“EXTRACTION OF PREBIOTICS FROM SELECTED PLANT SAMPLE AND IT’S ANALYSIS AND EFFECT ON NORMAL GUT FLORA AND PATHOGEN”

A REASEARCH PROJECT REPORT

SUBMITTED TO

DEPARTMENT OF MICROBIOLOGY,

Pune District Education Association's

WAGHIRE COLLEGE OF ARTS, COMMERCE AND SCIENCE,

SASWAD, PUNE

Affiliated to

SAVITRIBAI PHULE PUNE UNIVERSITY, PUNE

For The Partial Fulfilment of Master of Science Degree

In the Subject of Microbiology

Under the Faculty of Science and Technology

PRESENTED BY

MISS. RUTUJA RAJENDRA KONDE

MISS. RAKSHA GOPALKRISHNA PATIL

(M.SC-II)

UNDER THE GUIDANCE OF

ASST. PROF. MANASI M. JOSHI

Department of Microbiology

2023-2024

CERTIFICATE

This is to certify that **Miss. Rutuja Rajendra Konde , Raksha Gopalkrishna Patil.** Final year student of M.Sc (Microbiology), Waghire College Saswad,Pune. She has successfully completed the dissertation entitled, "EXTRACTION OF PREBIOTICS FROM SELECTED PLANT SAMPLE AND IT'S ANALYSIS AND EFFECT ON NORMAL GUT FLORA AND PATHOGEN" For the partial fulfillment of degree of master of science, (microbiology) of academic year 2023-2024, Carried out by candidate herself supervision and guidance of **Asst. Prof. Manasi M. Joshi.**

Asst. Prof. Manasi M. Joshi

(Guide)

Asso. Prof. Sonwane H. V

Head of Department)

Internal Examiner

External Examiner

CANDIDATE DECLARATION

We the undersigned hereby declare that the project work entitled, “EXTRACTION OF PREBIOTICS FROM SELECTED PLANT SAMPLE AND IT’S ANALYSIS AND EFFECT ON NORMAL GUT FLORA AND PATHOGEN” presented in the dissertation has been carried out under the guidance and direct supervision of professor Mrs MANASI M. JOSHI mam. We have collected the literature required for the project and carried out the experiments and presented data according to standard publication guidelines. We have not submitted the review presented here at any other university for the award of any degree.

MISS. RUTUJA RAJENDRA KONDE

MISS. RAKSHA GOPALKRISHNA PATIL

DATE:

PLACE:

INDEX

ACKNOWLEDGEMENT

We, the members of " Extraction, Screening and Analysis" project, would like to extend our deepest gratitude to everyone who contributed to the success of this project. This journey has been one of collaboration, learning and mutual support, culminating in a project that we are proud to present.

First and foremost, we express our sincere thanks to our project supervision, Manasi M. Joshi, whose guidance, expertise, and patience were instrumental in steering this project towards its completion. Her insights end feedback were invaluable, and her encouragement motivated us to excel.

We are also deeply grateful to Waghire College' faculty and staff, particularly those in the Microbiology Department, and most sincere thanks to our HOD, Prof. Hemlata Sonawane mam for providing us with the resources and environment conductive to our research and development efforts. Their assistance in navigating academic and logistical challenges was crucial.

We would also like to acknowledge the support of our families and friends, who provided encouragement, understanding, and motivation throughout the duration of this project. Their belief in our abilities fueled our determination and commitment.

Lastly, we extend our gratitude to each other, the members of our project Rutuja R. Konde and Raksha G. Patil. This project was a collaborative efforts that required dedication, compromise.

ABBREVIATION:

Mg - Milligram

Ml- Mililiter

µg - Microgram

MRS - De Man–Rogosa–Sharpe

MH -Mueller hinton agar

NB -Nutrients broth

D/W- Distilled water

Conc. - Concentration

Lab - Lactobacillus

Pre and pro - prebiotic and probiotic

µl - Microliter

R. F - Retardation or retention factor.

pH - Potential of hydrogen

Fig- Figure

Tab - Table

Abs - Absorbance

nm- Nanometer

DNSA -Dinitrosalicyalic acid

Std- Standard

Rt - Room temperature

1 N - one normal

ABSTRACT:

Extraction and analysis of prebiotics from selective plants. In this study five plant samples and their parts from local area were investigated for their prebiotic properties. The fresh, ground sample were extracted with 50% methanol and water at room temperature on magnetic stirrer based on extract yield and prebiotic properties out of five, two samples are selected as potential source of prebiotic. This include fruit of Tamarind (*Tamarindus indica*) and curry leaves (*Murraya koenigii*). In this investigation, isolation of *Lactobacillus* genus was done and used as a source of probiotics organisms. Selected sample were screened for antimicrobial activity. Reducing sugar content, total carbohydrate content was determined by DNSA and Phenol-sulfuric acid test respectively . *Tamarindus indica* and *Murraya koenigii* shows good prebiotic activity and can be consumed as prebiotic food.

Key words: Prebiotic, probiotic, Tamarind, Curry leave., LAB, DNSA,

1. INTRODUCTION:

Nowdays ,human lifestyle, diet and physical activity are changed. Individuals don`t have time for their health maintenance. In this busy world people consume wide variety of foods like junk food and they came away from our traditional food. In our traditional diet healthy and nutritious food was consumed, but in actively moving or busy world diet get changed and they need less physical activity. The biodiversity of the human intestinal flora is more likely affected by this lifestyle, this results in changes in its microbial composition that causes various health issues such as high blood pressure, cardiovascular diseases, diabetes, intestinal inflammation. Use of prebiotic might be a possible way to solve this situation. Many investigations on prebiotics have confirmed that prebiotics are clinically effective in increasing the intestinal flora.

Nutraceuticals and function food (NFF) are increasing in popularity as a tool of the consumers for management of their health and wellness. Pro, pre and symbiotics are an important group of NFF shown to be effective in modulating gastrointestinal diseases and other elements. Prebiotics polysaccharides and oligosaccarides that can withstand digestion and absorption in small intestine, but can be selectively fermented by probiotic bacteria native to the large intestine. They consist of short chain carbohydrates, principally oligosaccharides, e.g. fructooligosaccharides (FOS), GOS, and polysaccharides'. Insulin (Gibson, 1995; Panitantum,2004). The colonic fermentation of prebiotics enhance the growth of probiotic such as *Bifidobacteria*, *Lactobacillus*, *Eubacteria* (Gibson and Roberroid 1995; Cummings., et.al.2001), but not of pathogens, which causes gastrointestinal diseases. The fermentation of prebiotics by the probiotic bacteria improve host health, by enhancing the absorption of minerals such as Ca,Mg,Fe and producing compound capable of preventing compound capable of preventing colon cancer.

Prebiotics occurs naturally in fruits, and vegetables e.g. onion, garlic,banana, and small amounts are found in the forms of free sugars or glycoconjugate in human milk and animal. Recently, dragon fiesh has been reported to be a sourse of oligosaccharides, which is a candidate prebiotic (Wichienchot et.al .,2010). Prebiotics may also be synthesised from polysaccharides, such as starch or sugars using appropriate enzymes ; e.g. GOS may be synthesized from lactose with beta-galactosidase; FOS may be produsedfrom polymerisation of fructose monomers however consumers preference towards natural products or ingredients has encouraged the continuing search for viable natural sourses for prebiotics. This study describes study on ^5 plants parts and vegetables and theire parts, all found and aquired in local areas of Saswad as potential sourse of prebiotics.

Prebiotics are non-digestible nutrients that enhance the growth of beneficial intestinal microflora to improve host health (Ezeonu, I.M and Ukwah, B. N., 2009.). Where as probiotics are live microbes that beneficialy affect the host therefore the prebiotics supports probiotic growth. (Akhter et.al. 2015.). Phenolic compounds in plant samples selectively promote probiotic growth and inhibit pathogenic bacterial growth.Probiotic organism have role in maintaining the function and strucure of the intestine. Probiotics also helps in digestion ,fermentation, inhibition of pathogenic organism ,provision of enzymes,and amino acid ,also helps in developing the immunity. In local markets various types of probiotic foods that is food containing live microflora ,for example.,yoghurt are available. But individuals are suspecious about consuming live microorganism regardless of the profound benefits , so prebiotics are on high demand.

To the best of our knowledge ,poor study has evaluated the prebiotic and antimicrobial activity of the Murraya koenigii and Tamarinda indica. Therefore, this study evaluated the potential of aqueous extract as prebiotic by determining the MIC , MBC , Prebiotic activity .Prebiotics affect not only the growth of beneficial bacteria but also health and growth performance of animals.(Ringo et.al .,2010) . For example ,the addition of prebiotic honey in Penaeus vannamei diet increased their total weight and reduced the feed conversion ratio (Fuandila et al.,2020) . Furthermore ,supplementation of prebiotics and probioitcs in the diet of P.vannamei resulted in improved growth comapred with the use of a prebiotic or probiotic alone (Arisa et al .,2015). The extract of curry leaves and tamarind fruit has antimicrobial properties that inhibit the growth of some bacteria , including pseudomonas ,S.aureus, E.coli , but not that of other bacteria such as, S.typhi, bacillus .

Prebiotics as functional foods

Functional food or medicinal food is any fresh or processed food claimed to have a health-promoting and/or disease-preventing property beyond the basic function of supplying nutrients. Prebiotics and probiotics are the food ingredients which fit into this functional food definition and in which food industries are interested. Probiotics are live microbial feed supplements added to appropriate food vehicles, whereas prebiotics are dietary carbohydrates that have a selective metabolism in the colon and serve to increase number of probiotics such as lactic acid-producing bacteria. Including bifidobacteria. In recent years, increasing attention has been focused on the possible beneficial effects of prebiotics, such as enhanced resistance to invading pathogens, improved bowel function, prevention of colon cancer, lipid lowering action, improved calcium and iron bioavailability (Bruzzese et al 2009, Bosscher etal 2003, Ferguson & Philpott 2007). Since the search for functional foods or functional food ingredients is one of the leading trends in today's food industry. The market values and biological potential of both probiotics as well as prebiotics are enormous.

Why prebiotics?

Currently, changed lifestyles as well as the increased use of antibiotics are significant factors challenging the preservation of a healthy intestinal microflora. The concept of probiotics is to restore and uphold microflora, which are helpful to the human body. Probiotics are found in a number of fermented dairy products, infant formulae, and dietary supplements. In the presence of prebiotics, which are non-digestible food ingredients favourable for probiotic growth, their survival in the intestine is ameliorated (Broekaert & Walker, 2006).

Origin of the term :

A prebiotic was first defined by Gibson (1995), a pioneer in the field of prebiotics, as 'non-digestible food ingredient that beneficially affects the host by selectively stimulating the growth and/or activity of one or a limited number of bacteria in the colon, and thus improves host health. This was reframed by him in 2004 as: A prebiotic is a selectively fermented ingredient that allows specific changes, both in composition and/or activity in the gastrointestinal microflora that confers benefits. Upon host wellbeing and health" (Gibson et al, 2004). However, a prebiotic quality has been. Attributed to many food components without due consideration to the criteria required.

During Recent years, almost every food oligosaccharide and polysaccharide (including dietary fibre) has been claimed to have prebiotic activity, but not all dietary carbohydrates are prebiotics. There is therefore, a need to establish clear criteria for classifying a food ingredient as prebiotic. Such Classification requires a scientific demonstration that the food component or ingredient is prebiotic.

Criteria for classifying a food ingredient as prebiotic :

a. Resists digestion, absorption and adsorption predvertisement

b. Fermented by the microflora colonising the gastrointestinal system of the host

c. Selectively stimulates the growth and/or the activity of one or a limited number of bacteria within the gastrointestinal system of the host (Gibson et al 2004),

d. Not metabolized by non-probiotic gut flora such as Bacteriodes sp. And Escherichia coli (Fedorak & Madsen, 2004).

Although, the first two criteria may be satisfied by some biomolecules, the third and the forth criteria are difficult to fulfil. This requires a consideration of fermentable substrates in the human diet, availability for the microflora and selective metabolism. It needs anaerobic sampling followed. By reliable and quantitative microbial analysis of a wide variety of microbial genera i.e. total aerobes, total anaerobes, bacteroides, bifidobacterium, clostridium, enterobacteria, eubacterium and lactobacillus (Gibson, 2004).

Benefits from prebiotics :

1. Enhanced resistance to invading pathogens
2. Improved bowel function
3. Anticancer properties (colon)
4. Lipid lowering action and beneficial for metabolic syndrome
5. Improved Ca & Fe bioavailability, vitamin supply and osteoporosis management

4. Probiotics :

Probiotics, the live microorganisms, which when administered in adequate amounts confer several health benefits. These bacteria can also alleviate the symptoms of disease-related metabolic disorders. Table I gives the commonly used microorganisms as probiotics.

Health benefits by probiotics :

1. Providing nutrients and cofactors
2. Successfully competing with pathogens
3. Stimulating host immune responses by producing specific polysaccharides.
4. Managing lactose intolerance
5. Prevention of colon cancer
6. Lowering cholesterol
7. Lowering blood pressure
8. Improving immune function and preventing infections
9. Reducing inflammation
10. Improving mineral absorption prevents harmful bacterial growth under stress

Table-

Lactobacillus acidophilus	Lactobacillus delbrueckii	Bifidobacterium bifidum
Lactobacillus casei	Lactobacillus helviticus	Befidobacterium brevie
Lactobacillus lactis	Lactobacillus rhamnosus	Bifidobacterium longum
Sacharromyces boulardii	Lactobacillus plantarum	Enterococcus faecalis
Lactobacillus fermentum	Streptococcus thermophilus	

5. Prebiotics vs. Probiotics

Prebiotics are the fibre type of ingredients, which trigger the growth of bacteria having favourable effects on the intestinal flora. Probiotics, however, are live micro-organisms contained in the food we eat. They remain intact throughout the digestive process and reach the large intestine. Some of the effects of prebiotics are indirect l.e. through the action of probiotics while some effects are direct. Both sets of benefits are valuable for our health wellness and can act symbiotically to provide numerous health benefits.

Since prebiotics are non-digestible fibre components of food, unlike live organisms of probiotic Preparations, they have lower risk of degradation and allergic reactions or problems of intolerance than probiotics. Prebiotic consumption without sufficient presence of healthy bacteria may not give favourable results and probiotic supplements without sufficient amounts of prebiotics as the substrates may not show fruitful outcomes. In fact, the benefits of consuming both prebiotics and probiotics are so strong that synbiotic products (products in which both a probiotic and a prebiotic are combined) are being developed as functional foods. (Nomoto 2005)

2. REVIEW OF LETERATURE:

Non-digestible food elements called prebiotics encourage the formation of lactic acid and bifidogenic bacteria in the gastrointestinal system. Prebiotics are usually made up of dietary fibers and oligosaccharides. Prebiotics provide numerous benefits for your health, including The prebiotics lactulose and polydextose are considered established, while lactitol, xylooligosaccharides (XOS), and isomaltooligosaccharides (IMO) are considered developing. The xylooligosaccharides (XOS), arabinoxylooligosaccharides (AXOS), and inulin-derived from chicory roots (FOS) from wheat bran demonstrated significant applicability (Sabater-Molina et al. 2009; Femia et al. 2010; Xu et al. 2009). Raffinose, maltodextrin, mannitol, maltodextrin, raffinose, lactulose, and sorbitol are also prebiotics with proven health properties (Yeo and Liong 2010; Vamanu and Vamanu 2010; Mandal et al. 2009).Whole grains high in resistant starch are thought to be prebiotic by nature and to have numerous health advantages when consumed. In healthy people, they are not absorbed in the small intestine; instead, short-chain fatty acids (SCHFA) are produced through fermentation by the colon's natural microbiota (Vaidya and Sheth 2010). Dietary fibers such as fenugreek gum, flaxseed gum, and oat β-glucan are fermentable to SCFAs, which suggests that they could be used as prebiotics to improve human health (Lin et al. 2011). Recently, it has been shown that yeast cell wall material rich in mannan oligosaccharides is a beneficial prebiotic.An alarming rise in morbidity and mortality has been observed in the past few decades due to poor diet, tobacco use, and alcohol intake. A increasing number of consumers are looking up to companies that manufacture prebiotics due to the growth in cases of degenerative diseases, cancer, diabetes, heart disease, and chronic obesity. Prebiotic products are dominating the nutraceutical market, capitalising on the public passion for low-carb, high-fiber diets. Two health supplement ingredients that are becoming recognised as viable prebiotic agents are First Leaf (FL), which is made up of blackcurrant extract powder, lactoferrin, and lutein and was developed by Four Leaf Japan Co. Ltd. in Japan, and Cassis Anthomix 30 (CAM30), which is also made up of blackcurrant extract powder and was developed by Just the Berries Ltd. in New Zealand. Rats fed CAM30 and FL showed a considerable increase in population size.Additionally, it showed a decrease in β-glucuronidase activity and an increase in β-glucosidase activity. According to Molan et al. (2010), these health advantages could make these items an excellent source of probiotics. Following 20 days of supplementing human subjects with wheat germ preparation Viogerm®PB1, there was a significant drop in the coliform population and pH, as well as an increase in the number of lactobacilli and bifidobacteria. According to Matteuzzi et al. (2004),

these findings demonstrated that the product Viogerm®PB1 has a prebiotic effect and may enhance host health. Glover et al. (2009) assessed the impact of supplementing with matured gum arabic (Acacia (sen) SUPERGUMTM) on the systolic blood pressure of both normal individuals and patients with diabetic nephropathy. For eight to twelve weeks, administering 25 g of SUPERGUMTM daily through diet had a notable positive impact.Pineiro et al. (2008) examined the advantages of prebiotics for food during a technical meeting called by the Food and Agriculture Organization of the United Nations (FAO). In order to ensure the safe use of prebiotics, a team of international experts developed a systematic methodology, set guidelines, and suggested criteria.

The current state of prebiotic research was to be summarized, and new prebiotic sources, production methods, and paths for future research were to be investigated by us.

3. MATERIALS AND METHODS:

The present investigation was carried out during the year 2023-2024 in the Waghire college Saswad, in department of Microbiology, Savitribai Phule Pune university, on isolation and characterization of gut microflora obtain from newborn stool sample. The bacteria culture we tentatively identified upto genus level based on their morphological and biochemical characteristics. The selected isolate further examined for their ability to utilize prebiotic.

ISOLATION AND CHARACTERIZATION OF LAB :

GLASSWARE AND APPARATUS-

All the glassware used in this study are clean with, 70% ethanol, before use sterilization of glassware and other apparatus were carried out by autoclaving at 121°c for 15 minutes.

COLLECTION OF SAMPLE

Newborn baby stool sample where collected from Chintamani Hospital's maternity ward of a 5 day old baby .The sample were randomly collect in a pack in sterile container and transporated immediately to laboratory and stored at 12-14°c for further study.

ISOLATION :

De Man Rogosa Sharp is a selective media used for LAB. The MRS agar and MRS broth were used for isolation , enrichment, cultivation of Lactobacillus species

For enrichment : Aprrox. 2gm newborn stool sample inoculated directly into the sterile 100 ml MRS broth,with 5 ml of mother milk as a complementary ingredient.

Procedure:

Then incubated broth at 37^{o} C for 48 hours, in an anaerobic atmosphere.

After 48 hours enriched broth is used for isolation.

A loopful of enriched broth is taken and streaked on sterile MRS agar plate by four quadrant method.

Then plates are incubated for 37^{o} C for 48 hours.

After 48 hrs morphological characteristics are noted and characterization is proceed.

IDENTIFICATION OF LAB

Selected isolates were examined from the colony morphology , cell shape and Gram character as per standard procedure.

GRAM STAINING :

Isolated bacteria were examined microscopically for cellular morphology and Gram stain phenotypes. The gram stain involves applying a sample inoculum onto a glass slide and allowing to dry. The slide is then treated with a special stain and examined under a microscope. Gram staining is a common technique used to differentiate two large groups of bacteria based on their different cell wall constituents. The gram stain procedure distinguishes between gram positive and gram negative groups by coloring these cells pink or violet. Gram positive bacteria stain violet and Gram negative is pink.

BACTERIAL ENDOSPORE STAINING:

Bacterial endospores are metabolically inactive, highly resistant structure produced by some bacteria as a defensive strategy against unfavorable environmental condition. The bacteria can remain in this suspended state until conditions become favorable and they can germinate and return to their vegetative state. In this method, a primary stain-malachite green is forced into the spore by steaming the bacterial emulsion. Malachite green is water soluble and has a low affinity foe cellular material, so vegetative cells may be decolorized with water. Safranin is then applied to counterstain any cells which have been decolourized. At the end of staining process, vegetative cells will be pink, and endospore will be dark green. This is observed under microscope for visualization.

Biochemical Tests:

The biochemical characterization of the isolate was essentially carried out as per the procedure given in Bergy's manual of Determinative, systemic bacteriology. Following tests are conducted, given detailed below :

OXIDASE TEST:

The oxidase test detects the presence of a cytochrome oxidase system that will catalyse the transport of electron between electron donors in the bacteria and a redox dye-tetramethyle-P-phenylene-diamine. The dye is reduced to deep purple colour. This test is used to assist in the identification of bacteria which produces the enzyme cytochrome oxidase.

CATALASE TEST:

This test is used to identify organisms that produce the enzyme, catalase. This enzyme detoxifiers hydrogen peroxidase by breaking down it into water and oxygen gas. The bubbles resulting from production of oxygen gas clearly indicate a catalase positive result.

MR-VP (METHYL RED – VOGES PROSKAUER TEST):

These tests are based on the facts that bacteria can ferment glucose into mixed acids or butylene glycol. These tests are used to identification of certain fermentative bacteria.

MR- When grown in a glucose containing medium, some bacteria, can produce large amounts of mixed acids such as acetic acid, formic acids or succinic acid from glucose fermentation. The amount of acid produced overcomes the buffering activity of the phosphate broth thereby rendering the P^H of the medium acidic. This acidity is tested by using Methyl Red, a P^H Indicator. MR reagent is an alcoholic solution of the methyl red dye, which remains red at a P^H 4.4 or below. However, the VP test detects an intermediate product, the acetyle methyl carbiinol (acetoin). Upon the addition of KOH, acetoin is oxidized to diacetyle,which then reacts with the guanidine group of arginine (contained in the pepton) to give rise to a red-coloured product.

