru Science Postdoctoral Program 2013-2014.** (Place: Georgia Institute of Technology, Atlanta (USA))

SUPPORT STAFF:



ARUN JOGI
Ph. D. (TECH.)
Junior Analyst



VISHAKHA THAKUR
M. SC.
Senior Technical Assistant



SUDHIR MAHADIK
Laboratory Assistant



SACHIN DHADVE,
B. SC.
Laboratory Assistant



RAMESH TONDLER
Laboratory Attendant



R. L. KALBHATE
Laboratory Attendant



S. A. PARAB
Laboratory Attendant

STUDENT INFORMATION

UNDERGRADUATE STUDENTS' SEMINARS/PROJECTS/HOME PAPERS :

Seminars (2017-18)

No.	Name of the Student	Topic
1	Ghuge Sejal	Aromatherapy in Personal Care Products
2	Charde Jaya	Cosmeceuticals
3	Patil Aniket	Preparation and Properties Evaluation of Biolubricants Derived from Non-edible vegetable oil
4	Daswani Vinay	Customized Hair care products
5	Dupare Shubham	Lipid Based Drug Delivery Systems.
6	Roy Noyonika	Biosurfactant applications
7	Jadhav Sanket	Graphene: a new emerging lubricant
8	Kanade Harshal	Sugar Based Surfactants as an alternative to Synthetic Ones in Personal Care Products
9	Khanolkar Rigved	The role of micro-algae as a novel source for production of Very Long Polyunsaturated Fatty Acids (VL-PUFA)

10	Prabhu Prathamesh	Extraction of essential oils by Phytonic process
11	Shirsekar Afrid	Experimental study of Ethylene Glycol based Nanofluids using metallic oxide (Al ₂ O ₃) nanoparticles as new coolant for car radiators
12	Ramchandra Bharti Radhika	Gamma Linolenic Acid: Sources, nutritional benefits and applications in nutraceuticals
13	Patil Shalin	Desulphurization using Surfactants

PROJECT / HOME PAPER (2017-18)

No.	Name of the Student	Topic
1	Ghugse Sejal	Development of Milder and Sulphate Free coco-surfactants and Herbal Ingredients based Shampoo and Body Wash Products
2	Charde Jaya	Development of Milder and Sulphate Free coco-surfactants and Herbal Ingredients based Shampoo and Body Wash Products
3	Patil Aniket	Manufacture of Dibasic Acids and Perfumery Chemicals by Alkali Fusion and Pyrolysis of Castor Oil
4	Daswani Vinay	Flavoured Sugar Cubes
5	Dupare Shubham	Surfactants and their application in textile processing
6	Roy Noyonika	Natural fibers for oil spill clean up
7	Jadhav Sanket	Extraction and purification of EPA/DHA from fish oil.
8	Kanade Harshal	Manufacture of Dibasic Acids and Perfumery Chemicals by Alkali Fusion and Pyrolysis of Castor Oil
9	Khanolkar Rigved	Development of Mosquito Repellent Formulation and Products using Natural Oils
10	Prabhu Prathamesh	Optimization of bio-diesel formation using waste cooked oil
11	Shirsekar Afrid	Optimization of bio-diesel formation using waste cooked oil
12	Ramchandra Bharti Radhika	Extraction and purification of EPA/DHA from fish oil.
13	Patil Shalin	Development of Mosquito Repellent Formulation and Products using Natural Oils

POST GRADUATE STUDENTS' SEMINARS/PROJECTS :

Seminars (2017-18)

No.	Name of the Student	Topic
1	Lembhe Akshay	Chemical Modification of Functional Fluids.
2	Kanchana Ramesh	Super Hydrophilic Polymers & Surface Modification To Achieve Super Hydrophilicity.
3	Kolamkar Radhika	Antioxidants & Their Therapeutic Implications.
4	Pawar Prasanajit	The Prospect Of Bio - Lubricant As Alternative In Automotive Application.
5	Warrier Preethi	A General Introduction To Curcumin.
6	Vaidya Madhav	Utilization Of Oil Cake
7	Bakhal Meera	Mango Oil And Its Applications
8	Nair Aishwarya	Biotechnology And The Fats & Oil Industry.
9	Gaikwad Divya	Development Of Polymeric Lubricants.

10	Patil Deepashri	Silicone Surfactants.
11	Deshpande Shriya	Sensors Based On Surfactant Capped Nanomaterials.
12	Palaspagar Kapil	Doped Titanium Oxide Catalysts For Oleo - Chemicals Synthesis.
13	Dethe Shalaka	Niger Seed Oil: Various Extraction Methods.
14	Roogi Abhishek	Fluorinated Surfactants.
15	Shaikh Mohd.Aizaz	Studies In Reactive Distillation As Mechanism For Manufacture Of High Performance Oleochemicals.