CARBOHYDRATE FERMENTATION TEST:

The principle of carbohydrate fermentation states that the action of organism or carbohydrate substrate results in acidification of the medium, detected by a P^H indicator dye . Carbohydrate fermentation is the process microorganisms use to produce energy. Most microorganisms convert glucose to pyruvate during glycolysis; however, some organisms use alternate pathways. A fermentation medium containing a single carbohydrate (glucose, lactose, sucrose, mannitol etc.) for fermentation. However, the medium also contains various P^H indicators. In addition to a P^H indicator to detect the production of acid from fermentation, a Durham tube is placed in each tube to capture gas produced by metabolism. The carbohydrate fermentation patterns shown by different organisms are useful in differentiating among bacterial groups or species.

GELATIN HYDROLYSIS TEST:

This test is used to determine the ability of an organism to produce extracellular proteolytic enzymes, gelatinase that hydrolyze gelatin. The presence of gelatinases is detected using a nutrient gelatin medium. This medium is a simple medium composed of gelatin, peptone and beef extract. When nutrient gelatin tube is stab-inoculated with a gelatinase positive organisms the secreted gelatinase will liquefy the gelatin, resulting in the liquefaction of the medium. While the gelatinase negative organisms do not secrete enzyme and do not liquefy the medium.

NITRATE REDUCTION TEST:

This test determines the production of an enzyme called nitrate reductase, which results in the reduction of nitrate(NO3). Bacterial species may be differentiated on the basis of their ability to reduce nitrate to nitrite or nitrogenous gases. A heavy inoculum of test organism is incubated in a broth containing nitrate. The organisms capable of producing the nitrate reductase enzyme reduce the nitrate, present in the broth, to nitrite which may then be further reduced to nitric oxide, nitrous oxide, or nitrogen. The nitrate reduction test is based on the detection of nitrite and its ability to form a red compound when it react with sulfanilic acid to form a complex (nitrite-sulfanilic acid) which then reacts with a alpha-naphthaylamine to give a red precipitate which is a water-soluble azo dye. However, only when nitrate is present in the medium, red colour in the medium after addition of sulfanilic acid and alpha-naphthalyamine means only nitrite is not present in the medium.

SELECTION OF PLANT SAMPLES:

For the study of prebiotic activity we selected five different types of plants. *Tamarindus indica, Murraya koenigii*, Moringa oleifera, Beta vulgaris and solanum tuberculum these plants were selected for study. These plants basically found in local areas in India. These plants locally called as tamarind tree, curry leaves tree, moringa tree, beetroot plant and potato plant. We were selected various parts of plants for study these are tamarind fruit, curry leaves, moringa leaves, beetroot and potato.

EXTRACTION OF PLANT SAMPLES:

Moringa oleifera leaves were purchased from Saswad vegetable market.

The leaves were cleaned and air-dried for 3 days at 35°C.

The dried leaves were grounded into a fine powder, mixed with distilled water (98°C) at a ratio of 1:9, and stored for 24 h at room temperature.

The solution was filtered using a Whatman Filter Paper no. 1 to separate the leaves from the liquid solution.

The solution was then frozen at -80°C and dried in a freeze dryer for 3 days until the solution turned to powder.

The powder was stored at -20°C until further use.

With some modifications this procedure is used for all samples.

ANTIMICROBIAL ACTIVITY SCREENING:

Antimicrobial activity screening is used for checking potential of extract to inhibit the growth of pathogenic microorganisms. Mueller Hinton agar plates were used for this assay. For antimicrobial activity screening we used five pathogenic strains. These strains are E.coli, Psuedomonas, S.aureus, S.typhi. These pathogenic microorganisms were taken from Microbiology Laboratory of Waghire College. Each of the bacterial solutions was adjusted to 1.108 CFU/ml for further use. The antimicrobial activity of plant extract was investigated against pathogenic bacteria by observing the inhibitory zone.

Agar well diffusion method:

Agar well diffusion method is widely used to evaluate the antimicrobial activity of plants or microbial extracts .

In this well-known procedure, agar plates are inoculated with a standardized inoculum of the test microorganism.

Then, a hole with a diameter of 6 to 8 mm is punched aseptically with a sterile cork borer or a tip, and a volume (20–100 µL) of the antimicrobial agent or extract solution at desired concentration is introduced into the well.

Then, agar plates are incubated under suitable conditions depending upon the test microorganism.

The antimicrobial agent diffuses in the agar medium and inhibits the growth of the microbial strain tested .

PREBIOTIC ACTIVITY SCREENING:

Well diffusion method:

Agar well diffusion method is widely used to evaluate the antimicrobial activity of plants or microbial extracts .With some modifications we performed well diffusion method for prebiotic activity. Here, enhancement of bacteria around the well is observed and not the zone of inhibition.

MRS Agar plates are inoculated with a standardized inoculum of the test isolated LAB with spread plate method.

A hole with a diameter of 6 to 8 mm is punched aseptically with a sterile cork borer or a tip.

A volume (20–100 µL) of the extract solution at desired concentration is introduced into the well.

Then, agar plates are incubated under suitable conditions depending upon the test microorganisms.

The extract solution diffuses in the agar medium and enhance the growth of LAB.

MIC AND MBC TESTS:

The MIC and MBC were determined using the broth dilution method previously described by Unegbu et al. (2020).

Procedure:

The extract was dissolved in broth to obtain the extract concentrations of 0, 5, 7.5, 10, 25, 50, 75 and 100 mg/ml.

Stock of LAB was transferred into a 10-ml broth containing various extract concentrations.

One of each extract concentration was not inoculated with LAB and served as a negative control

.

LAB were incubated at 37°C for 24 h

The lowest extract concentration that indicated no visual turbidity change was considered as the MIC.

After the MIC was determined, 200 µl of bacteria visible bacterial growth were seeded on the MRS and incubated at 28°C for 24 h.

The lowest extract concentration that exhibited no bacterial colony on the agar was considered as the MBC.

CHROMATOGRAPHY :

Thin layer chromatography is a process, for separating components of a mixture. Chromatography were performed for identification of the components for qualitative analysis. Solvent system are required, as Solvents are essential components of the mobile phase in liquid chromatography systems. They help to dissolve the sample and transport it through the stationary phase.

Requirement -

Solvent system used are :

1.For curry leaves extract -

Ethyl acetate : Methanol : Water (75:13.5:10 ratio)

2.For tamarind extract –

Acetonitrile : Water (7.5:25 ratio)

3.TLC sheet

4.TLC chamber

5.UV Chamber

6. Developer - 40 % KOH

Procedure-

Solvent system for respective extract are prepared in TLC chamber

Sample spot is applied to the TLC sheet

TLC sheet are placed in chamber containing solvent to elute.

After the spot run to 3/4th , the sheet are removed from chamber.

The spot were developed using developer

Spot visualized under UV chamber.

R. F value calculated using following formula and calculated value is compared with standard to identify the component.

R. F. = Distance travelled by solute (cm) /Distance travelled by solvent (cm)

PHYTOCHEMICAL ANALYSIS :

The confirmatory qualitative phytochemical screening of plant extracts was performed to identify the main classes of compounds. Some of the significant phytochemicals are carotenoids, polyphenols, alkaloids, steroids and flavonoids.

Following tests were performed –

Libermann Test :

It is a method of testing for phends. Phenols in concentrated sulphuric acid reacted with nitrite to give green to blue solution. Phenolic compounds inhibit enzymes associated with the development of human diseases. 2 mg of dry extract is dissolved in 2 ml of acetic acid. Then heated to boil, mixture cooled , followed by addition of 1ml conc. Sulphuric acid. Apperance of green colour represent a positive test.

Wagner's Test :

Alkaloids are naturally occurring toxic amines produced by plants mainly as a defense mechanism to protect themselves against herbivores. The main toxic effects of alkaloids result in disturbances of the central nervous system, digestive processes, reproduction, and the immune system. Most alkaloids are precipitated from neutral or slightly acidic solution and give rise red -brown precipitate. 2ml extract was treated with Wagner's reagent .

Alkaline reagent Test :

This test performed to detect presence of flavonoids in the extract. Flavonoids are secondary metabolites that are very abundant in plants. Flavonoids possess a number of medicinal benefits, including anticancer, antioxidant, anti-inflammatory properties. Two or three drops of sodium hydroxide were added to 2 ml of extract. Initially a deep yellow colour appeared, which is became colureless by adding few drops of HCL, indicating that flavonoids are present.

Salkowaski Test :

This test performed for detect presence of cholesterol and other steroids. Upon treating a sample containing sterols with chloroform and highly concentrated sulfuric acid leads to a dehydration reaction and formation of new double bonds. 5ml extract taken into test tube, followed by additiin of chloroform 2ml This solution is treated with conc. Sulfuric acid A red colur layer indicates positive result. Extract solution at desired concentration is introduced into the well. Then, agar plates are incubated under suitable conditions depending upon the test microorganisms. The extract solution diffuses in the agar medium and enhance the growth of the microbial strain tested .

DETERMINATION OF REDUCING SUGAR IN THE EXTRACT:

The Dinitrosalicylic acid (DNS) method is a colorimetric method that uses the redox reaction between the free carbonyl group (C=O) and 3, 5-dinitrosalicylic acid. When alkaline solution of 3, 5-dinitrosalicylic acid reacts with reducing sugars (e.g. Glucose, lactose...) it is converted into 3-amino-5-nitrosalicylic acid which produces orange red colour in the reaction mixture. Water is used up as a reactant and oxygen gas is released during the reaction. The intensity of the colour is measured at 540 nm in colorimeter.

Materials used:

1 Standard glucose solution (1 mg/ml)

2 DNSA reagent

3 Sodium potassium tartarate

4 Test tubes

5 Pipette

6 Measuring cylinder

7 Boiling water bath

Procedure:

Seven test tubes are taken and marked properly.

Standard sugar solution in the range of (0,0.1,0.2,0.3,0.4,0.6,0.8) are pipette out.

1 ml DNS reagent is added to all the tubes.

Volume made to 3 ml with distilled water.

Similarly blank and test are prepared. All tubes placed in boiling water bath for 5 mins.

Then, tubes are cooled and diluted, and volume made upto 10 ml.

Readings are taken at 540 nm against blank. Graph are drawn.

Total carbohydrate estimation by Phenol sulfuric acid method:

100 mg glucose was taken in the test tube. To this added 5ml 2.5N HCl and boil on a water bath for 3 hrs to hydrolyse. Cooled to room temperature. To this added a sufficient quantity of solid sodium carbonate (Na_2CO_3) till effervescence ceases. It indicates complete neutralization and then filtererd and the volume is made up to 100ml.

Procedure:

Working standards are Pipette out in the series of test tube (0.2,0.4,0.6,0.8,1ml).

Then, 0.2 ml sample pipette out ,Volume is made up to 1ml with water.

Blanks are setted with all reagents without sample .

1ml phenol was added to each tube, to this 5ml 96% sulfuric acid was added and shaked well.

After 10min the content is again shake and tubes are placed in a water bath at 25-30°C for 20min.

.In hot acidic medium glucose was dehydrated to hydroxymethyl furfural.

This forms a green colored product with phenol.

This colour intensity was measured at 490 nm.

Finally total amount of carbohydrate was calculated by using following formula.

Total carbohydrate content % = x mg of glucose × 0.1 /100

Enzymatic digestion by Gastric Juice:

Simulated human gastric juice was prepared by suspending the following chemicals in 1 L of deionised water: 8 g sodium chloride (NaCl), 0.2 g potassium chloride (KCl), 8.25 g disodium phosphate dihy- drate (Na2HPO4.2H2O), 14.35 g sodium hydrogen phosphate(NaHPO4), 0.1 g calcium chloride dihydrate (CaCl2.2H2O), and 0.18 g magnesium chloride hexahydrate (MgCl2.6H2O).

The acidity levels of the gastric juice were adjusted to pH 1,2, 3, and 4 by using 5 M hydrochloric acid (HCl).

One mL of the extracted sample was mixed with 1 mL of Simulated human gastric juices of various pH and incubated in a water bath at 37 ± 1°C for 5 hours.

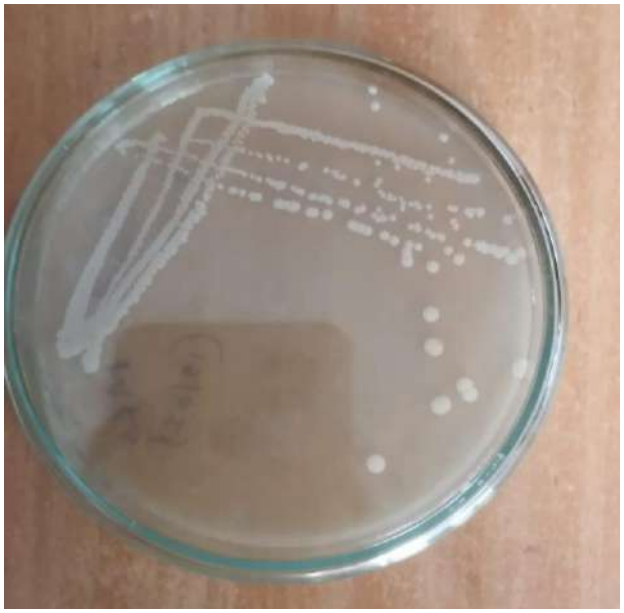
After incubation, one mL of the mixture was withdrawn and tested for final reducing sugar content (Section 2.6.2).

The contents of total carbohydrate and reducing sugar of the extracted sample before the digestion process were also determined.

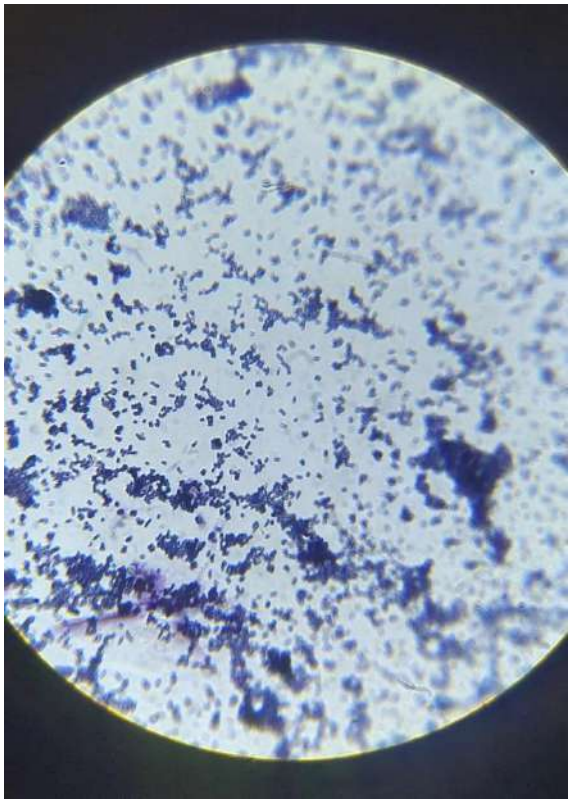
4. RESULT AND DISCUSSION:

Morphological characteristic and biochemical test :

Size	Shape	Colour	Margin	Consistency	Elevation	Opacity	Gram character	Motility
0.2 mm	Circular	Milky white	Regular	Smooth	Convex	Opaque	Gram positive rods	Non-motile



Colony morphology

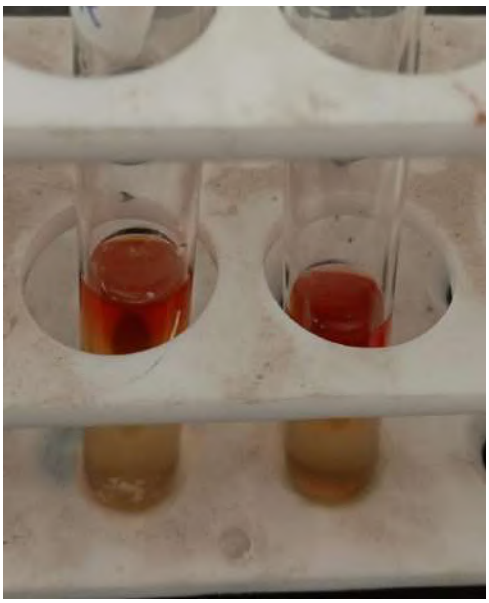


Gram Staining

BIOCHEMICAL TESTS:

Sr.No.	Biochemical test	Observation	Result
1.	Oxidase test	No purple colur observed.	Negative
2.	Catalase Test	Bubbles are not form	Negative
3.	Methyl red test	Colour change yellow to red.	Positive
4.	Voges Proskaur Test	Colur change yellow to red.	Positive
5.	Gelatin hydrolysis test	Zone of clearance not observed.	Negative.
6.	Nitrate reduction test	Colur change is not observed.	Negative

Methyl red test



Vogos proskaur test

CARBOHYDRATE FERMENTATION TEST :

Sr. No.	Sugars	Observation	Result
1	Lactose	Yellow colour changes to red.	Positive
2	Maltose	No colour change	Negative
3	Dextrose	Yellow colour changes to red.	Positive
4	Mannitol	No colour change.	Negative
5	Sucrose	Yellow colour changes to red.	Positive

Carbohydrate femermentation test observation

ANTIMICROBIAL ACTIVITY :

For concentraion 30,50,70(µl) Five plant extract were investigated to evaluate their antibacterial activity against pathogenic bacteria including one strain of Gram positive bacteria *(S. aureus)* and three strains of Gram-negative bacteria (*E. coli, Klebsiellas,*& *P. aeruginosa*) using well diffusion method. Analysis of antibacterial activity of these plant extracts was noted in Table 1 and in Fig. 1. The results revealed that all plant extracts were potentially effective in inhibiting microbial growth of bacteria with variable potency. *Tamarinus indica* extract was the most effective inhibiting microbial growth of all tested pathogenic bacteria at concentration of 30,50,70(µg) . Out of dive sample only 2 sample of *Tamarindus indica* and *Murraya koenigii* extract was effective against both gram positive and gram-negative strains.

Table for Tamarind extract

Name of Pathogen	Concentration of extract			Positive control (Ampicillin 50µl)	Negative Control (Methanol 50µl)
	30µl	50µl	70µl		
S. aureus	10mm	15mm	25mm	27mm	No inhibition
Klebsiella	18mm	18mm	20mm	22mm	No inhibition

Table for Curry leaves extract

Name of Pathogen	Concentration of extract			Positive control (Ampicillin 50µl)	Negative Control (Methanol 50µl)
	30µl	50µl	70µl		
E.coli	14mm	15mm	15mm	17mm	No inhibition
S. aureus	15mm	18mm	20mm	22mm	No inhibition


(Tamarind) S. aureus
-ve
30
+ve
70
50


Kleb
(Tamarind)
-ve
30
+ve
70
50

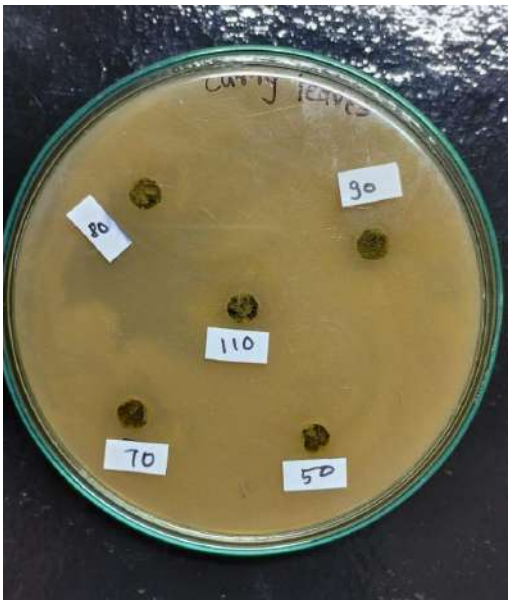

E.coli (Curry leaves)
30
-ve
+ve
50
70


S.aureus (Curry leaves)
30
50
+ve
-ve
70

PREBIOTIC ACTIVITY :

Prebiotic activity also checked by agar well diffusion method, Lactobacillus genus does not showed zone of inhibiton around the well , enhanced growth from lowest concentration is observed. So both extract, Tamarindus indica and Murraya koenigii act as prebiotic as they enhanced growth of probiotic bacteria and does not showed any inhibiton. These are observed in Figure.

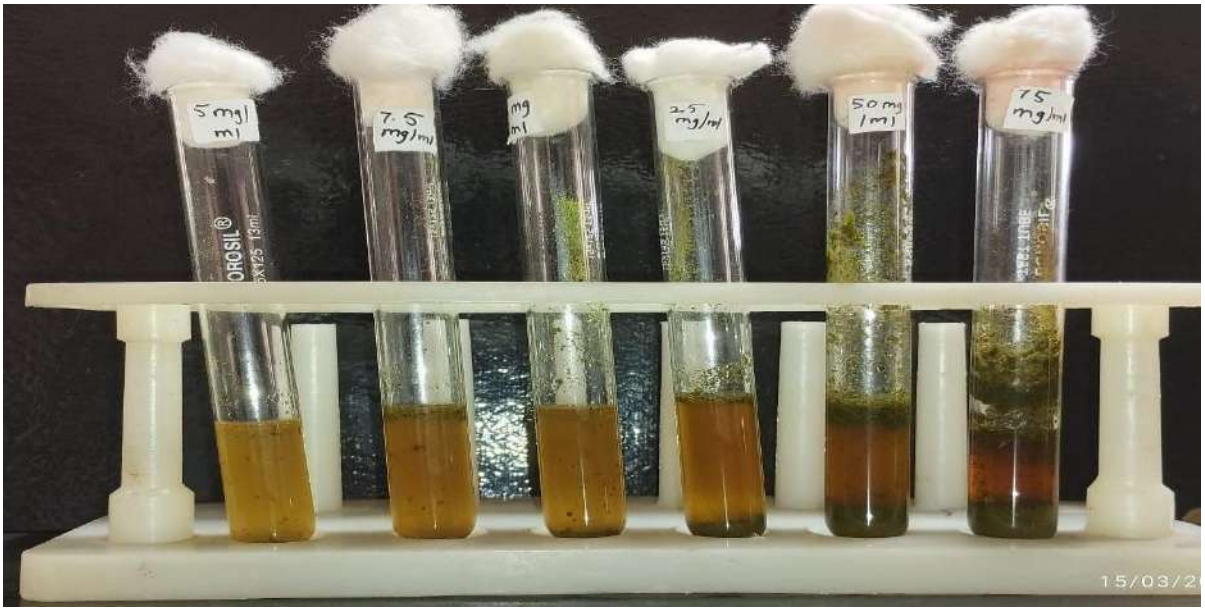
This study demonstrated that highest growth of *Lactobacillus* even at low extract concentration.



MIC AND MBC :

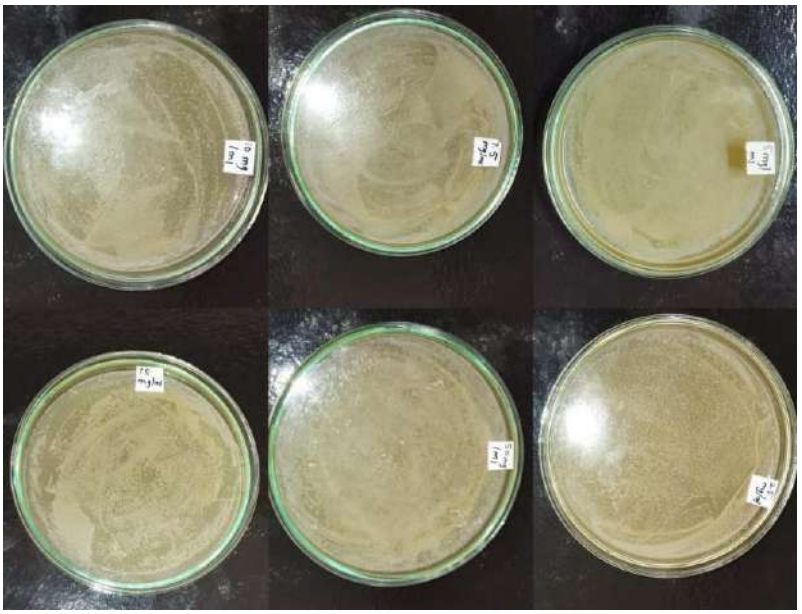
As shown in fig. 3 ,the MIC of *Murraya koenigii* extract for *Lactobacillus* spp. was 50 mg /ml, and of *Tamarindus indica* was 25 mg /ml and the bacterium remained alive even at an extract concentration of 75 mg /ml. However both the extract showed increase in the growth with increased concentration, but also observed that even at lowest concentration i.e 5 mg /ml hace highest growth.

Therefore, the extract inhibited growth of some pathogenic bacteria more effectively than that of *Lactobacillus* spp. *Lactobacillus* colonies were still observed on MRS at a extract concentration of 75 mg /ml. Thus both extract promoted growth of *Lactobacillus* but suppresed the growth of *E. coli, P. aeroginosa, S. aureus, and Klebsiella* .

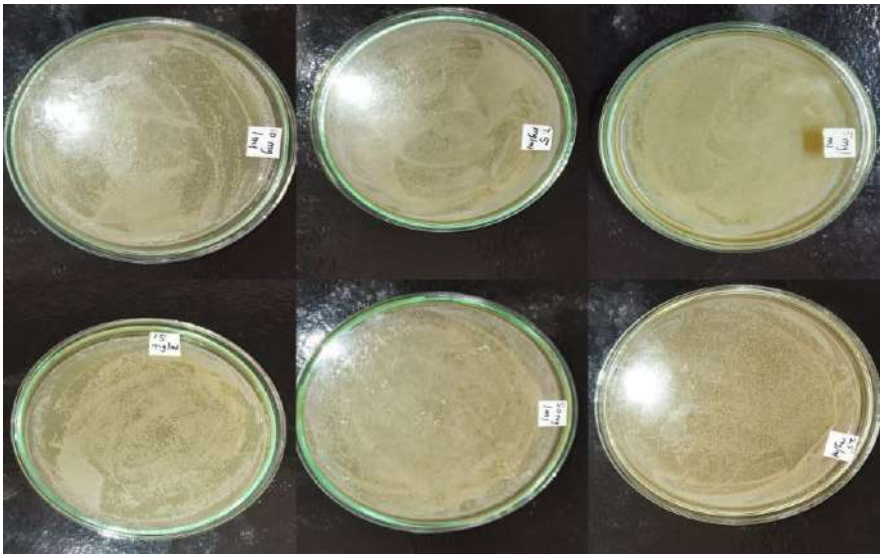


MIC of Curry leaves for LAB

MIC of Tamarind Extract Of LAB



MBC of Curry leaves extract for LAB

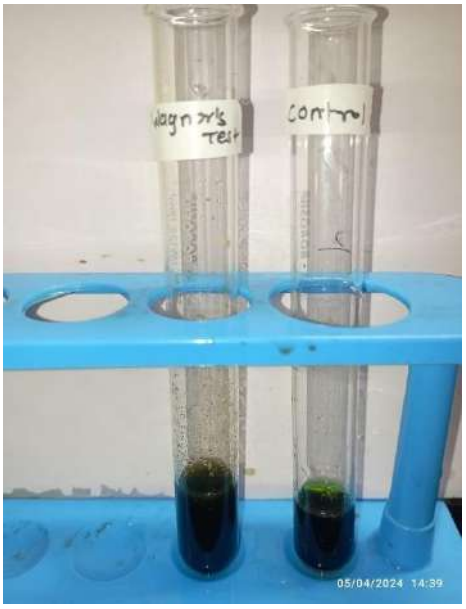


MBC of Tamarind extract for LAB

PHYTOCHEMICAL TESTS:

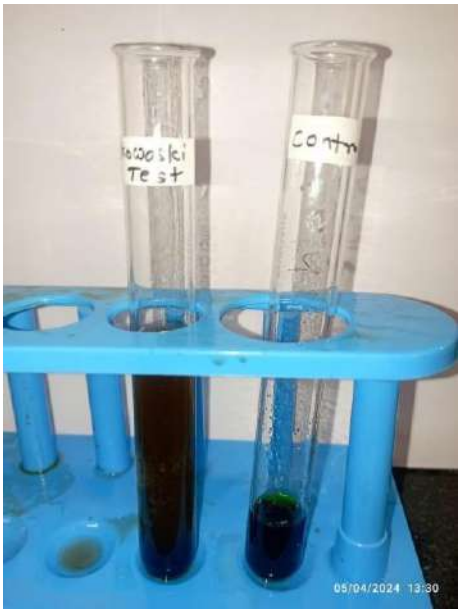
Following figures shows phytochemical tests observations of Murraya koenigii and Tamarindus indica extract and are noted in the table below.

Wagner's Test for Tamarind extract

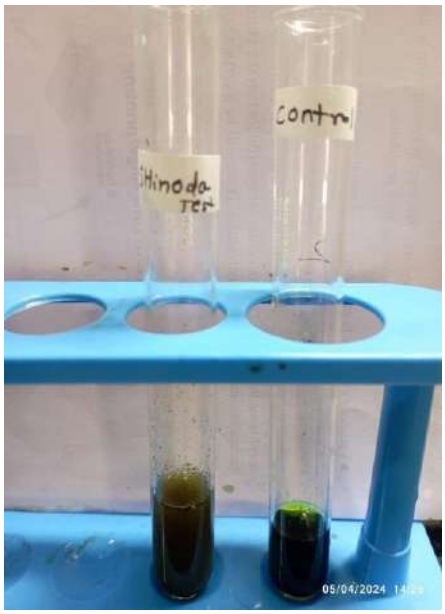


Wagner's Test for Curry leaves

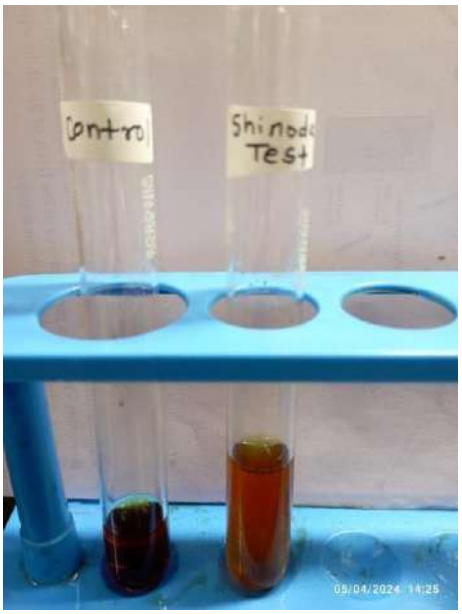
Salkowaski's test for Tamarind



Salkowaski's test for Curry leaves



Shinoda’s Test for Curry leaves



Shinoda’s Test for Tamarind

Leibermann Test for curry leaves

Leibermann Test for Tamarind

Table:

Test	Observation	Result	Conclusion
Wagner Test			
1.Tamarind extract	Reddish brown precipitate	Positive	Alcaloids groups Present
2.Curry leaves extract	No precipitate formed	Negative	Alcaloids groups Absent
Salkowaski Test			
1. Tamarind extract	Colour changes to reddish brown	Positive	Cholesterol and steroids groups are present
2.Curry leaves extract	Colour changes to reddish brown	Positive	Cholesterol and steroids groups are present
Leibermann Test			
1. Tamarind extract	Colour changes to green	Positive	Phenol groups are present
2.Curry leaves extract	Colour changes to green	Positive	Phenol groups are present
Shinoda Test			
1. Tamarind extract	Yellow colour become colourless by adding few drops of HCL	Positive	Flavanoid groups are present
2. Curry leaves extract	Yellow colour become colourless by adding few drops of HCL	Positive	Flavanoid groups are present

CHROMATOGRAPHY :

From fig.4 Spot is observed under UV chamber.

Calculation:

1) For *Murraya koenigii* :

R. F = Distance travelled by solute / Distance travelled by solvent

=0.9/1.5

=0.6

By reffering standard reading from fig. It is corresponds to xylose respectively.

2) For *Tamarindus indica :*

=0.7/1.6

= 0.44

By reffering standard readings this value correspond to the value of glucose.

By using standard reading Murraya koenigii showed presence of xylose sugar. And Tamarindus indica showes glucose.

Therefore,both sample have presence of monosaccharides which are utilized by probiotic organism for their growth.

Sugar	R_f	Analyte*
Lactose	0.17	-
Maltose	0.26	-
Sucrose	0.42	-
Galactose	0.38	F1
Glucose	0.44	F2
Mannose	0.47	F3
Sorbose	0.54	-
Fructose	0.51	-
Arabinose	0.53	F4
Xylose	0.66	F5
Ribose	0.69	-
Rhamnose	0.74	F6

*Sugar fractions matching with standards on TLC

ESTIMATION OF REDUCING SUGAR CONTENT :

DNSA method is utilized for estimation of reducing sugar content present in the sample before and after digestion with prepared gastric juice.

Absorbance at 540 nm :

Glucose concentration (ml)	DNSA (ml	Distilled water	Sample	Absorbance
0	1	1		0.03
0.1	1	0.9		0.04
0.2	1	0.8		0.06
0.4	1	0.6		0.09
0.6	1	0.4		0.01
0.8	1	0.2		0.15
Tamarind extract	1	-	1	0.33
Curry leaves extract	1	-	1	1.40
Blank	1	1	-	0.0

By plotting the absorbance value of sample in the standard curve the concentration of reducing sugar is calculated.

The amount of reducing sugar present before digestion, in Tamarindus indica is 1.50 g /ml and Murraya koenigii is 0.88 g /ml

TOTAL CARBOHYDRATE CONTENT :

Phenol sulfuric acid method were performed for total carbohydrate estimation. Absorbance is taken at 490nm . Graph plotted for standard.

Absorbance at 490nm

Glucose concentration (ml)	Distilled water	Phenol (ml)	Sulfuric acid (ml)	Concentration (mg/ml)	Absorbance
0.2	0.8	1	5	0.020	0.208
0.4	0.6	1	5	0.040	0.355
0.6	0.4	1	5	0.060	0.418
0.8	0.2	1	5	0.080	0.563
1	0	1	5	0.10	0.65
Blank	1	1	5	0	0.00
Tamarind extract		1	5		2.26
Curry leaves		1	5		1.41

By using standard graph concentration of sample were determined. They are obtained as for curry leaves it is 0.0144 mg /ml and 0.0138 mg /ml for tamarind. So , total carbohydrate content was determined by using following formula:

Total carbohydrate content % = x mg of glucose × 0.1 /100

For curry leaves -

Total carbohydrate content present in curry leaves is 14.4%

For Tamarind extract -

Total carbohydrate content present in tamarind extract is 13.8 %.

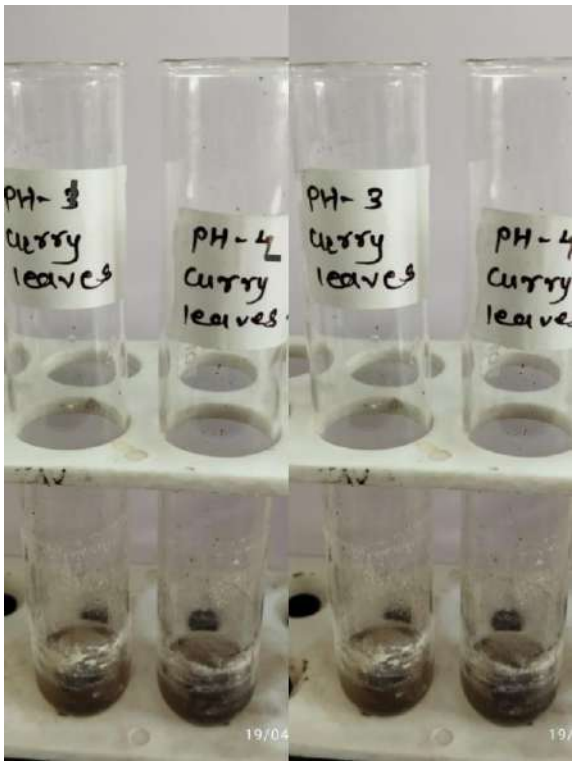
ENZYMATIC DIGESTION BY GASTRIC JUICE:

At various pH enzymatic digestion is proceed

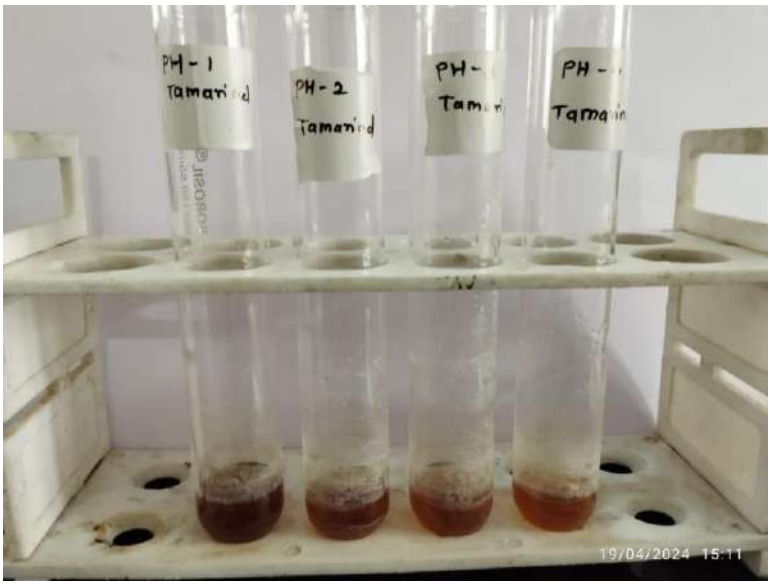
Reducing sugar before digestion and after digestion with gastric juice is noted. It is found that sugar present in extract is reduced after digestion with gastric juice.

Before Digestion Curry leaves extract

Before Digestion Tamarind extract



After Digestion Extract of Curry leaves



After Digestion Extract of Tamarind

Initial Sugar Content (mg/ml)	Final Sugar Content After digestion (mg/ml)				Total Carbohydrate Content (%)
	P^H 1	P^H 2	P^H 3	P^H 4	
1)Curry leaves Extract 0.88g/ml	0.13	0.68	0.2	0.2	13.8%
2)Tamarind Extract 1.59g/ml	0.13	0.13	0.13	0.13	14.4%

5. APPENDIX:

MRS agar composion-

Peptone - 10 gm

Yeast extract- 5 gm

Meat extract - 10 gm

Glucose - 20 gm

Polysorbate - 1 gm

Sodium acetate - 5 gm

Magnesium sulfate - 0.1 gm

Disodium phosphate - 2gm

Mangnese sulfate - 0.05 gm

Agar - 30 gm

Final P^H -5.5±0.2 at 25°C

MRS broth composion-

Peptone - 10 gm

Yeast extract- 5 gm

Meat extract - 10 gm

Glucose - 20 gm

Polysorbate - 1 gm

Sodium acetate - 5 gm

Magnesium sulfate - 0.1 gm

Disodium phosphate - 2gm

Mangnese sulfate - 0.05 gm

D/W - 1000 ml

Final P^H - 5.5±0.2 at 25°C

Mueller Hinton agar composion-

Beef extract - 2. 00 gm

Acid hydrolysis casein -17. 00 gm

Starch - 1.50gm

D/W - 1000 ml

P^H - 7. 3

Nitrate broth composion-

Peptone - 0.25 gm

Meat extract - 0.15 gm

Potassium nitrate - 0.05 gm

D/W - 50 ml

P^H - 7. 0

Reagent -

Sulfanilic acid

Alpha Naphthamlmin

Gelatinase media composion

Gelatin - 0.1 gm

Dipotassium phosphate - 0.15 gm

Potassium phosphate - 0.05

Agar - 2.5 gm

Nutrient broth - 1.3 gm

D/W - 100 ml

P^H - 6.8

Reagent - mercuric chloride.

Carbohydrate fermentation broth-

Peptone - 10 gm

Beef extract - 1.0 gm

Sodium chloride - 5. 0 gm

Phenol red - 0.018 gm

1% sugar

D/W - 100 ml

1 N NaOH - 0.4 gm sodium hydroxide in 50 ml D/W dissolve and make volume 100 ml.

Standard glucose stock -

0.25 0 mg glucose in 100 ml D/W.

Working stock -

Take 10 ml from standard stock and dilute with D/W and make volume 100 ml.

6. CONCLUSION:

In this present study, moringa leaves, potato, beetroot, tamarind fruit and curry leaves were tested for these prebiotic ability against potential probiotic strain of LAB. Prebiotic activity screening describes the extend to which prebiotics can support the growth of LAB. Tamarind fruit and curry leaves has significantly higher prebiotic activity. Thus, tamarind fruit and curry leaves might be has high potential as new prebiotics. This study showed that LAB strain has ability to utilizes resistant starch from tamarind fruit and curry leaves as carbon source and can be another option as prebiotics.

REFERENCES:

RINGO, E., R. E. OLSEN, T. Ø. GIFSTAD, R. A. DALMO, H. AMLUD, G. I. HEMRE & A. M. BAKKE, 2010. Prebiotics in aquaculture: a review. Aquacult. Nutr., 16: 117-136.

SANTO, A. P., E. N. S. CARTOLANO, T. F. SILVA, F. A. S. M. SOARES, L. A. GIOIELLI, P. PEREGO,

A. CONVERTI & M. N. OLIVEIRA, 2012. Fibers from fruit by-products enhance probiotic viability and fatty acid profile and increase CLA content in yoghurts. Int. J. Food Microbiol.,154: 135-144.

SHERIF, A. H., A. M. EL-GAMAL & A. E. TOLAN, 2014. Incorporation of Moringa oleifera leaf in Nile tilapia Oreochromis niloticus diet and its effect on growth performance and immune

status. J. Vet. Sci., 1: 806-814.

THITIRATSAKUL, B. & P. ANPRUNG, 2014. Prebiotic activity score and bioactive compounds in longan (Dimocarpus longan Lour.): influence of pectinase in enzyme-assisted extraction. J. Food Sci. Technol., 51: 1947-1955.

UNEGBU, V., N. NKWOEMEKA, F. OKEY NDECHE & C. OBUM NNADI, 2020. Phytochemical and antibacterial properties of Moringa oleifera leaf extracts on Escherichia coli and Staphylococ-cus aureus. Niger. J. Microbiol., 34: 5145-5152.

VONGSAK, B., P. SITHISARN, S. MANGMOOL, S. THONGPRADITCHOTE, Y. WONGKRAJANG & W. GRITSANAPAN, 2013. Maximizing total phenolics, total flavonoids contents and antioxidant activity of Moringa oleifera leaf extract by the appropriate extraction method. Ind. Crops Prod.,44: 566-571.

WANG, F., Y. F. BAO, J. J. SI, Y. DUAN, Z. B. WENG & X. C. SHEN, 2019. The beneficial effects of a polysaccharide from Moringa oleifera leaf on gut microecology in mice. J. Med. Food, 22: 907-918.

WANG, Y. & Q. GU, 2010. Effect of probiotics on white shrimp (Penaeus vannamei) growth performance and immune response. Mar. Biol. Res., 6: 327-332.

YOO, H. D., D. KIM & S. H. PAEK, 2012. Plant cell wall polysaccharides as potential resources for the development of novel prebiotics. Biomol. Ther. (Seoul), 20: 371-379.

YU, M. C., Z. J. LI, H. Z. LIN, G. L. WEN & S. MA, 2009. Effects of dietary medicinal herbs and Bacillus on survival, growth, body composition, and digestive enzyme activity of the white shrimp Litopenaeus vannamei. Aquacult. Int., 17: 377-384.