M. TECH. (2017-18)

No.	Research Scholar	Previous Institution	Project	Supervisor
1	Lembhe Akshay	DBATU, Lonere	Chemical Modification Of Oleochemicals And Its Application In Lubricant Industry.	RDK
2	Kanchana Ramesh	AISSMS, College of Engineering, Pune	Efficient Oil Water Separation Using Carbon Nanomaterials.	PRN
3	Kolamkar Radhika	Datta Meghe College of Engineering, Airoli, Navimumbai.	Extraction, Characterization And Encapsulation Of Moringa Oleifera Seed Oil And Its Application In Nutraceutical And Cosmetic.	JSW
4	Pawar Prasanajit	DBATU, Lonere	Studies Of Extraction, Characterization, And Value Added Products From Calotropis Procera Seed Oil.	CSM
5	Warrier Preethi	SIES – Graduate School of technology, Mumbai	Extraction, Characterization And Potential Applications of Curcuma Longa.	PRN
6	Vaidya Madhav	UDCT, Aurangabad	Studies In Hydrogenation Of Vegetable Oils And Its Application.	APP
7	Bakhal Meera	Vasantrao Naik Marathawada Agricultural University, Parbhani	Value Added Products From Dateseed Oil And Its Application's.	CSM
8	Nair Aishwarya	SIES – Graduate School of technology, Mumbai	Development Of Stable Formulation Of Ginger Oleoresin For Application In Microemulsion Bases Topical Drug Delivery.	CSM
9	Gaikwad Divya	LIT, Nagpur	Synthesis Of Grease From Waste Wax	DVP
10	Patil Deepashri	ICT, Mumbai	Studies In Interfacial Science: Dynamics & Stabilization Of Foam And Its Application In Detergent Laundry Powder Formulation.	JSW
11	Deshpande Shriya	D. Y. Patil College of Engineering & Technology, Kasaba Bawada, Kolhapur.	Surfactants Assisted Synthesis Of Zinc Oxide Nanomaterials And Graphene Nanocomposites For Explorations In Cosmetics And Ammonia Sensor Application	RDK

12	Palasagar Kapil	Bharti vidyapeeth College of Engineering, Kharghar, Navimumbai	Production Of Multipurpose Grease From Sustainable Feedstock	PRN
13	Dethe Shalaka	K K Wagh College of Food Science & Technology, Nashik	Niger Seed: Oil Extraction And Its Characterization With Application In Food Industries.	DVP
14	Roogi Abhishek	ICT, Mumbai	Synthesis Of Branched Oleo- Chemicals & Study Of Their Properties	APP
15	Shaikh Mohd. Aizaz	Datta Meghe College of Engineering, Airoli, Navimumbai	Green Synthesis Of Cationic And Amphoteric Surfactants And Their Application.	RDK

RESEARCH PROJECTS

Ph.D. (TECH)

No.	Research Scholar	Previous Institution	Project	Supervisor
1	Mesrti Rohan	ICT, Mumbai	Surfactants Based on Renewable Sources through sustainable technology	APP
2	Jadhav Jagruti	ICT, Mumbai	Biobased Surfactant Fermentative Production, Purification and Development of Application	APP
3	Kirti Datir	ICT, Mumbai	Product and process Development of Amphiphilic Molecule and its Application	APP
4	Patil Harshada	NMU, Jalgaon	Fermentative Production and Downstream Processing of Microbial Surfactants	APP
5	Parekh Rutu	ICT, Mumbai	Synthesis and application of sustainable surfactants from renewable resources	APP
6	Parmar Ronak	ICT, Mumbai	Biofuel And Natural Wax Related Products	APP
7	Wankhede Dharmendra	ICT, Mumbai	Studies in Cost Effective Terpenes Based on Fragrance and Flavor Materials	APP
8	Pavan Paraskar	NMU, Jalgaon	Novel Renewable Lipids- based Polyurethanes: Synthesis, Characterizations and High Performance Applications	RDK
9	Harshal Patil	NMU, Jalgaon	Formulation and Application of Laser Printing Ink Jet Toners	RDK
10	Kulkarni Shivani	LIT, Nagpur	Synthesis of novel speciality surfactants and exploration of their application In health care and personal care industries	RDK
11	Jadhav Pravin	BATU, Lonere	Removal of Diglycidyl ester from crude palm oil	RDK

12	Fakir Asma	ICT, Mumbai	Studies on Nutraceuticals Oils and their Applications	JSW
13	Wanjari Nikita	ICT, Mumbai	A study on Vegetable Oilseed Meal Applications for Surfactants, Nutraceuticals and Cosmeceuticals	JSW
14	Deshpande Ratnakar	LIT, Nagpur	Enzymatic Intetensification to form Saturated Lipids	JSW