ZENG, P., 2019. Effect of dietary Lactobacillus plantarum and Lactobacillus acidophilus on water qualities, growth, and non-spesific immune responses of Litopenaeus vannamei, Aquaculture Department. National Taiwan Ocean University, Keelung.

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9138100/#:~:text=The%20extraction%20yields%20with%20different,as%20shown%20in%20Figure%201.&text=Extraction%20yield%20of%20beetroot%20extracts,supercritical%20fluid%20extraction%20(SFE)

https://www.researchgate.net/publication/271833861_Prebiotics

https://www.researchgate.net/profile/Arunporn-Itharat/publication/267709720_Extraction_and_analysis_of_prebiotics_from_selected_plants_from_southern_Thailand/links/546c9e240cf2c4819f229f67/Extraction-and-analysis-of-prebiotics-from-selected-plants-from-southern-Thailand.pdf

PROJECT ON

ONLINE CAKE ORDER

handmade

WITH LOVE

YOUR CELEBRATION PARTNER...

WHERE CAKES ARE MADE WITH LOVE...

A

PROJECT REPORT ON

"ONLINE CAKE ORDER"

SUBMITED TO

UNIVERSITY OF PUNE

IN PARTIAL FULFILMENT OF REQUIREMENT FOR

THE DEGREE COURSE OF

BBA(CA)

BY

NAME:- RUTUJA CHANDRASHEKHAR NERIKAR

TO

WAGHIRE COLLEGE

OF

ARTS,SCIENCE & COMMERCE ,

SASWAD,PUNE – 412301

SAVITRIBAI PHULE PUNE UNIVERSITY

(2023-2024)

Pune District Education Association's

Waghire College of Arts, Commerce & Science, Saswad

Department of Computer Application

(under Commerce)

CERTIFICATE

This is to certify that Mr./Miss Nesikar Rutuja Chandrashekhar of class SYBCA has completed her/his project work entitled.

"Online cake order"

As a part of BBA (Computer Application) SEM- IV Curriculum.

During that Academic year 2023-2024

Project Guide

Head of Department

Internal Examiner

External Examiner

Date:- / / 2024

ACKNOWLEDGEMENT

A project for a student is an experience in the course of which he /she realize the real problems and obstacles that one has to undergo during the development of a real-life system we had one such experience in developing this project which would not have been possible without the help & guidance of our teachers.

We are thankful to Prof. Ajay Gadhave and all staff members for giving as there valuable time and also for keeping us interested during the different stages of development that we thought were not necessary.

Last but not least we would also like to thank all our friends who have helped us whole-heartedly to complete this project in time.

Mrs.Rutuja Nerikar

CONTENTS

1.introduction

INTRODUCTION TO SYSTEM

The project "Online Cake Order System" allows users to check for various cakes available at the online store and purchase online. The project consists of list of cakes displayed in various categories. The user may browse through these items as per categories. If the user likes a product he may add it to his shopping cart.

Once user wishes to checkout he must register on the site first. He can then login using same id password next time. Now he may pay through a credit card or cash on delivery. here we use html framework to make entire frontend. Thus the online cake shopping project brings at entire cake shop online and makes it easy for both buyer and seller. Nowdays existing online ordering websites are selling whatever products available in market according to their brand name but we are selling certified cakes in reasonable rate to customers with the help of website.

We are reducing the cost margins of distributors, agents and shopkeepers and saving cost on stock management ,executives, travelling, shop.

OVERVIEW OF PROJECT

A cake is a sweetened baked food, usually made with flour, eggs, sugar, and a leavening agent. Shortening may or may not be used. Shortening is a fat or oil of animal or vegetable origin, such as butter, lard, vegetable oils, processed shortenings, and margarine. A cake is a sweet food made by baking a mixture of flour, eggs, sugar, and fat in an oven. Cakes may be large and cut into slices or small and intended for one person only. The cake is served as a special function at a birthday or wedding party .

The birthday cake is decorated with candles.

Cakes come in many flavors like strawberry cake, chocolate cake etc.

I like Chocolate Cake. The cake contains carbohydrates and fats

The acerbic, hilarious Claire Bennett becomes fascinated by the suicide of a woman in her chronic pain support group. As she uncovers the details of Nina's suicide and develops a poignant relationship with Nina's husband, she also grapples with her own, very raw personal tragedy. Cakes can be classified based on the combination of

formulations and production methods: batter (pound cake and layer cake), foam (sponge cake), chiffon (a combination of a batter & foam). Flour, sugar, egg and fat form the basic components of all cakes

How to Bake a Cake

Step 1: Prepare Baking Pans. ...

Step 2: Allow Ingredients to Reach Room Temperature. ...

Step 3: Preheat the Oven. ...

Step 4: Stir Together Dry Ingredients. ...

Step 5: Combine the Butter and Sugar. ...

Step 6: Add Eggs One at a Time. ...

Step 7: Alternate Adding Dry and Wet Ingredients. ...

Step 8: Pour Batter into Pans and Bake.

3.Feasibility study

FEASIBILITY STUDY

TECHNICAL FEASIBILITY

The system must be evaluated from the technical point of view first. The assessment of this feasibility must be base on outline design of system requirements in this term input, output and program procedure are concern. The project should be developing such that the necessary function and performance are achieved within the constraints. The project developed within latest technology available.

ECONOMICAL FEASIBILITY

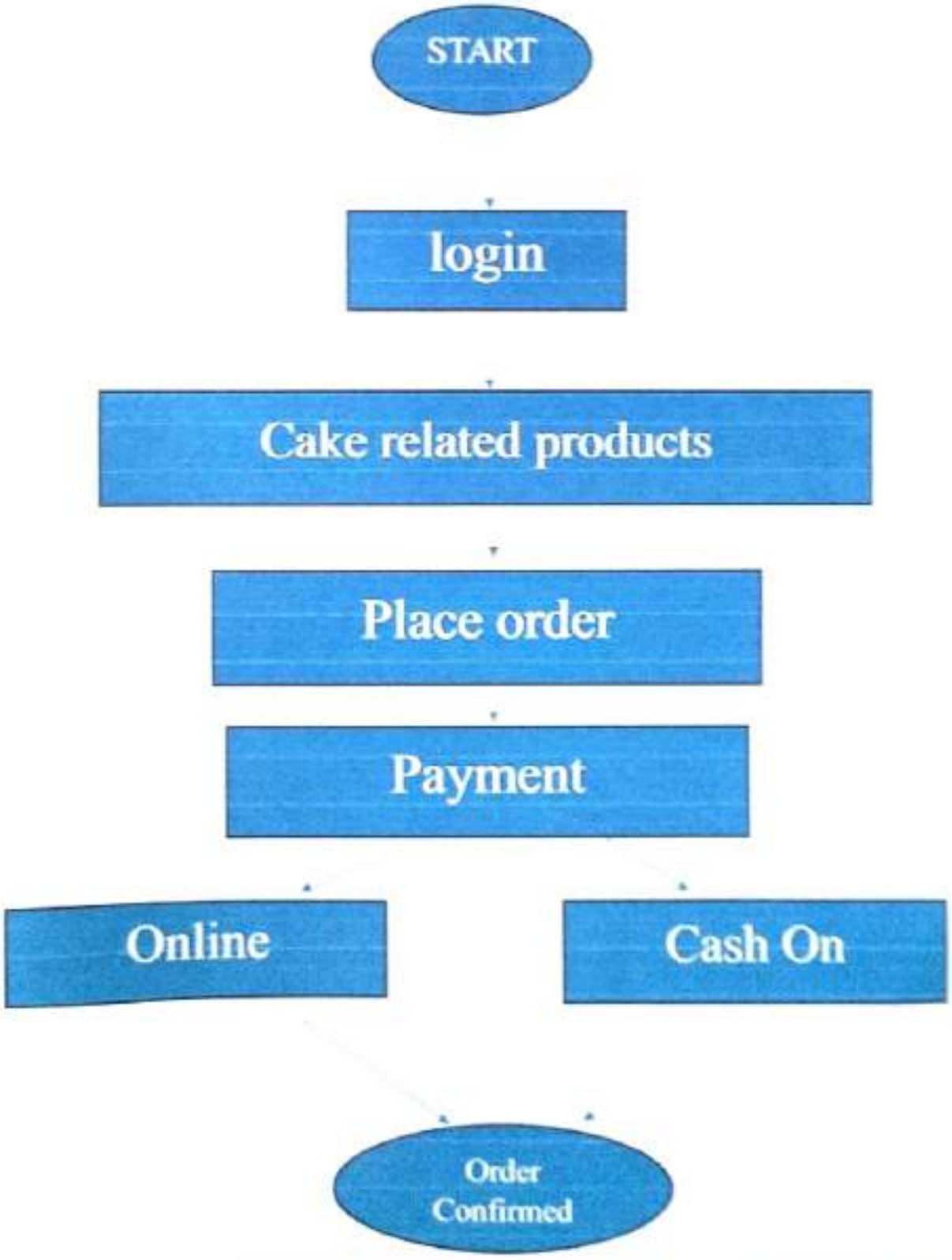
The proposed system must be justifying be const and benefits criteria to ensure that effort is concentrated project which will give best return earliest. since the system is developing as part of project work there is no mutual cost to spend for proposed system also all resources bare already available. It gives a conduct of system is economically possible for development

OPERATIONAL FEASIBILITY

It is measure of how well a proposed system solved problems and taken advantage of the opportunity identified during bakery management system. How it satisfies the requirement and analysis of system development by checking system work cyclically such as purchase. It also prefers to the measure of solving problems with the help of new proposed system. It help if advantage to fulfill the requirement.

4.Diagrams

DATA FLOW DIAGRAMS



5.Screens Layout

SCREENS

1.HOME

2.LOGIN

3.CAKE PRODUCTS

DUTCH CHOCLATE...
₹1300

Earliest Delivery: Today

KULFI FALOODA...
₹423

Earliest Delivery: Today

DELICIOUS BLUBERRY...
₹396

Earliest Delivery: Today

Earliest Delivery: Today

CHRUNCHY BUTTERSCOTCH...

Earliest Delivery: Today

CHOCLATE MOCHA...

Earliest Delivery: Today

Earliest Delivery:

Earliest Delivery:

Earliest Delivery:

4.PRODUCT DESCRIPTION

₹1,300

- Eggless...
- With Egg...
- Heart Shape...
- Square Shape...
- Circle Shape...

- Cake Flavour :Dutch Chocolate...
- Sponge Type :Chocolate...
- Type Of Cream :Dutch...

- Keep refrigerated until ready to enjoy...
- Resealable container to maintain freshness...

₹423

- Eggless
- With Egg
- Heart Shape
- Square Shape
- Circle Shape

- Cake Flavour :Kaffi Falooda
- Sponge Type :Vanilla
- Type of Cream :kaffi
- Filling In Layers:kaffi Syrup

- Keep refrigerated until ready to enjoy
- Reclosable container to maintain freshness
- Consume the cake within 24 hours

₹

- Eggless
- With Egg
- Heart Shape
- Square Shape
- Circle Shape

- Cake Flavour :Blueberry
- Sponge Type :Vanilla
- Type of Cream :blueberry
- Filling In Layers:Blueberry Syrup

- Keep refrigerated until ready to enjoy
- Reclosable container to maintain freshness
- Consume the cake within 24 hours

₹520

- Eggless
- With Egg
- Heart Shape
- Square Shape
- Circle Shape

- Cake Flavour :Chocfare Mocha
- Sponge Type :Chocfare
- Type Of Cream :Coffee
- Filling In Layers:Chocfare Coffee Syrup

- Keep refrigerated until ready to enjoy
- Reclosable container to maintain freshness
- Consume the cake within 24 hours

5.PLACE ORDER

6.ORDER CONFIRMED

6.Hardware & Software Requirements

HARDWARE AND SOFTWARE REQUIREMENTS

➢HARDWARE

THE HARDWARE REQUIREMENTS INCLUDE:

Processor	*AMD Ryzen 7 5800H with Radeon Graphics 3.20 GHz*
Installed RAM	16.0 GB (15.4 GB usable)
Keyboard	*Standard keyboard*
Mouse	*Optical*
Monitor	*"15" Color Monitor*

➢SOFTWARE

THE SOFTWARE REQUIREMENTS INCLUDE:

Web presentation	*HTML*
Backend database	*Css,Javascript*
Operating system	*Windows 11 Home Single Language*
Browser	*Google chrome*

7.Proposed Enhancement

PROPOSED ENHANCEMENT

Some echancement are required like:

1. To provide Customer Feedback and Reviews.
2. To provide Online help.
3. To provide personalization Option.

8.Bibliography

BIBLIOGRAPHY

1. http://www.google.com

2. https://www.w3schools.com

3.https://www.tutorialspoint.com/ 4. http://www.wikepedia.com

CERTIFICATE

This is to Certify that Ms. Dudhane Shubhada Gajanan successfully completed research project on "An Efficient One-Pot Synthesis Of 1,8-Dioxo-Decahydroacridine Derivatives Using Cobalt Ferrite Catalyst", and report submitted to the Department of Chemistry, Pune District Education Association's Waghire College of Arts, Commerce and Science, Saswad, Dist: Pune (M.S.), for the partial fulfilment of Master of Science Degree in the subject of Organic Chemistry under the Faculty of Science and Technology, Savitribai Phule Pune University, Pune (M.S.).

Date: 8 / 05 / 2023

Research Guide

HOD
HEAD
Department of Chemistry
Waghire College, Saswad,
Dist. Pune.

INTRODUCTION

.

Multi-component reactions is a synthetic method in which three or more reactant react together to form a single product. MCRs also known as one pot synthesis [1]. The main advantage of these reaction is its simplicity and versatility of the experimental procedures and access to a wide range of products. Formation of a new carbon-carbon bond is one of the most fundamental operation in organic chemistry.

Advantages of MCRs:

1) Easy to carry out than the multistep synthesis,

2) They are eco-friendly

3) Chemo selectivity

4) Atom economy and step efficiency

5) Low waste generation etc. [2]

As multi component reactions represent a powerful tool in the sustainable organic synthesis its complementary utilization with other green chemistry principles would bring organic chemist one step closer to ideal synthesis [3]. In multicomponent organic reaction, the catalyst that are needed must have the quantities of numerous active sites, nano range size, and a large surface area [4].

Ferrites are the compounds with Iron (III) oxide Fe2O3 as their principle components [5]. Many ferrites are spinel with the formula AB_2O_4, where A and B represent various metal cations. Spinel ferrites consists of cubic closed – packed (fcc) oxides (O^{2-}) with A cations occupying one eighth of the tetrahedral holes and B cations occupying half of the octahedral holes – that is the inverse spinel structure .

Spinel ferrite nanoparticles have attracted much attention because of their electronic, magnetic, and catalytic properties, all of which are different from those of their bulk counterparts. Among spinel ferrites, cobalt ferrite ($CoFe_2O_4$) has an inverse spinel structure in which, in the ideal state, all Co^{2+} ions are in B sites, and Fe^{3+} ions are equally distributed between A and B sites [6].

The surface properties and catalytic activity of ferrospinels of nickel, cobalt, copper and their sulphated analogues are prepared by soft chemical methods at the room temperature coprecipitation route to yield samples with high surface areas [7].

The catalytic effectiveness of ferrites for many such reactions arises because of the ease with which iron can exchange its oxidation state between 2+ and 3+. Another important attribute of these materials, from commercial standpoint, is their stability under extremely reducing conditions, which is due to the spinel structure. Thus the reduction of Fe^{+3} to Fe^{+2} takes place without altering these lattice configurations so that upon re-oxidation, the original state is retained [11]. In contrast to the spinel ferrites, the catalyst Fe_2O_3 loses its activity as it is reduced to FeO and metallic iron. Magnetite iron oxide nanoparticles catalyst is that they can be easily separated using an external magnet, which achieves a simple separation of catalyst without filtration [12].

The spinel ferrites are effective catalysts for number of industrial processes such as catalytic alkylation [10], combustion of methane [11], decomposition of alcohol and hydrogen peroxide and oxidative dehydrogenation of hydrocarbons [12-13]. These applications mainly depend upon the method of preparation [14].

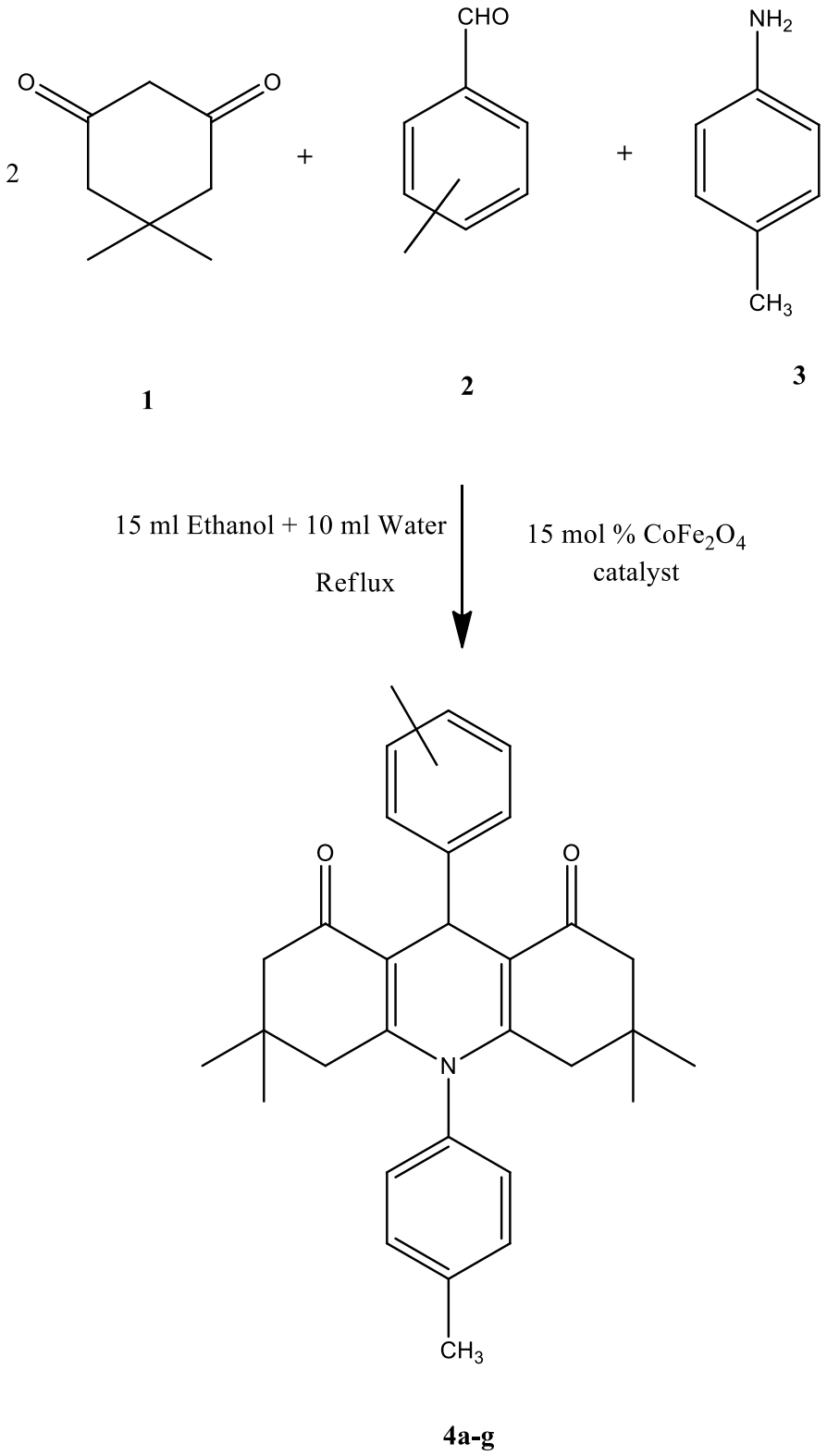
Acridine -1,8-dione and acridine derivatives are well known polyfunctionalized 1,4-dihydropyridine (DHPs) . These derivatives of DHPs have an important ring skeleton and reported wide range of pharmaceutical and biological properties, including antitumor, antitubercular, antimalerial, antibacterial, antihypertensive, fungicidal, anticancer, anti-inflammatory and diabetes [15]. These derivatives are also commercially used as calcium channel blocker [16, 17]. Further, these compounds are useful for treatment of Angina pectoris, hypertension, Alziemer's disease. Few of these compounds are used in numerous bioactive compound [18].

1,8-Dioxo-decahydroacridines derivatives are using as dyes and also as photoinitiators. Furthermore, these derivatives have the applications in material science like semiconductors and in spectroscopy as luminescent agent [19]. Synthesis of acridine derivatives containing 1,4-dihydropyridines, involves the three component cyclocondensation reaction of 5,5-dimethyl-1,3-cyclohexanedione (Dimedone), aromatic aldehyde and various anilines .in presence of several catalysts .

However, some of these reported methods for the synthesis of 1,8-dioxodecahydroacridine have limitations such as low yields, unpleasant experimental procedure, reagents are expensive or the use of an excess of catalyst, generation of polluting effluents and prolonged reaction times. Therefore, there is scope for further innovation of methods with milder reaction conditions, short reaction times, increase in variation of the substituents in the components and better yields for the synthesis of

1,8-dioxodecahydroacridine, the discovery of new methodologies using new and efficient catalyst is highly desirable.

Keeping the importance of 1,8-dioxodecahydroacridine derivatives we have decided to synthesize 1,8-dioxodecahydroacridine derivatives (**4a-g**) by one-pot three-component reaction of dimedone (**1**), aromatic aldehyde (**2**) and p-Toluidine (**3**) using magnetically recoverable and reusable spinel cobalt ferrite catalyst synthesized by oxalate precursor method (Scheme-1).



1 **2** **3**

4a-g

Scheme 1: Synthesis of 1,8-dioxo-decahydroacridinederivatives (**4a-g**) from dimedone (**1**), aromatic aldehyde (**2**) and p-Toluidine (**3**) using cobalt ferrite catalyst

Results and Discussions

Structural analysis of $CoFeO_4$ spinel ferrite Catalyst:

The IR spectrum (FTIR) of synthesised oxalate precursor [$CoFe_2(C_2O_4)_3.2H_2O$] were recorded in the range of 400–800 cm^{-1} at room temperature and the obtained results are shown in Figure 1. The two peaks at 3404.25 cm^{-1} and 3343.52 cm^{-1} assigned to OH_2 symmetric stretch and OH_2 asymmetric stretching respectively. The strong single peak at 1640.85 cm^{-1} can be assigned to the >C=O stretching vibration. The two proximate peaks at 1373.24 and 1320.35 cm^{-1} are attributed to the C−O symmetric and asymmetric vibrations, respectively. The peak at 821 cm^{-1} is due to the O−C−O vibration. Another two IR peaks at 494.63 and 532.45 cm^{-1} are from the Fe−O stretching and Co−O stretching, respectively.

Infrared absorption spectrum (FTIR) of calcinated cobalt ferrite were recorded in the range of 400–800 cm^{-1} at room temperature and the obtained results are shown in Figure 2. Two major IR absorption bands observed, the high wave number band v_1 at 591.13 cm^{-1} is assigned to the tetrahedral complexes, while the lower wave number v_2 at 425.36 cm^{-1} is assigned to the octahedral complexes. In the cobalt ferrite sample, the high wave number v_1 represents the vibration of M^{2+}–O^{2-} in the sub-lattice site A, while the lower wave number band v_2 represents the trivalent metal–oxygen vibrations at the octahedral B-sites. The difference in v_1 and v_2 band positions is expected because of the difference in the M^{3+}–O^{2-} distances for the octahedral and the tetrahedral sites [20].

The XRD pattern of the calcinated at 600 ^{o}C cobalt ferrite sample presented in Figure 3. All the peaks in the pattern are characteristic of cubic spinel cobalt ferrite $CoFe_2O_4$ (JCPDS card#79-1744); however, the absence of extra peaks ensures the phase purity [20].

The diffraction peaks corresponding to (220), (311), (222), (400), (422), (333) and (400) planes of cobalt spinel ferrite were ascribed. The average crystallite sizes of the produced cobalt ferrites for the most intense peak [(3 1 1) plane] were calculated from the XRD data using the Debye–Scherrer formula [21] and found 36.599 nm.

The Lattice parameter 'a' was calculated by using XRD data the equation discussed elsewhere [21], $a = d\sqrt{N}$, where, 'a' is lattice constant, 'd' is inter planer spacing and $\sqrt{N} = \sqrt{(h^2 + k^2 + l^2)}$. The calculated value of lattice parameter of cobalt ferrite is A = 8.365 Å, shows that the sample is to be cubic spinel structure.

As it can be noted in SEM micrograph (Figure 4), calcinated $CoFe_2O_4$ nanoparticles prepared by the oxalate precursor method have a uniform, mono-disperse, and spherical/cubic structure with narrow particle size distribution. Very fine spherical $CoFe_2O_4$ particles with some extent of aggregation can be observed in the SEM pictures.

Magnetic characterization of the particles was done using vibrating sample magnetometer (VSM). Hysteresis loop of calcinated cobalt ferrite shown in Figure 4. The saturation magnetization (MS) obtained at room temperature was found to be 76.6947 emu/gm and remanent magnetization (Mr) was 42.4054 emu/gm, and coercivity (Hc) was 290.1552 Oe. The observed saturation magnetization (Ms) value for $CoFe_2O_4$ nanoparticles is 42.4054 emu/gm, which is lower than the reported value

for the bulk samples (80 emu/g), which is a consequence of superparamagnetic nature of the magnetic nanoparticles.

Synthesis of 1,8-dioxo-decahydroacridine Derivatives:

Synthesis of 1,8-dioxo-decahydroacridine derivatives (**4a-g**) by one-pot three-component reaction of dimedone (**1**), aromatic aldehyde (**2**) and p-Toluidine (**3**) using magnetically recoverable and reusable spinel cobalt ferrite catalyst synthesized by oxalate precursor method (Scheme-1) for different aromatic aldehydes investigated.

A mixture of dimedone (**1**) (20 mmol), aromatic aldehydes (**2**) (10 mmol) and p-Toluidine (**3**) (10 mmol) dissolved in solvent (15 mL ethanol + 10 mL distilled water) in round bottom flask (capacity 50 mL), the cobalt ferrite catalysts (15 mol%) added and the reaction mixture was then heated under reflux. The completion of reaction was monitored using TLC, [solvent system Ethyl acetate: n-Hexane (3:7)].

The catalyst removed by fixing the catalyst magnetically at the bottom of the flask with a strong magnet, after which the reaction mixture was taken off and cooled to room temperature. The reaction mixture was then filtered. The residue was then washed with ethanol + water mixture and the residue which is obtained was then dried. The product was purified by column chromatography. Then melting point recorded and, % yield was calculated.

Initially the amount of ferrites (catalyst load) was optimized for model reaction (**4a**) using benzaldehyde. The catalyst was added in amounts of 0, 05, 10, 15 and 20 mol %. The results indicate that increase in amount of catalyst from 0 mol % to 15 mol % increases yield of reaction. When no catalyst was added (0 mol %) for model reaction

4a, there was only small amount (Yield 27 %) of product obtained after 160 min (Table 1).

Table 1: Optimization of reaction conditions and catalyst load (mol %) of cobalt ferrite nanoparticles for the synthesis of of 1,8-dioxo-decahydroacridine(**4a**).

Entry	Catalyst loading (mol %)	Time (min)	Yield of **4a**, [a] %
1	0	160	27:00
2	05	20	89.65
3	10	15	95.45
4	15	15	96.02
5	20	15	93.50

[a] Hereinafter, isolated yield of pure product.

The representative spectral data of 9-(4-(dimethylamino)phenyl)-3,3,6,6-tetramethyl-10-(p-tolyl)-3,4,6,7,9,10-hexahydroacridine-1,8(2H,5H)-dione (4b) : m.p. 198 ^{o}C;

IR (KBr): 3039.91 cm^{-1} (aromatic C-H stretching), 2958.64 cm^{-1} (aliphatic C-H stretching), 1719.17 cm^{-1} (C=O stretching), 1604.81 cm^{-1} (aromatic C=C stretching), 1469.64 cm^{-1} (C-N stretching), 1148.96 cm^{-1} (C-C stretching) cm^{-1}, 814.73 cm^{-1} (aromatic C-H bending)

^{1}H NMR: (500 MHz, $CDCl_3$): δ 1.093 (s, 6H, CMe); 1.224 (s, 6H, CMe); 2.320 (s, 4H, CH_2); 2.378 (s, 6H, CMe); 2.404 (s, 3H, CMe); 2.897 (s, 6H, NMe); 5.471 (s, 1H, CH); 6.650 (s, 2H, Ar-CH); 6.931 (s, 2H, Ar-CH); 6.951 (s, 2H, Ar-CH); 7.259 (s, 2H, Ar-CH)

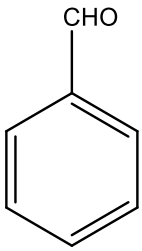
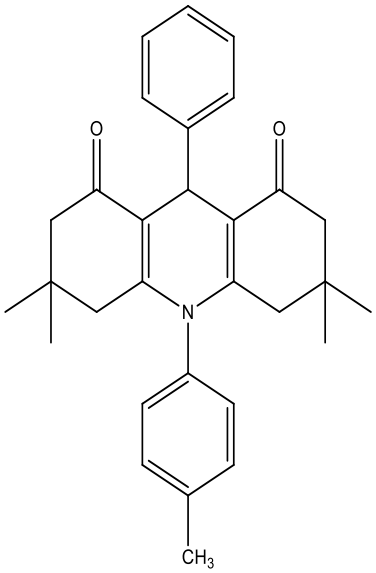
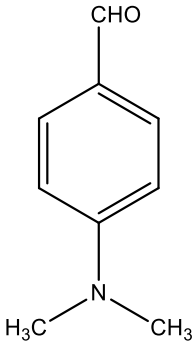
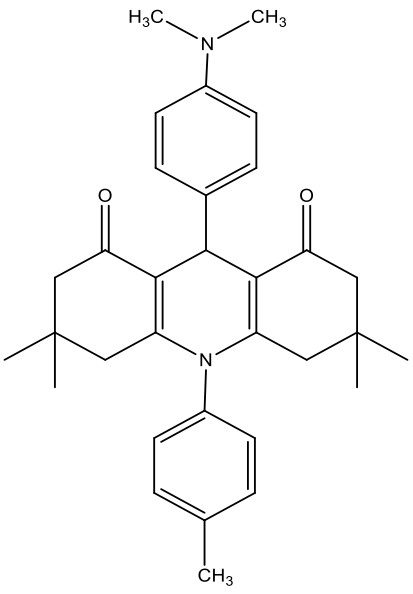
To evaluate the generality of this approach, seven aromatic aldehydes were used under optimized conditions to obtain substituted 1,8-dioxo-decahydroacridine **4(a-g)** (Scheme 1). As shown in Table 2, the reaction of aromatic aldehydes having electron-withdrawing groups reacted very well at faster rate compared with aromatics aldehydes substituted with electron releasing groups to give 1,8-dioxo-decahydroacridine.

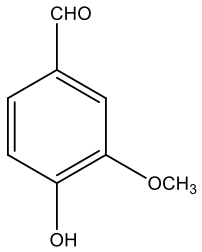
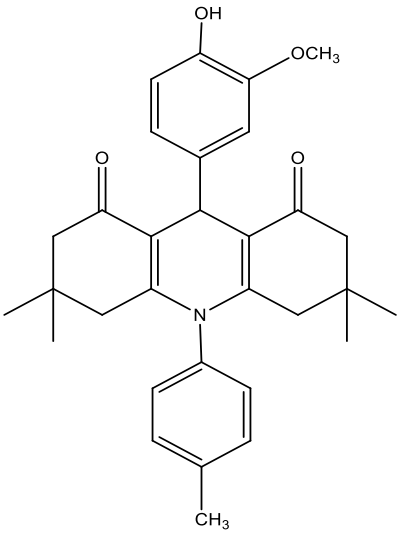
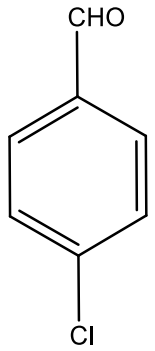
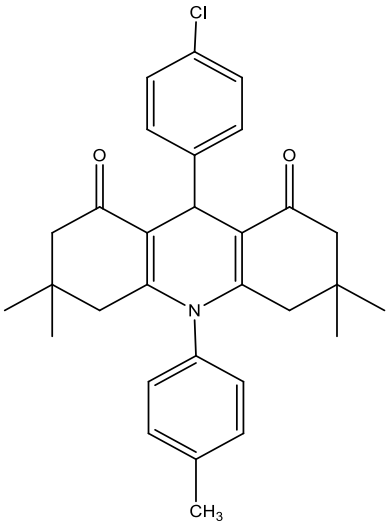
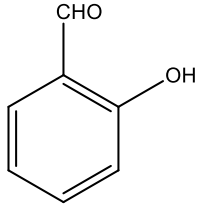
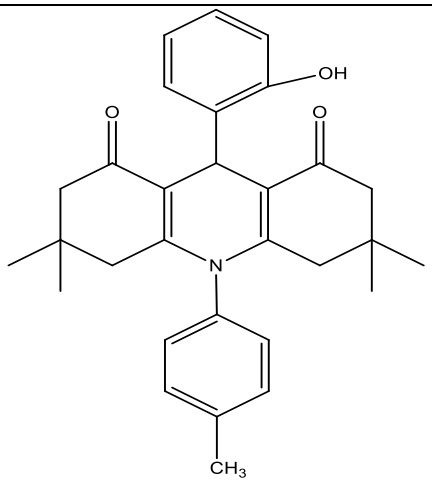
Catalyst reusability is of major concern in heterogeneous catalysis. The recovery and reusability of the catalyst was investigated in this reaction for model reaction (**4a**). The reaction was carried out using dimedone (**1**) (20 mmol), aromatic aldehydes (**2**) (10 mmol) and p-Toluidine (**3**) (10 mmol) dissolved in solvent (15 mL ethanol + 10 mL distilled water) in round bottom flask (capacity 50 mL), the cobalt ferrite catalysts (10 mol%) added and the reaction mixture was then heated under reflux.The completion of reaction was monitored using TLC, [solvent system Ethyl acetate: n-Hexane (3:7)].

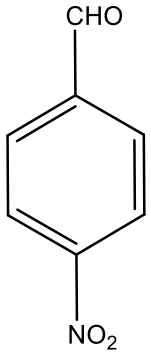
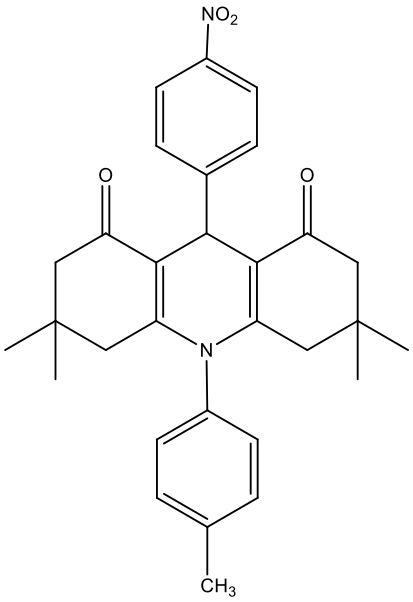
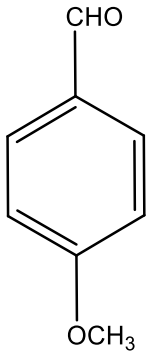
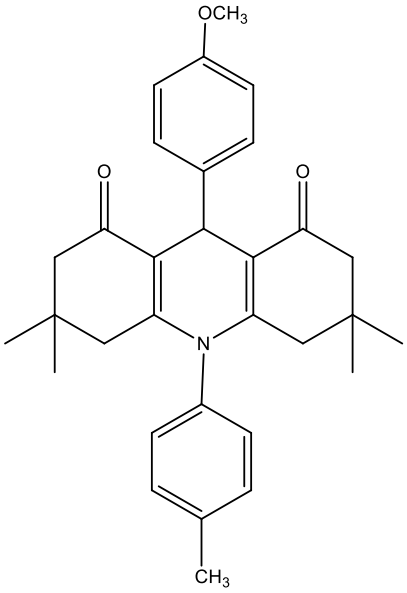
The catalyst removed by fixing the catalyst magnetically at the bottom of the flask with a strong magnet, after which the reaction mixture was taken off and cooled to room temperature. The solid catalyst washed twice with acetone and the fresh substrate was introduced into the flask, allowing the reaction to proceed for the next run. The catalyst was consecutively reused five times without any noticeable loss of its catalytic activity (Cycle number and yield of **4a**: 1- 96.02 %; 2- 95.56 %; 3- 94.60 %; 4- 93.20 %; 5- 92.75 %). These catalysts are highly magnetic therefore; they could be easily and almost completely separated by an external magnet which is of a great advantage for a heterogeneous catalyst.

The work-up of these reactions was very clean, the catalyst removed by fixing the catalyst magnetically at the bottom of the flask with a strong magnet, after which the reaction was taken off and cooled to room temperature. The reaction mixture was then filtered. The residue was then washed with ethanol + water mixture and the residue which is obtained was then dried. The catalyst is not only efficient but also mild and easy to handle.

Table 2: Synthesis of 1,8-dioxo-decahydroacridinederivatives using $CoFe_2O_4$ nanoparticles(**4a-g**).

Entry	Aromatic Aldehyde	Product	Time / min	Yield[a] / %	M.P.
1		 **4a**	25	96.02 %	210 ^{0}C
2		 4b	15	97.63 %	198 ^{0}C

Entry	Aromatic Aldehyde	Product	Time / min	Yield / %	M.P.
3		 4c	15	96.36 %	190 ^{0}C
4		 4d	15	95.22 %	260 ^{0}C
5		 4e	20	95.92%	256 ^{0}C

Entry	Aromatic Aldehyde	Product	Time / min	Yield / %	M.P.
6		 4f	25	94.32 %	196 ^{0}C
7		 4g	15	94.77%	240 ^{0}C

[a] Hereinafter, isolated yield of pure product.

Experimental

Preparation of $CoFe_2O_4$ ferrite catalyst:

Nano spinel cobalt ferrite was synthesized by the oxalate precursor method [22]. Analytical reagent grade oxalic acid, cobalt sulphate and ferrous sulphate were used for synthesis. Stoichiometric amount of corresponding cobalt sulphate and ferrous sulphatedissolved in deionized water at 60 ^{o}C to obtain clear solution. Saturated oxalic acid solution added with continuous string till all metal sulphates converted in to metal oxalates, then the precipitate digested for half hour, washed with deionized water till free from sulphates (tested with barium chloride). The oxalate precursor precipitate filtered and dried at room temperature. The oxalate precursor's calcinated at 600 °C for four hours, gives final spinel cobalt ferrites.

Characterization of Cobalt ferrite catalyst:

The structural parameters investigated by X-ray diffraction Phillips-3710 X-ray diffractometer employed with Cu-K_α radiation (λ=1.5405Å) were used in the present study. The infrared spectra were recorded at room temperature using Perkin Elmer infrared spectrophotometer. Magnetic measurements carried at room temperature using vibrating sample magnetometer.

General Procedure for synthesis of 1,8-dioxo-decahydroacridine derivatives:

A mixture of dimedone (**1**) (20 mmol), aromatic aldehydes (**2**) (10 mmol) and P-Toluidine (**3**) (10 mmol) dissolved in solvent (15 mL ethanol + 10 mL distilled water) in round bottom flask (capacity 50 mL), the cobalt ferrite catalysts (10 mol%) added and the reaction mixture was then heated under reflux. The completion of reaction was monitored using TLC, [solvent system Ethyl acetate: n-Hexane (3:7)].

The catalyst removed by fixing the catalyst magnetically at the bottom of the flask with a strong magnet, after which the reaction mixture was taken off and cooled to room temperature. The reaction mixture was then filtered. The residue of 1,8-dioxo-decahydroacridinederivatives **4a-g** was then washed with ethanol + water mixture and the residue which is obtained was then dried. The product was purified by recrystallization using ethanol as a solvent. Then melting point recorded and, % yield was calculated.

Characterization of 1,8-dioxo-decahydroacridine derivatives:

Melting points are uncorrected. ^{1}H-NMR spectra of representative derivative was recorded on BrukerAvance III HD NMR 500 MHz spectrometer. Chemical shifts are reported in δ units (ppm) relative to TMS as internal standard. The infrared spectra were recorded at room temperature using Perkin Elmer infrared spectrophotometer. All the reagents used were of AR grade and were used without further purification.

Conclusion

In conclusion, spinel cobalt ferrite nanoparticles successfully synthesized by oxalate precursor method. XRD pattern and IR spectrum confirmed formation of single phase cubic spinel copper cerium ferrite. The average crystallite size is 36.599 nm and lattice constant is 8.365 Å. Nano spinel copper cerium ferrite nanoparticles is a readily synthesized, non-toxic, inexpensive, easily magnetically recoverable and efficient catalyst for the synthesis of 1,8-dioxo-decahydroacridine derivatives by the condensation of aromatic aldehydes with p-Toluidine and dimedone. The advantages offered by this method are short reaction times, ease of product isolation, and high yields.

References

1. Ugi, I., Dömling, A., &Hörl, W. (1994). Multicomponent reactions in organic chemistry. *Endeavour*, *18*(3), 115-122.

2. Nikoorazm, M., Mohammadi, M., &Khanmoradi, M. (2020). Zirconium@ guanine@ MCM-41 nanoparticles: An efficient heterogeneous mesoporousnanocatalyst for one-pot, multi-component tandem Knoevenagel condensation–Michael addition–cyclization Reactions. *Applied Organometallic Chemistry*, *34*(8), 5704.

3.Mandle, U. M., Pachpinde, A. M., Kulkarni, D. R., & Shinde, B. L. (2021). An efficient one pot multicomponent synthesis of pyranopyrazoles using Cu2+ doped Ni-Zn nano ferrite catalyst. *Materials Today: Proceedings*, *46*, 6122-6126.

4. Nunes, P. S. G., Vidal, H. D. A., &Corrêa, A. G. (2020). Recent advances in catalytic enantioselective multicomponent reactions. *Organic &Biomolecular Chemistry*, *18*(39), 7751-7773.

5. Shinde, B. L., Mandle, U. M., Pachpinde, A. M., &Lohar, K. S. (2022). Synthesis and characterization of Al3+ substituted Ni–Cu–Zn nano ferrites. *Journal of Thermal Analysis and Calorimetry*, *147*(4), 2947-2956.

7. Houshiar, M., Zebhi, F., Razi, Z. J., Alidoust, A., &Askari, Z. (2014). Synthesis of cobalt ferrite (CoFe2O4) nanoparticles using combustion, coprecipitation, and

precipitation methods: A comparison study of size, structural, and magnetic properties. *Journal of Magnetism and Magnetic Materials*, *371*, 43-48.

8. Ramankutty, C. G., &Sugunan, S. (2001). Surface properties and catalytic activity of ferrospinels of nickel, cobalt and copper, prepared by soft chemical methods. *Applied Catalysis A: General*, *218*(1-2), 39-51.

9. Kooti, M., &Afshari, M. (2012). Magnetic cobalt ferrite nanoparticles as an efficient catalyst for oxidation of alkenes. *ScientiaIranica*, *19*(6), 1991-1995.

10. Bahlawane, N., Ngamou, P. H. T., Vannier, V., Kottke, T., Heberle, J., &Kohse-Höinghaus, K. (2009). Tailoring the properties and the reactivity of the spinel cobalt oxide. *Physical Chemistry Chemical Physics*, *11*(40), 9224-9232.

10. Sobhani-Nasab, A., Maddahfar, M., &Hosseinpour-Mashkani, S. M. (2016). Ce (MoO4) 2 nanostructures: synthesis, characterization, and its photocatalyst application through the ultrasonic method. *Journal of Molecular Liquids*, *216*, 1-5.