Ph.D. (SCIENCE)

No.	Research Scholar	Previous Institution	Project	Supervisor
1	Rajput Yogeshsing	NMU, Jalgaon	Green synthesis of Carbohydrate and Fat based Specialty Surfactants for development of milder and Sulphate free Skin, Hair and Oral Care Cosmetic Products.	RDK
2	Kedar Rahul	NMU, Jalgaon	Studies in Nutraceuticals, Lipid excipient and Topical pharma bases from vegetable oil	RDK
3	Girase Chetan	NMU, Jalgaon	Synthesis of cationic Polymers and their applications	RDK
4	More Snehal	Mumbai University	Synthesis of Structured Lipids and their Applications	JSW
5	Patil Pramod	NMU, Jalgaon	Structural Modifications of Fatty Materials	APP
6	Mondal Mithun	Nagpur Univeristy	Nitrogen Derivatives of Fatty Materials	APP
7	Chiplunkar Pranali	Mumbai University	Value Addition to the Byproducts from Vegetable Oil Industry	APP
8	Kadam Amol	Mumbai University	Studies in Isolation and Purification of Bioactives from Natural Spices	APP
9	Daware Sachdeo	Pune Univeristy	Chemical Strategies for Derivatization of Natural Products	APP
10	Shelke Prem	Marathwada University Aurangabad	Bioactives from Selected Spices: Separation and Applications	APP
11	Dalvi Ankush	Amaravati University	Studies in Oleoresins from Spices	APP
12	Tiwari Richa	Mumbai University	Synthesis of Dendrimer for Catalysis and Chromatographic Separation	APP
13	Singh Priya	Mumbai University	Synthesis and Applications of Amino Sugar Surfactants: A Novel Green Surfactant	APP
14	SK Aminul Islam	SK Porwal College, Nagpur University	Molecular Switch	PKK
15	J. Pradeepruban	St. Joseph College, Bharathadasan University, Trichy	Synthesis and Applications of Spiropyran Derived Molecules on Materials for Photoswithable Catalyst	PKK