11.Hosseinpour-Mashkani, S. M., Sadeghinia, A., Zarghami, Z., &Motevalli, K. (2016). AgInS 2 nanostructures: sonochemical synthesis, characterization, and its solar cell application. *Journal of Materials Science: Materials in Electronics*, *27*, 365-374.

12. Rahimi-Nasrabadi, M., Pourmortazavi, S. M., Khalilian-Shalamzari, M., Hajimirsadeghi, S. S., &Zahedi, M. M. (2013). Optimization of synthesis procedure and structure characterization of manganese tungstate nanoplates. *Central European Journal of Chemistry*, *11*, 1393-1401.

13. Ramezani, M., Sobhani-Nasab, A., &Hosseinpour-Mashkani, S. M. (2015). Synthesis, characterization, and morphological control of Na 1/2 Bi 1/2 Cu 3 Ti 4 O 12 through modify sol–gel method. *Journal of Materials Science: Materials in Electronics*, *26*, 4848-4853.

14. MostafaHosseinpour-Mashkani, S., Maddahfar, M., &Sobhani-Nasab, A. (2016). Novel silver-doped CdMoO 4: synthesis, characterization, and its photocatalytic performance for methyl orange degradation through the sonochemical method. *Journal of Materials Science: Materials in Electronics*, *27*, 474-480.

15.Alam, M. M., Mubarak, A. T., Assiri, M. A., Ahmed, S. M., &Fouda, A. M. (2019). A facile and efficient synthesis of 1, 8-dioxodecahydroacridines derivatives catalyzed by cobalt–alanine metal complex under aqueous ethanol media. *BMC chemistry*, *13*, 1-10.

16. Bossert, F., &Vater, W. (1989). 1, 4-Dihydropyridines—a basis for developing new drugs. *Medicinal research reviews*, *9*(3), 291-324.

17. Stout, D. M., & Meyers, A. I. (1982). Recent advances in the chemistry of dihydropyridines. *Chemical reviews*, *82*(2), 223-243.

18.Bretzel, R. G., Bollen, C. C., Maeser, E., &Federlin, K. F. (1992). Trombodipine platelet aggregation inhibitor antithrombotic. *Drugs Future*, *17*, 465.

19. Reddy, B. S., Antony, A., &Yadav, J. S. (2010). Novel intramolecularaza-Diels–Alder reaction: a facile synthesis of trans-fused 5H-chromeno [2, 3-c] acridine derivatives. *Tetrahedron Letters*, *51*(23), 3071-3074.

20. Allaedini, G., Tasirin, S. M., &Aminayi, P. (2015). Magnetic properties of cobalt ferrite synthesized by hydrothermal method. *International Nano Letters*, *5*(4), 183-186.

21. Shinde, B. L., Mandle, U. M., Pachpinde, A. M., &Lohar, K. S. (2022). Synthesis and characterization of Al3+ substituted Ni–Cu–Zn nano ferrites. *Journal of Thermal Analysis and Calorimetry*, *147*(4), 2947-2956.

22. Srinivasan, S. Y., Paknikar, K. M., Bodas, D., &Gajbhiye, V. (2018). Applications of cobalt ferrite nanoparticles in biomedical nanotechnology. *Nanomedicine*, *13*(10), 1221-1238.

Spectroscopic data and other relevant supporting data

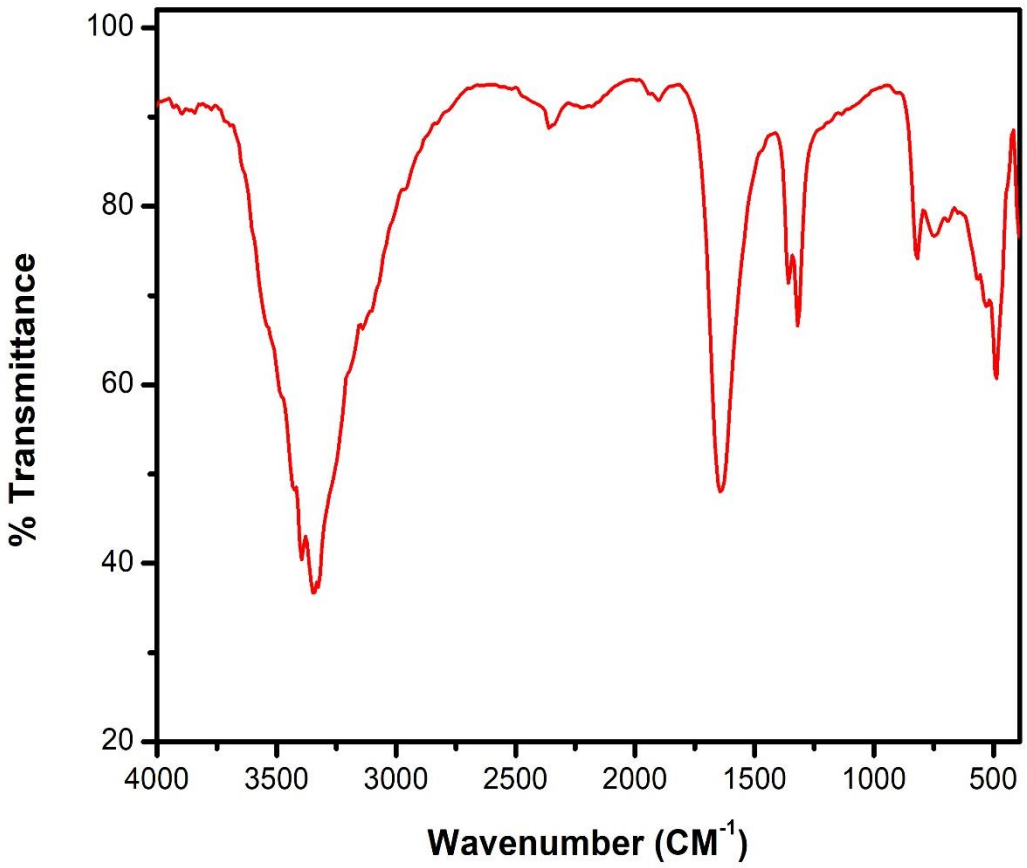


Figure 1: IR spectrum of Oxalate Precursor [$CoFe_2(C_2O_4)_3.2H_2O$]

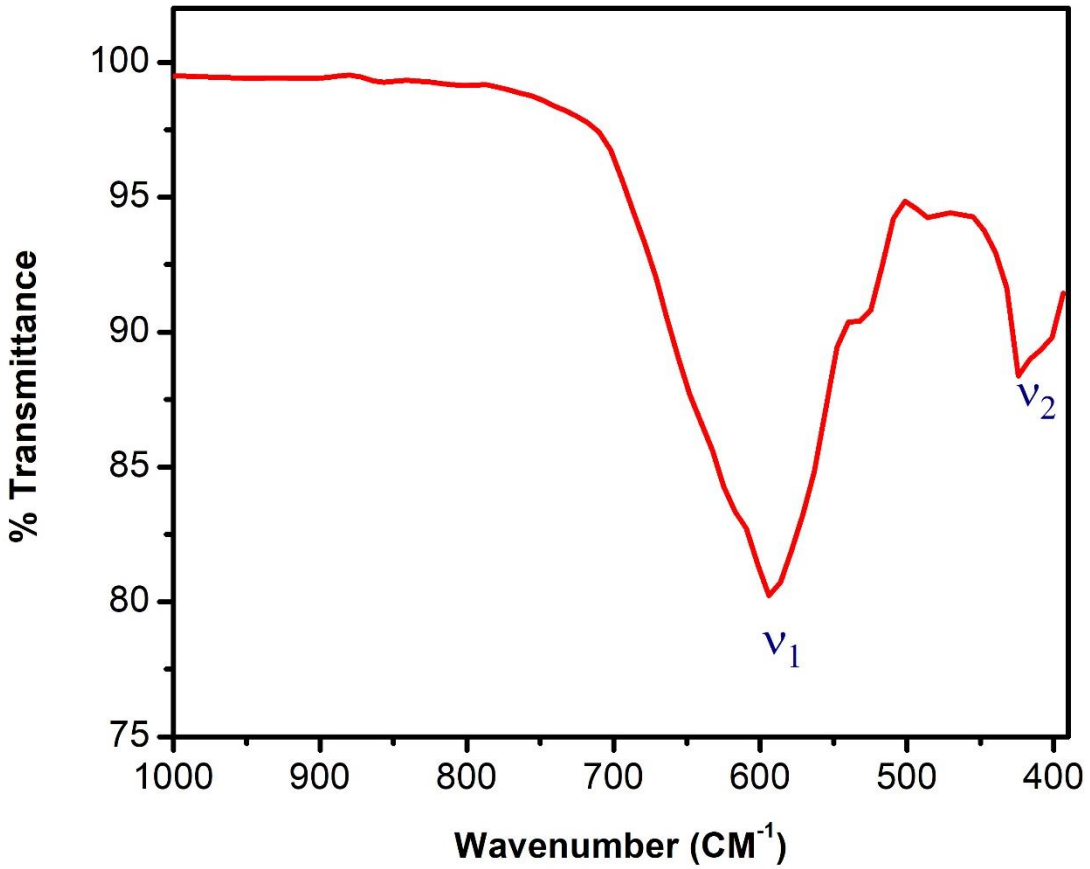


Figure 2: IR spectrum of $CoFe_2O_4$ catalyst

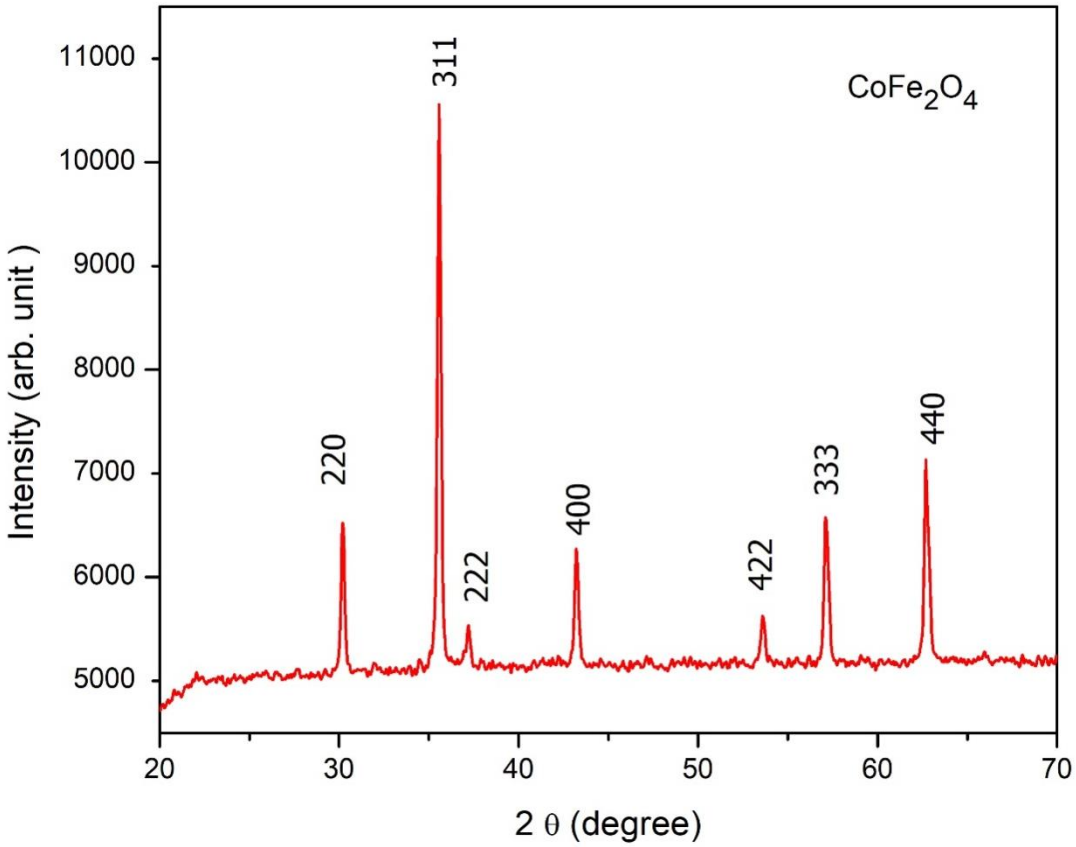


Figure 3: XRD patterns of calcinated $CoFe_2O_4$ catalyst

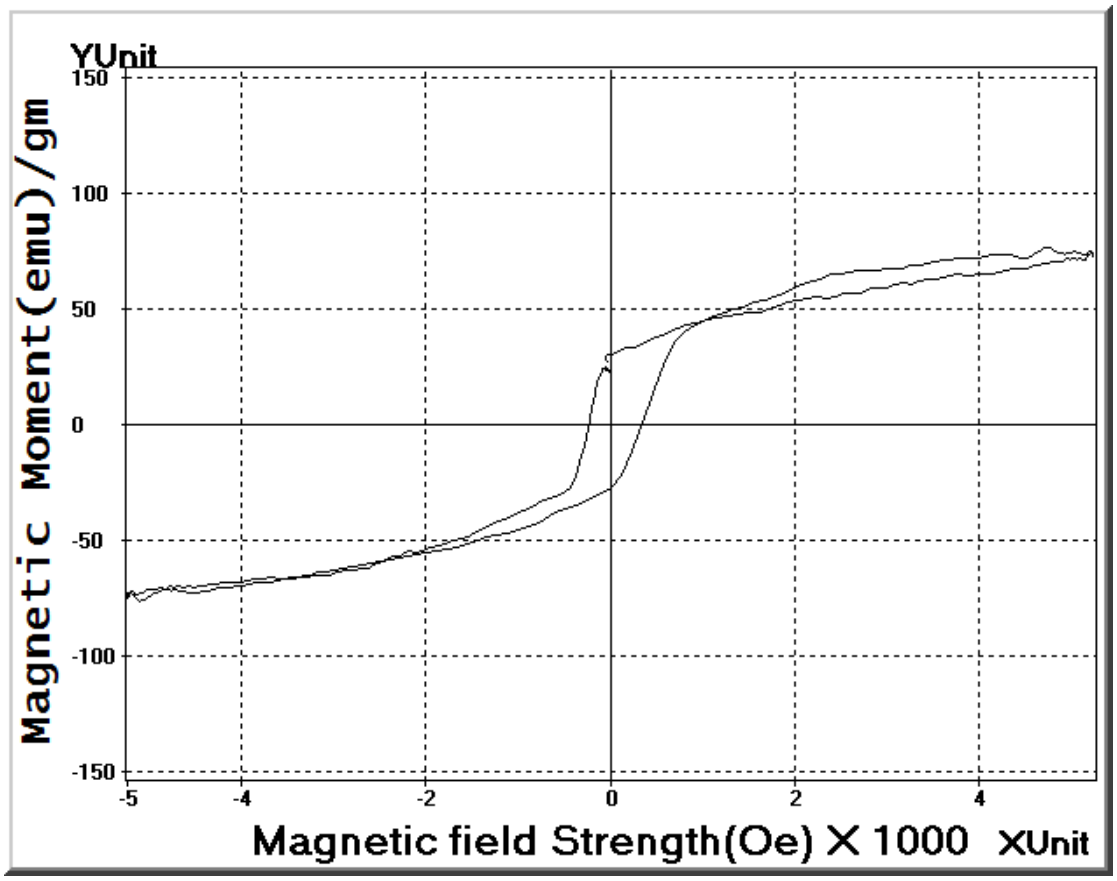


Figure 4: Hysteresis loop of calcinated $CoFe_2O_4$ catalyst

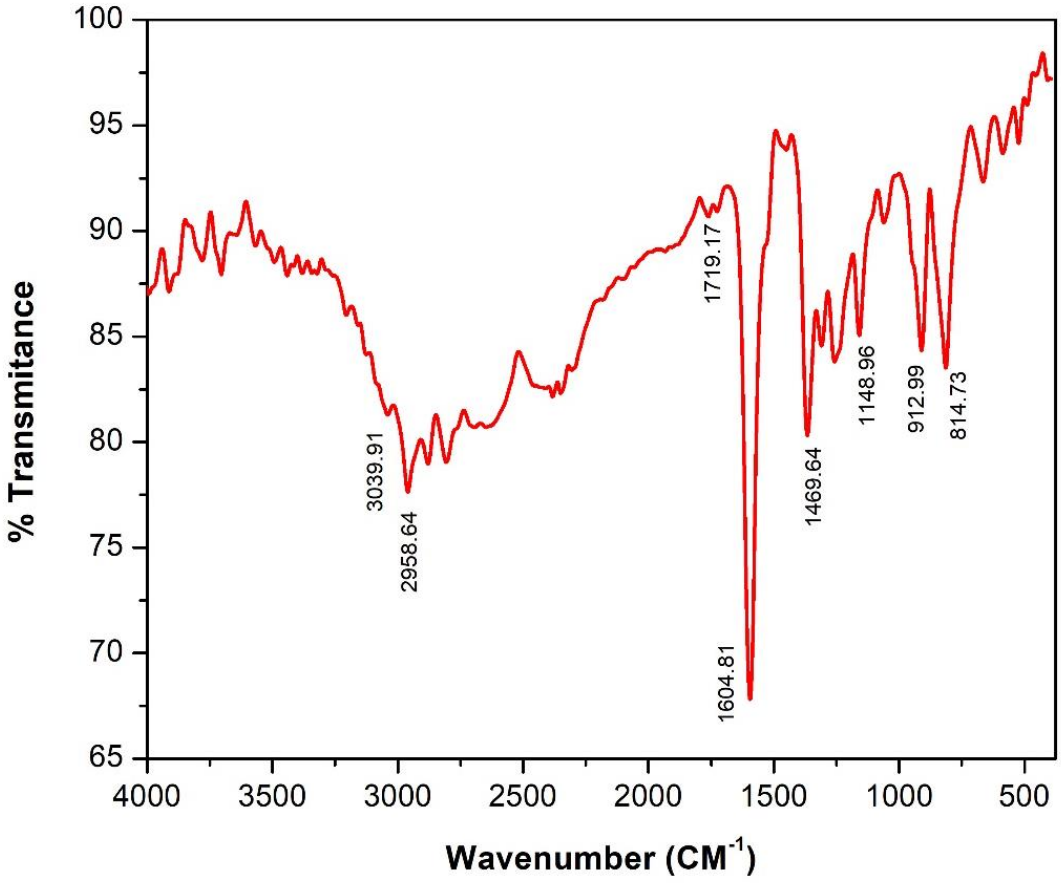


Figure 5: IR spectrum of 9-(4-(dimethylamino)phenyl)-3,3,6,6-tetramethyl-10-(p-tolyl)-3,4,6,7,9,10-hexahydroacridine-1,8(2H,5H)-dione (4b)

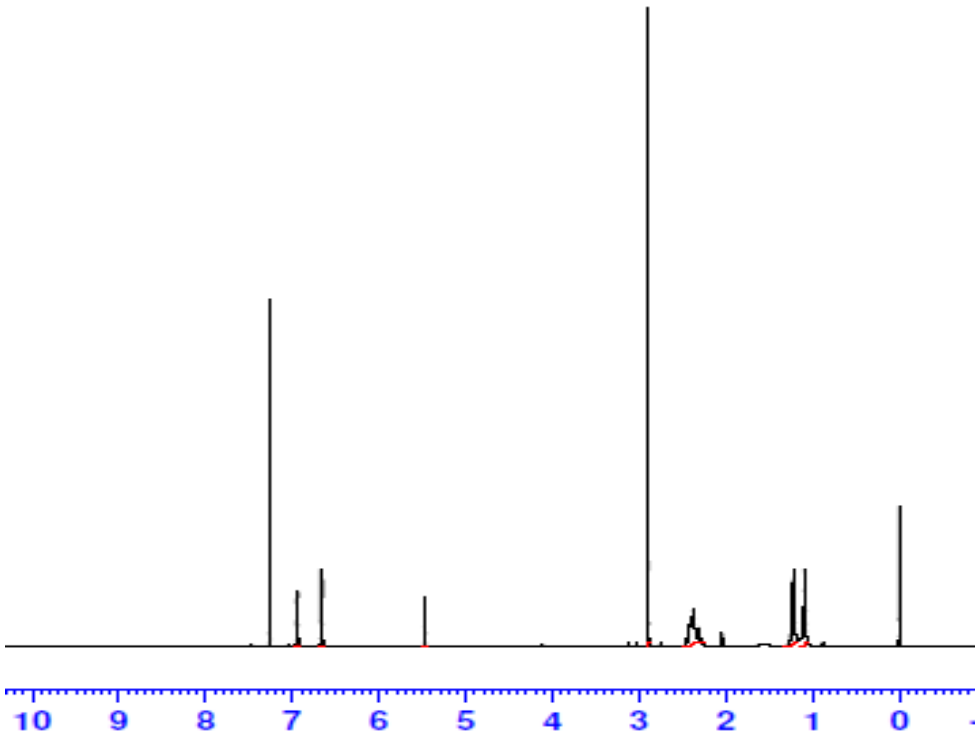


Figure 5: ^{1}HNMR spectrum of 9-(4-(dimethylamino)phenyl)-3,3,6,6-tetramethyl-10-(p-tolyl)-3,4,6,7,9,10-hexahydroacridine-1,8(2H,5H)-dione (4b)

Acknowledgement

I express my genuine thanks to Principal Dr. Pandit Shelke and Dr. M. M. Jagtap, Head, Department of Chemistry, P. D. E. A.'s, Waghire College of Arts, Commerce and Science, Saswad, Dist: Pune for providing laboratory facility. I am very thankful to Professor Dr. B. L. Shinde for their support and guidance. I am also thankful to all teaching staff and non-teaching staff members of Department of Chemistry, P. D. E. A.'s, Waghire College of Arts, Commerce and Science, Saswad, Dist: Pune for their apt suggestions and kind cooperation from time to time.

I am expressing deep sense of gratitude to my entire family members for their encouragement and support.

I am also thankful to PDEA's SGR Sable College of Pharmacy, Saswad, Department of Physics, Punyashlok Ahilyadevi HolkarSolapur University; Department of Chemistry Central Instrumentation facility, Savitribai Phule Pune University, Pune for their kind cooperation and providing characterization facilities / techniques as IR, XRD and NMR for characterization of samples.

At the end, I would like to acknowledge and thank all the known and unknown faces individually for their direct and indirect contribution for the successful completion of this work. I am grateful to all of you for your kind cooperation.

Ms. Dudhane Shubhada Gajanan

P.D.E.A.'s

Waghire College of Arts, Commerce and Science, Saswad

Department of Computer Science

Academic Year (2023-24) IN

PARTIAL FULFILLMENT

OF

M.Sc.(Computer Science)- II (SEMIV)

UNDER

SAVITIBAI PHULE PUNE UNIVERSITY

A Project Report on

"AGRO PORTAL - FERTILIZER"

Submitted By

Ms. Shruti Sanjay Gaikwad

P.D.E.A.'s

Waghire College of Arts, Commerce and Science, Saswad

Department of Computer Science

Academic Year (2023-24) IN

PARTIAL FULFILLMENT OF

M.Sc.(Computer Science)- II (SEMIV)

UNDER

SAVITIBAI PHULE PUNE UNIVERSITY

A Project Report on

" AGRO PORTAL - FERTILIZER"

Submitted By

Ms. Shruti Sanjay Gaikwad

P.D.E.A.'s

Waghire College of Arts, Commerce and Science, Saswad

Department of Computer Science

Academic Year (2023-24) IN

PARTIAL FULFILLMENT OF

M.Sc.(Computer Science)- II (SEMIV)

UNDER

SAVITIBAI PHULE PUNE UNIVERSITY

A Project Report on

"AGRO PORTAL - FERTILIZER"

Submitted By

Ms. Shruti Sanjay Gaikwad

INDUSTRY INTERNSHIP REPORT ON

AGRO PORTAL - FERTILIZER

Web Soft IT Solution
Innovator in IT

AT

WEB SOFT IT SOLUTION

SUBMITTED BY

SHRUTI SANJAY GAIKWAD

IN PARTIAL FULFILMENT OF

MSC (COMPUTER SCIENCE) SEM IV

UNDER THE GUIDANCE OF

MS. MANISHA BIBAWE

P.D.E.A.'s

Waghire College of Arts, Commerce and Science, Saswad

Department of Computer Science

CERTIFICATE

This is to certify that, **Ms. Shruti Sanjay Gaikwad** of class M.Sc. (Computer Science)- II SEMIV Seat No: 1197 has completed the project on **"Agro Portal – Fertilizer "** as a partial fulfilment and requirement as per SPPU curriculum for the project in the academic year 2023-24.

(Mr. Jadhavrao S.S)
Project Guide

Dr. Wani V. R.
H.O.D.
(Department of Comp. Sci.)

Internal Examiner

I. T. Expert

External Examiner

Web Soft IT Solution
Innovator in IT

WEB SOFT IT SOLUTION

Office Address: 1st Floor, Office No -2, Building C-2, Manikmoti Complex, Near Jivandhara Hospital, Pune- Satara Road, Katraj Chowk, Pune- 411046.
Mobile No: +91-7755945544 E-mail: websoftitsolutionpune@gmail.com
Website: www. websoftitsolution.com

REF: Int-WS1090-2024

To Whomsoever It May Concern

This is to certify that **Ms. Shruti Sanjay Gaikwad** student from **"Waghire College Saswad"** has successfully delivered Internship on **"Agro Portal - Fertilizer"** as a partial fulfillment of requirement towards of her project.

University Name- Savitribai Phule Pune University, Pune.

Duration- 06th January 2024 to 30th May 2024

As abided by intellectual property and confidentiality policy of WEBSOFT IT SOLUTION Pune.

We wish her every success in life.

Websoft IT Solution Pune

AUTHORIZED PERSON SIGN

WEB SOFT IT SOLUTION PUNE

www.websoftitsolution.com

ACKNOWLEDGEMENT

I would like to express my deepest gratitude to Ms. Manisha Bibawe ma'am., for his invaluable guidance, support, and mentorship throughout my internship period. His expertise in the field of complaint management systems has been instrumental in shaping this project. I am also thankful to the entire team at for providing me with the opportunity to work on this project and for their continuous encouragement and assistance. I extend my appreciation to all those who have directly or indirectly contributed to the successful completion of this project. Your inputs, feedback, and collaboration have been immensely valuable. Lastly, I would like to express my heartfelt thanks to my family and friends for their unwavering support and understanding during this journey.

Date:

Place: Pune

Index

1. Company Profile

Web Soft IT Solution

Innovator in IT

Web Soft IT Solution is a leader in Software Development and empowers IT individuals with competitive advantage. Web Soft IT Solution is a leader in Software Development and empowers IT individuals with competitive advantage Our Company provides creative solutions that not only cater to client's current but future needs as well. Our company provides services in the field of custom software development and information technology consulting We bring intent will and soul into our operations as we charge forward to help customers scale new peaks, develop monetization avenues, and diversify their reach and impact What you partner and collaborate with us, you are with partners in progress who care and deliver uniquely memorable experiences.

What we do?

We are specialized at transforming the creative business idea into interactive web solutions. We offer fullfledged web services from web design, development, interactive ecommerce solutions, graphic design, logo design, digital marketing and online brand reputation that make them stand unique amongst their competitors.

Who we are?

We are a team of professional organization teamed by competent, committed, qualified and experienced personnel in various field. With the help of our commitment to professionalism and excellence.

The programmers we design are developed to meet specific organizational needs. We provide a service that provides clients with value for each rupee invested. So feel free to come forward and avail the opportunity of getting reasonably priced consultancy services from us.

OUR SERVICES

Web Soft IT Solution provides various Software Development services to the clients located worldwide in order to rationalize their business processes and e-enabling their business. We, at Web Soft IT Solution strongly believe that technology is a true business enhancer and you should not implement technology for the sake of it. That's why; we help you make best use of information technology. With the use of our services such as application development, application migration and application maintenance for your existing applications, you can formulate the best possible use of technology. We are a team of professional organization teamed by competent, committed, qualified and experienced personnel in various field. With the help of our commitment to professionalism and excellence. The programmers we design are developed to meet specific organizational needs. We provide a service that provides clients with value for each rupee invested. So feel free to come forward and avail the opportunity of getting reasonably priced consultancy services from us.

IT PROVIDES THE FOLLOWING SERVICES TO THE CLIENTS:-

Technology Services-

- Data Warehousing
- Data Migration
- High Availability
- Internet of Things
- Java Technology
- Linux and Unix
- Architecture

Business Services-

- Business Analytics
- Business Process Services
- Customer Experience

- Customer Relationship Management
- Enterprise Content Management
- Enterprise Management
- Management & Retail Services

2. Existing System and Need of Existing System

The present scenario for shopping is to visit the shops and market manually and then from the available product list one needs to choose the item. This system is not much user-friendly as one needs to go to the market physically and then select items only from the available list. So mostly it is difficult to get the product as per our desire.

Description about the products are less available and are mostly verbal only. For this type of shopping, one needs to have ample amount of free time. Also not really good markets exist everywhere, so many times good markets become out of reach for certain people.

Need of Existing System

Agro Portal is online application, which provides the online shopping facility available to farmers.

User needs a simple interface to order farming product online.

This project Online Agro Portal fulfils all the requirements of user and it provides an easy interface to navigate

THIS SYSTEM PROVIDES THE FOLLOWING FACILITIES-

- Order tracking
- Report generation.
- Payment Gateway.
- SEO (Search Engine Optimization).
- Review product

3.Scope of Work:

The purpose of online agriculture store website is to help farmers to buy agriculture products from their homes. Farmers can buy different agriculture products from the website.

- Farmers can buy different seeds, pesticides, fertilizer from anywhere through internet connectivity.
- Customers will get them registered in this application and then will be able to access the website by logging into the system.
- Customers can view/search the list of items based on their categories, add the items in their Wish List, also able to update it as per requirement.
- Customers regarding any product, add the product/item in the Cart and select any of three payment options Cash on delivery, Payment via Credit Card or online transfer, update and conceal the order.
- Admin can log in to the admin panel and will be able to add/delete the list of categories such as seeds, pesticides, fertilizers etc.
- Admin can add the list of the item of each category based on their names, price and company name and mention their expiry as well.

- Admin will also add/update/delete information about promotion and sales and also send SMS to regular customers on any promotion or sale.

4. Operational Environments

(Client Side)

RAM	Minimum 2GB and above
Hard Disk	Minimum 80 GB and above
Processor	Dual Core and above

Hardware Specifications (Server Side)

RAM	Minimum 4GB and above
Hard Disk	Minimum 250 GB and above
Processor	Core 2 Duo and above

Software Specifications (Client Side)

Operating System	Windows XP/Later
Web Browser	Internet Explorer-6/Later Mozilla Firefox

Software Specifications (Server Side)

Operating System	Windows XP/Later
Web Browser	Internet Explorer-6/Later Mozilla Firefox / Later Chrome/ Later
Technology	Java
Database	MYSQL
Development Tool(Editor)	Eclipse Photon
Supporting Technology	Ajax, JavaScript, JQuery, Html5, Css3

5. Detail Description of Technology Used

1) JSP(Java Server Pages):

Java Server Pages (JSP) is a technology for developing web pages that support dynamic content which helps developers insert java code in HTML pages by making use

of special JSP tags, most of which start with <% and end with %>.

A Java Server Pages component is a type of Java servlet that is designed to fulfill the role of a user interface for a Java web application. Web developers write JSPs as text files that combine HTML or XHTML code, XML elements, and embedded JSP actions and commands.

Using JSP, you can collect input from users through web page forms, present records from a database or another source, and create web pages dynamically.

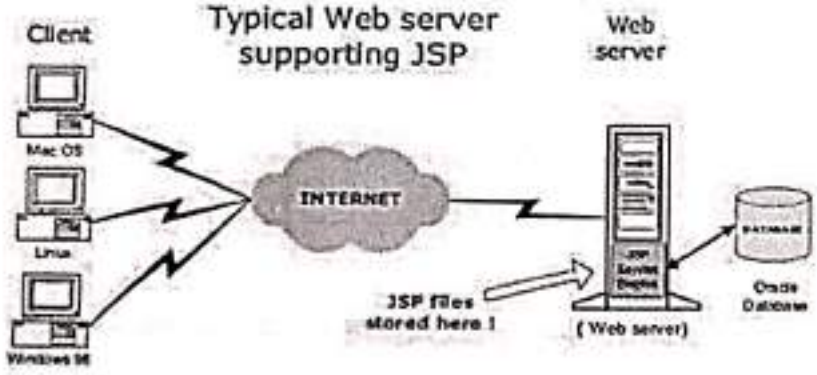
JSP Architecture:

The web server needs a JSP engine ie. container to process JSP pages. The JSP container is responsible for intercepting requests for JSP pages. This tutorial makes use

of Apache which has built-in JSP container to support JSP pages development.

A JSP container works with the Web server to provide the runtime environment and other services a JSP needs. It knows how to understand the special elements that

are part of JSPs.



2) MVC Architecture:

Model View Controller or MVC as it is popularly called, is a software design pattern for developing web applications. A Model View Controller pattern is made up of the

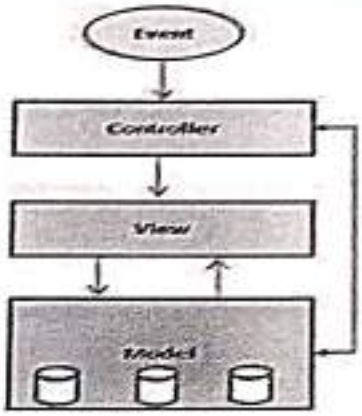
following three parts:

- **Model** - The lowest level of the pattern which is responsible for maintaining data.

- **View** - This is responsible for displaying all or a portion of the data to the user.
- **Controller** - Software Code that controls the interactions between the Model and View.

MVC is popular as it isolates the application logic from the user interface layer and supports separation of concerns. Here the Controller receives all requests for the application and then works with the Model to prepare any data needed by the View. The View then uses the data prepared by the Controller to generate a final presentable

response. The MVC abstraction can be graphically represented as follows.



The model

The model is responsible for managing the data of the application. It responds to the request from the view and it also responds to instructions from the controller to update

itself.

The view

A presentation of data in a particular format, triggered by a controller's decision to present the data. They are script based templating systems like JSP, ASP, PHP and very neasy to integrate with AJAX technology.

The controller

The controller is responsible for responding to user input and perform interactions on the data model objects. The controller receives the input, it validates the input and then performs the business operation that modifies the state of the data model.

6. PROPOSED SYSTEM

The proposed system consists of the registration module for the user. The registered user gets the accessibility and to purchase and buy the any type of agriculture products.

- In this system you can able to purchase agriculture product at any time, place.
- Online stores must describe agriculture products for sale with text, photos, and multimedia files.
- One advantage of shopping online is being able to quickly seek out deals for items or services with many different vendors.
- Choose agriculture products faster and easier at one place.
- Alerts and real time reporting through Emails (to both vendor as well as buyer).
- Reports generated can be saved for future references.
- Inventory reports for the vendor/seller on daily, monthly, yearly basis.
- Good/Trusted & Tension free delivery services.

7. OBJECTIVE

- To promoting a service or product online.
- To selling a product or a service online.

- To providing product support and customer service.
- To easily add or remove a product from cart.
- To easily admin can view or update details of products.
- To establishing brand awareness and identity.

8. User Requirement

The nonfunctional requirements are as follows:

1) Security:

- Each member is required to have an individual password
- Administrators have the option of increasing the level of password security their members must use.

2) Reliability:

- System will prompt the user if any incorrect input is made.
- To handle data consistency, DBMS software is used.
- User can easily work through the different menus and buttons.

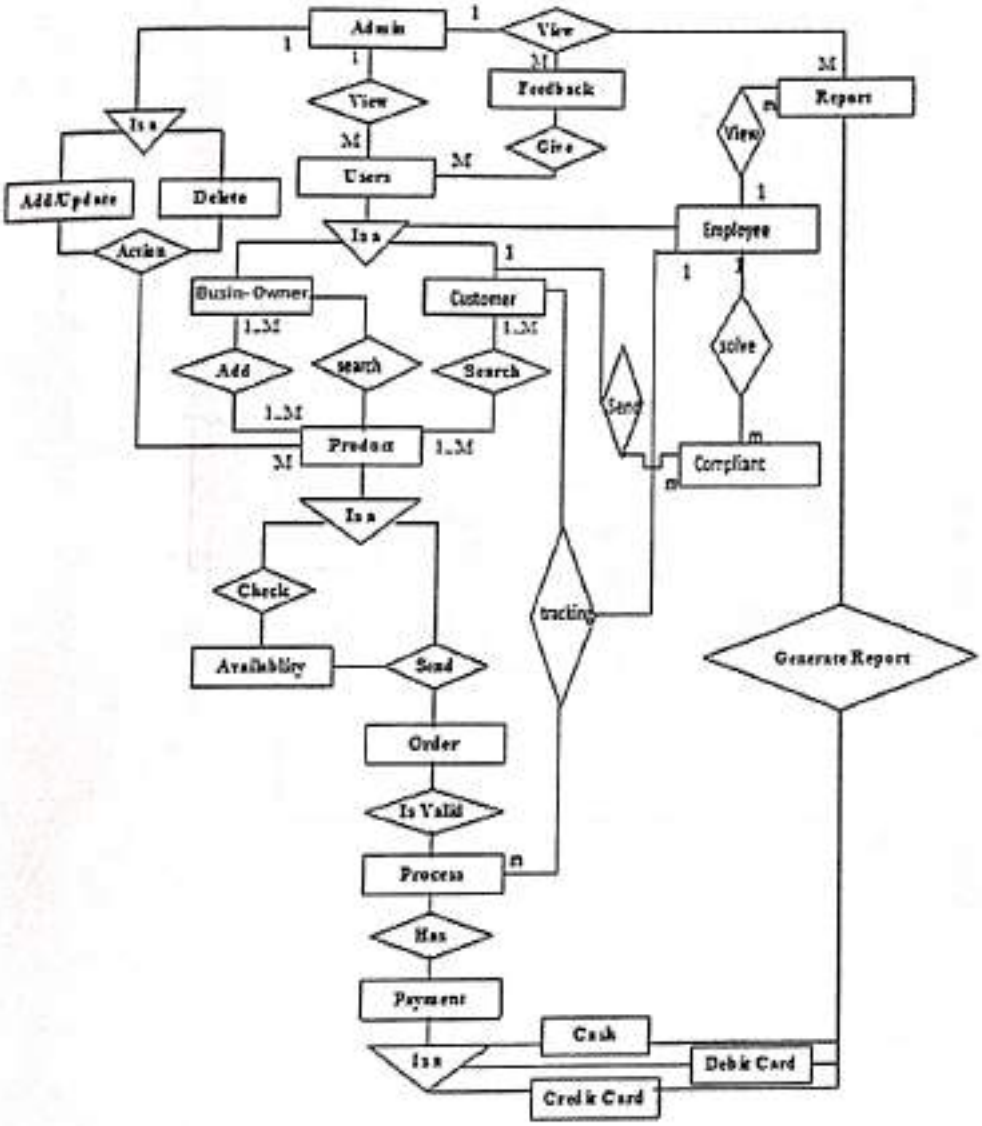
3) Maintainability:

- Proper documentation is available for further upgradation and maintenance.
- User will be trained enough to handle the minor changes required.
- The system shall be available all the time i.e 24*7*365.

4) Portability:

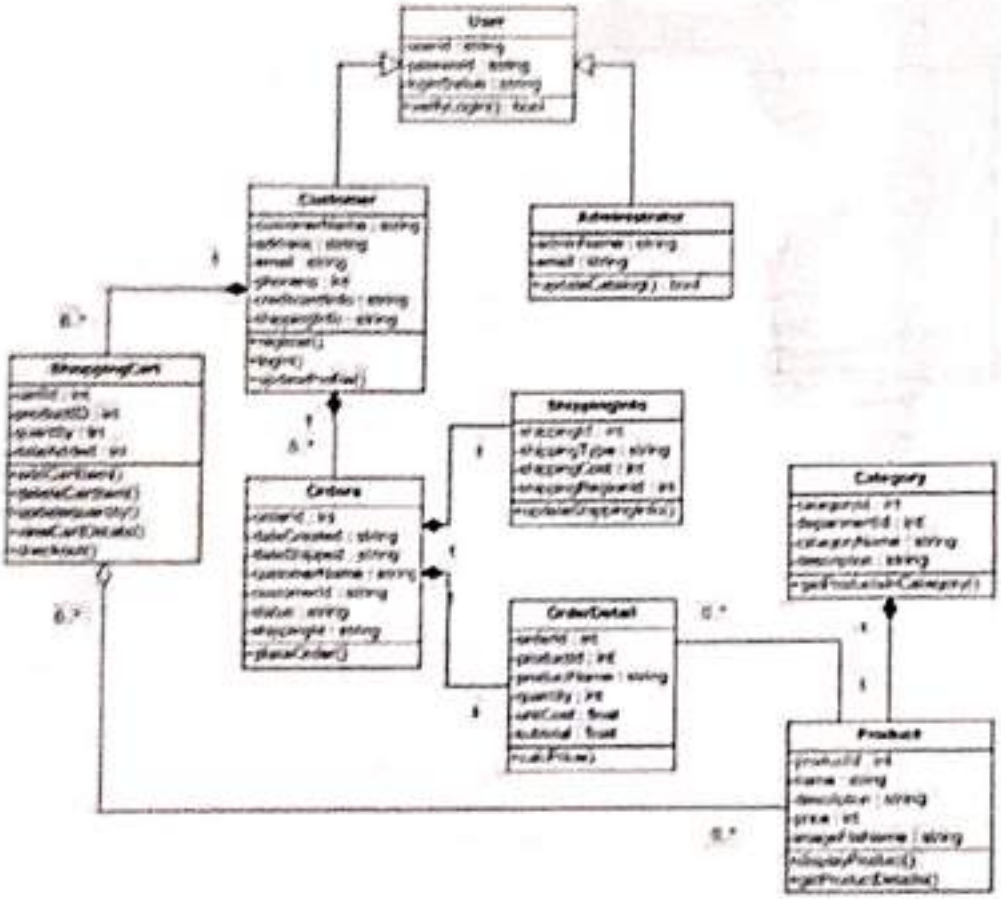
- System is independent of hardware specification.