Instrumental Facilities



Turg-O-Tometer



Spray Drier



Homogeniser



Rancimat



HP-TLC



Autoclave Reactor

Instrumental Facilities



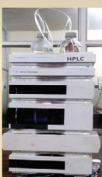
Krusz Tensiometer



Kjeldahl



GC



HPLC



Tintometer



FTIR Spectrophotometer



UV Spectrophotometer



Rotary Evaporator



Reflectance meter

Instrumental Facilities

Biotechnology Research Facilities



Laminar Flow



Autoclave



Four Ball Test



Karl Fisher



Incubator



Fermentor



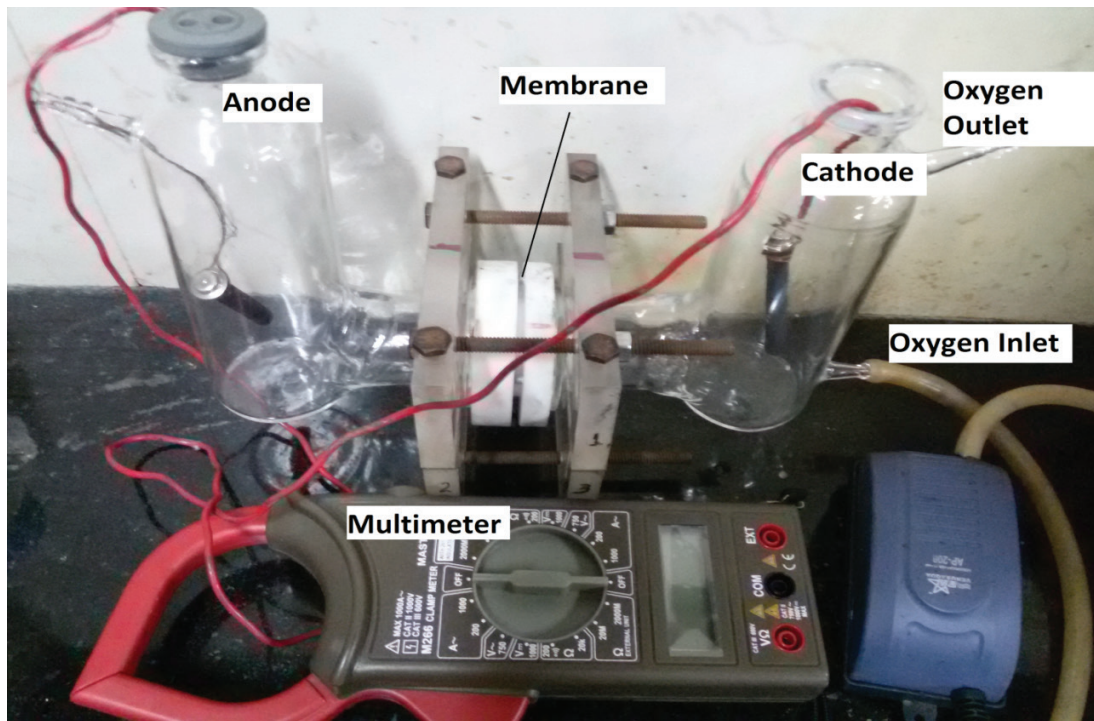
Viscometer



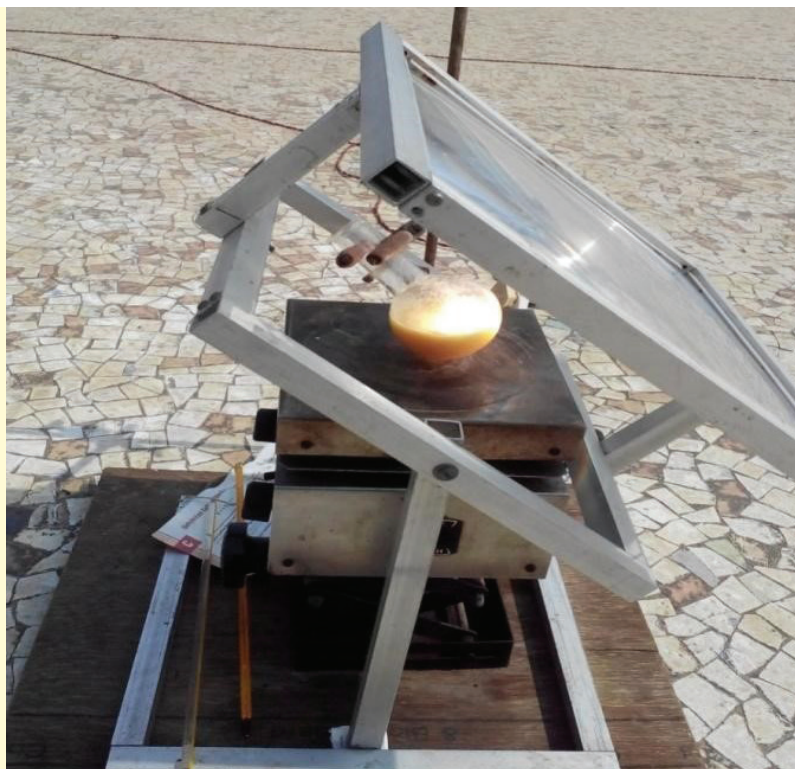
Hydrodynamic Cavitation Set-up



Acoustic cavitation set-up



Microbial fuel cell set-up



Solar set-up

RESEARCH GROUP



Left to Right: Mr. Deepak Kapile, Mr. Rameshwar Karad, Mr. Prateek Bhishma, Mr. Md. Kaurar, Mr. Deepak Sonawane, Mr. Rohan Mestri, Dr. Amit P. Pratap, Ms. Pranali Chiplunkar, Ms. Pranali Chiplunkar Ms. Deepika Mahale, Ms. Shruti Joshi, Ms. Jagruti Jadhav, Ms. Harshada Patil, Ms. Rutu Parekh



*Front Row: Left to Right: Prof. R. D. Kulkarni, Dr. Amit P. Pratap, Dr. Jyotsna Waghmare
Back Row: Left to Right: Dr. Arun Jogi, Mr. Madhav Vaidya, Mr. Abhishek Roogi, Mr. Aizaz Shaikh, Ms. Rutu Parekh, Ms. priya Singh, Mr. Prasannajit Pawar, Mrr. Keshav Bichkule*



*Front Row: Left to Right: Ms. Pooja Khairnar, Ms. Soumya Agrawal, Ms. Jagruti Jadhav, Ms. Parul Thakur, Dr. Chandu Madankar, Ms. Priya Singh, Ms. KARishma Datir, Mr. Deepak Sonawane
Back Row: Left to Right: Mr. Deepak Kapile, Ms. Harshada Patil, Ms. Pranali CHiplunkar, Mr. Rohan Mestri, Mr. Suraj Sonje, Ms. Yogita Pal, Ms. Swapna Shahane*



Top row (from Left to Right): Amit Kharat, Bhushan Sinker, Gandhar Bhole, Ashish Gadhave.
Middle Row (from Left to Right): Pawan Lone, Aniket Shishupal, Harsh Jadhav, Swatej Dhage, Swapnil Mane.
Bottom Row (from Left to Right): Swati Nakhate, Rakhi Patil, Dr. Jyotsna Waghmare, Asma Fakir, Snehal More, Nikita Wanjari.