9. ERD


Admin
View
Feedback
Give
Users
Is a
Add/Update
Delete
Action
Busin-Owner
Customer
Add
search
Search
Product
Is a
Check
Availability
Send
Order
Is Valid
Process
Has
Payment
Is a
Cash
Debit Card
Credit Card
Employee
Report
View
solve
Send
Compliant
tracking
Generate Report

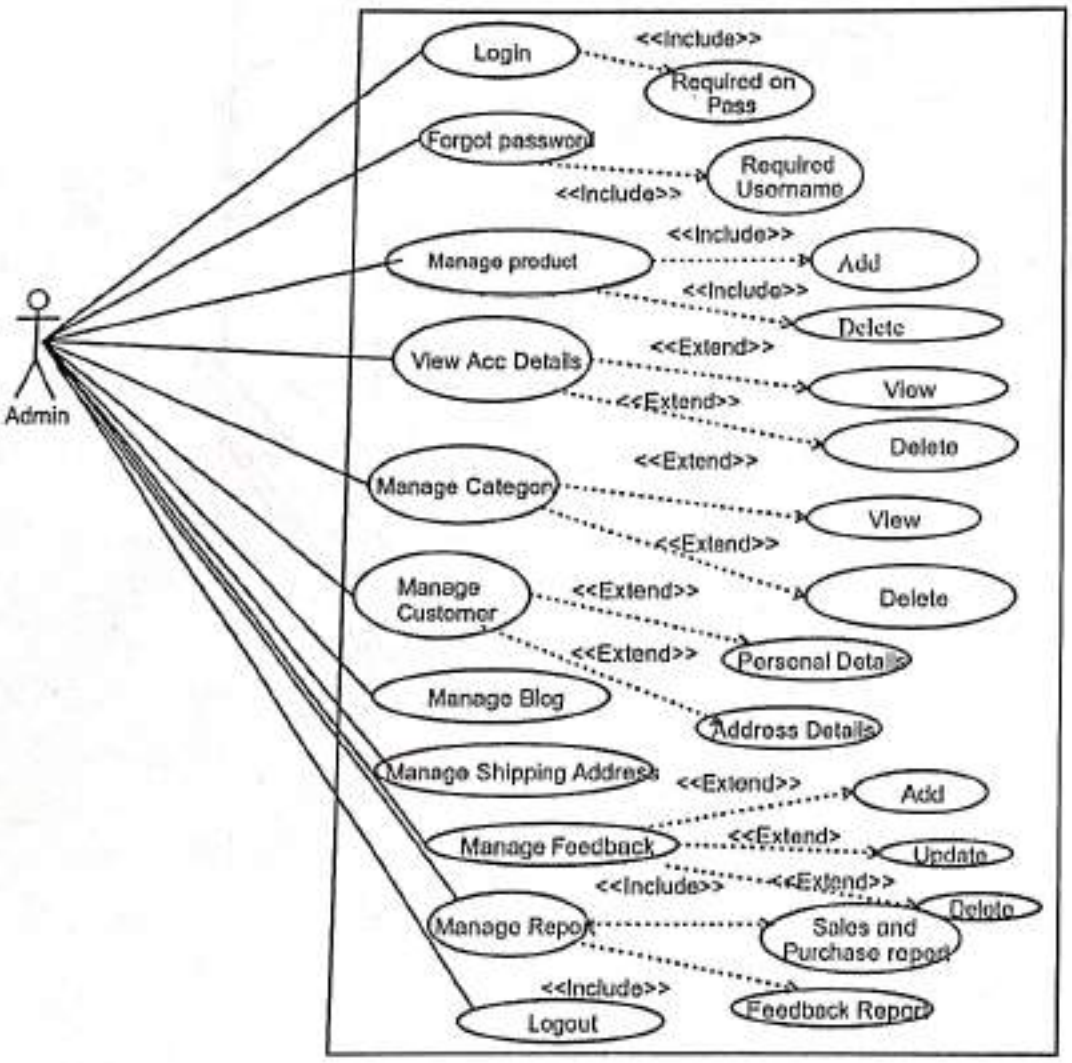
10.1 UML Diagram

1. Class Diagram

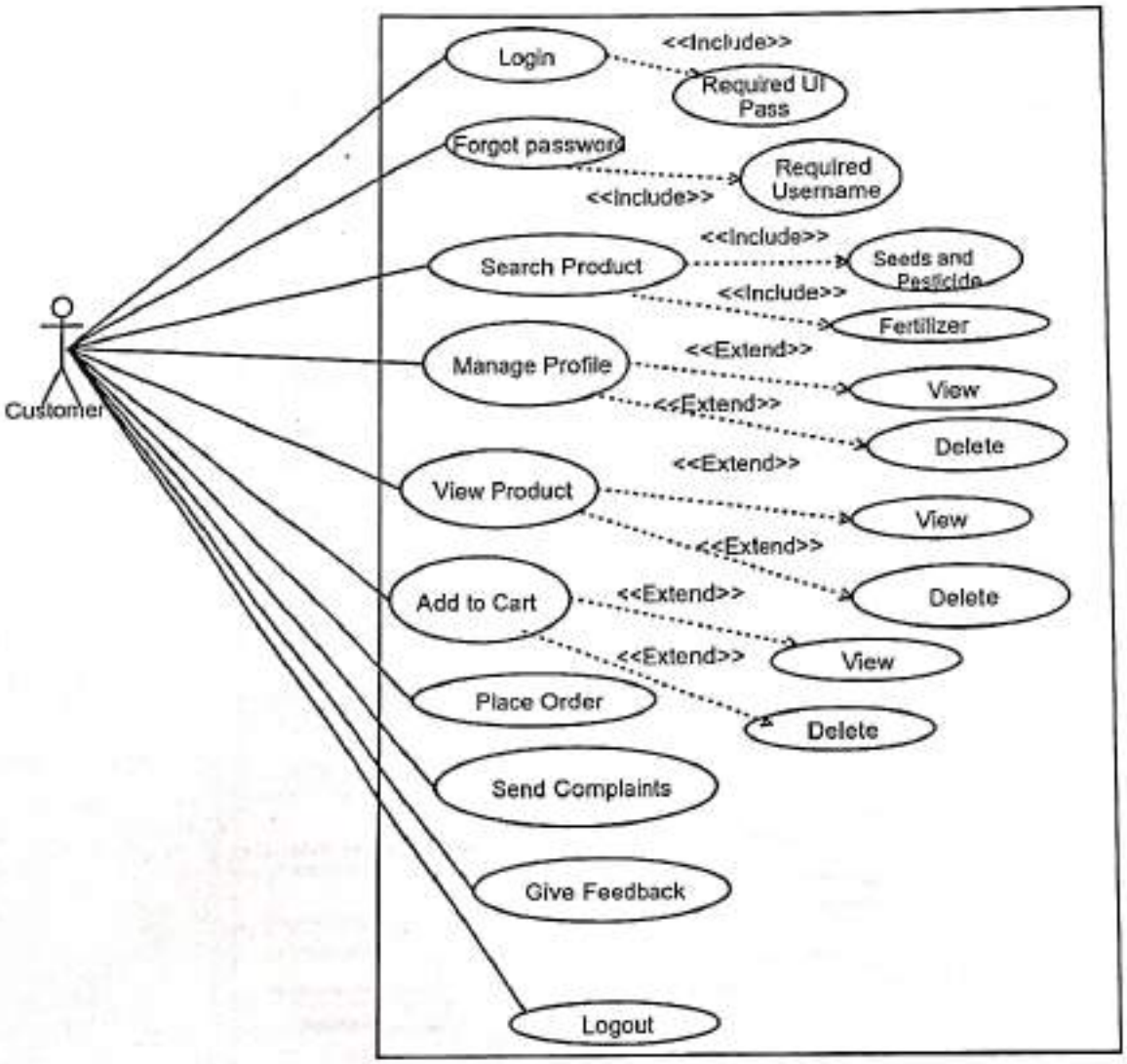


2. Use Case Diagram

1. Admin

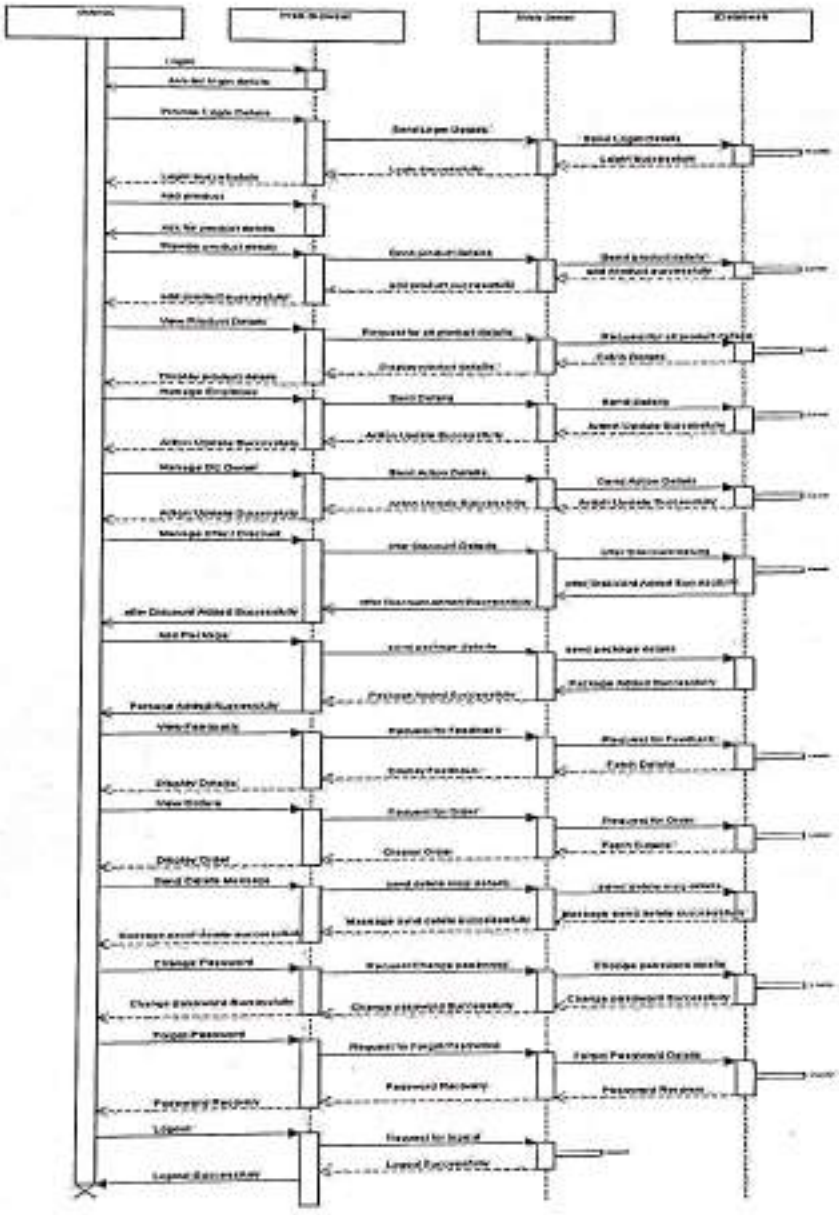


2.Customer

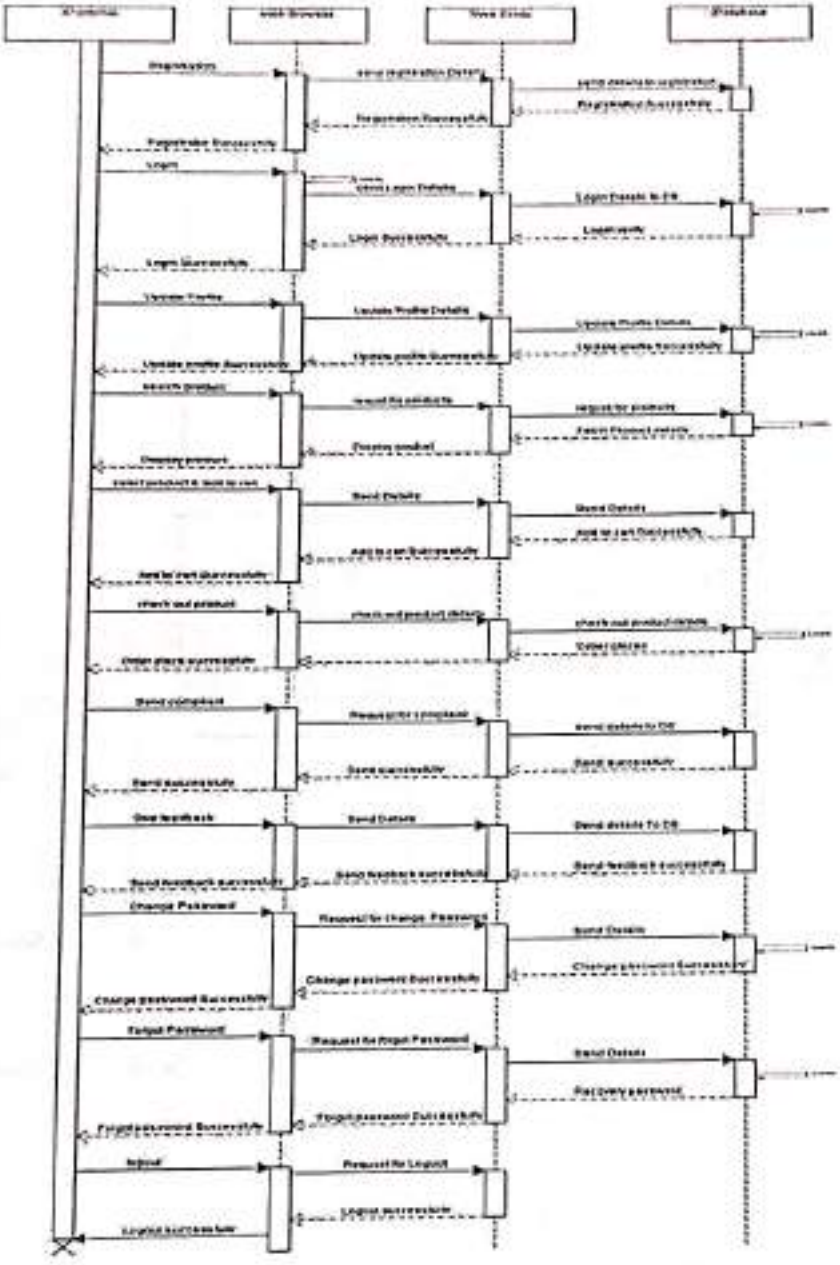

Customer
Login
<<Include>>
Required UI Pass
Forgot password
<<Include>>
Required Username
Search Product
<<Include>>
Seeds and Pesticide
<<Include>>
Fertilizer
Manage Profile
<<Extend>>
View
<<Extend>>
Delete
View Product
<<Extend>>
View
<<Extend>>
Delete
Add to Cart
<<Extend>>
View
<<Extend>>
Delete
Place Order
Send Complaints
Give Feedback
Logout

3. Sequence Diagram

1. Admin

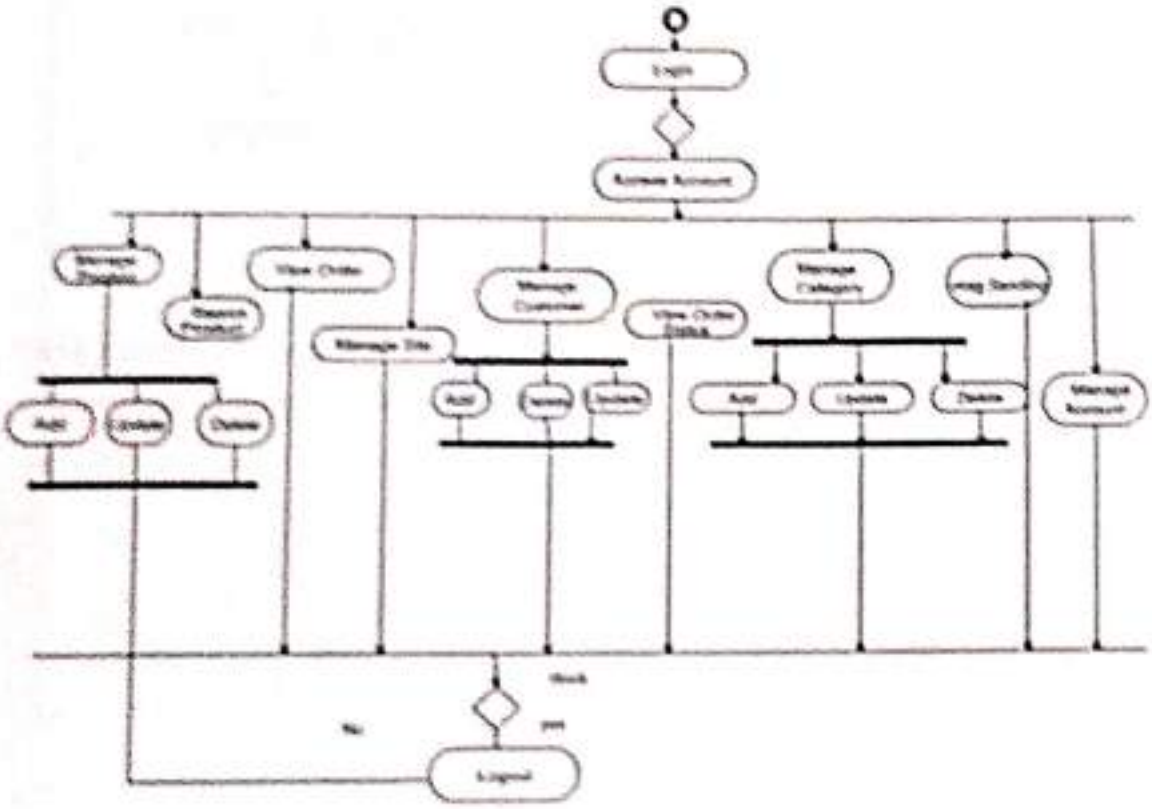


2. Customer

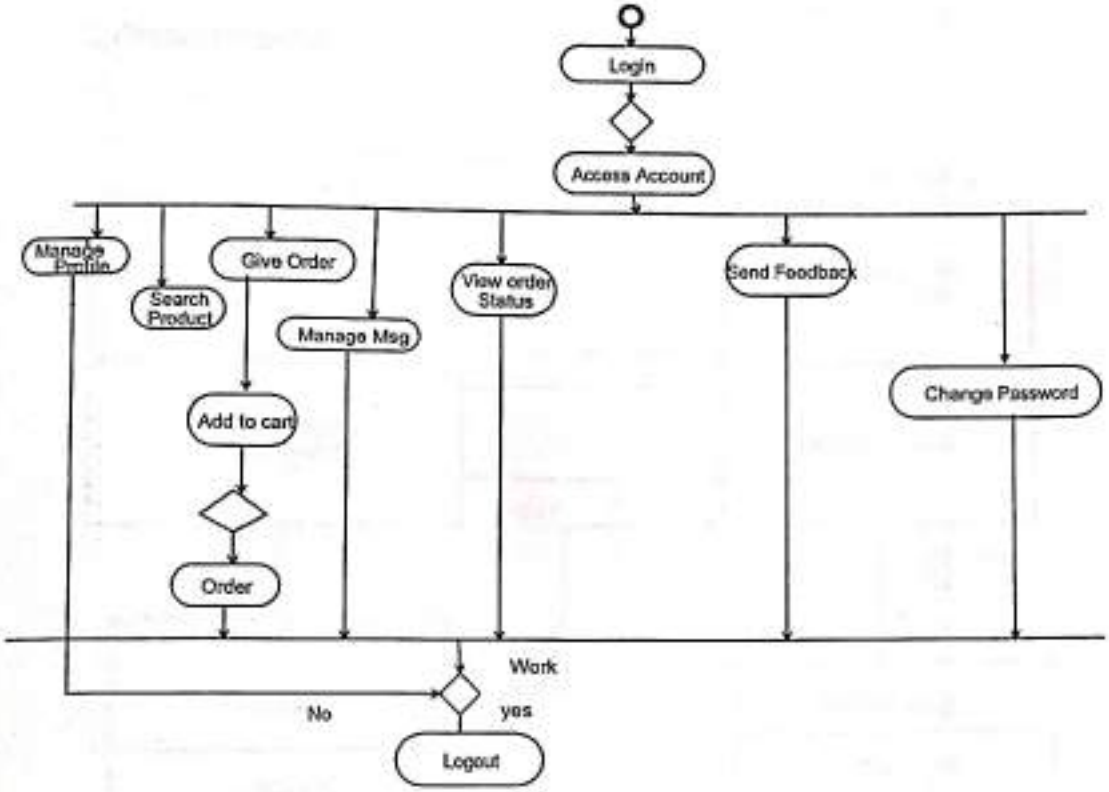


4. Activity Diagram

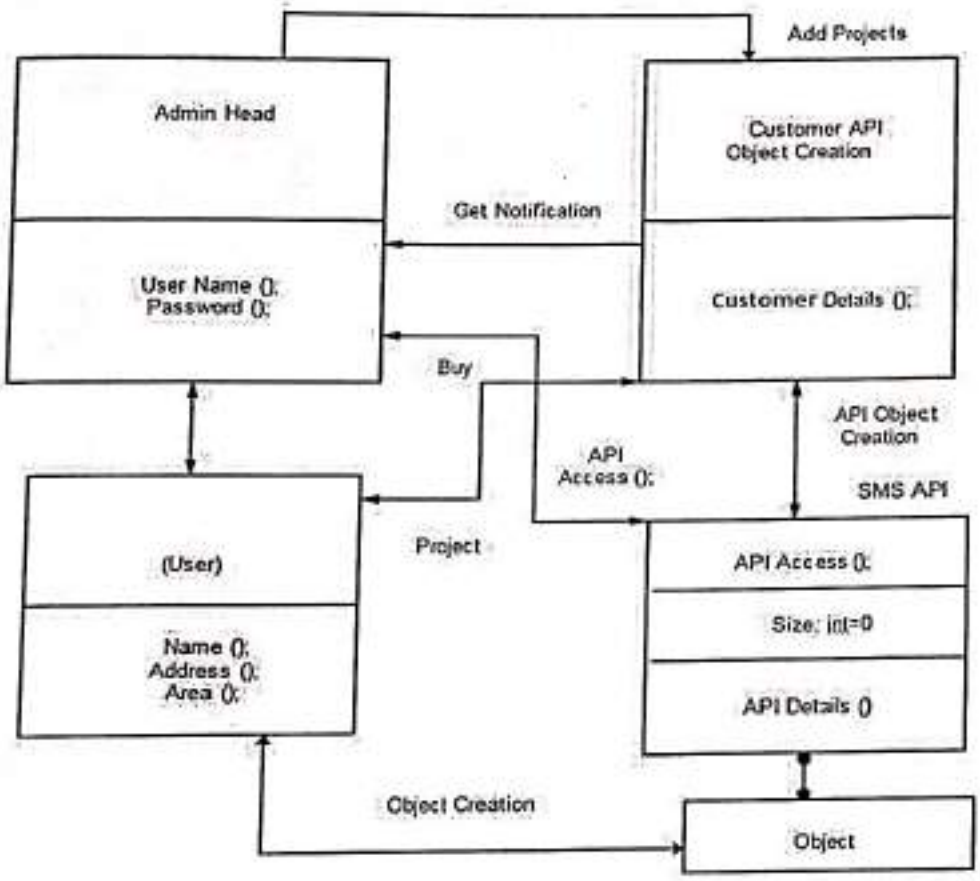
1. Admin



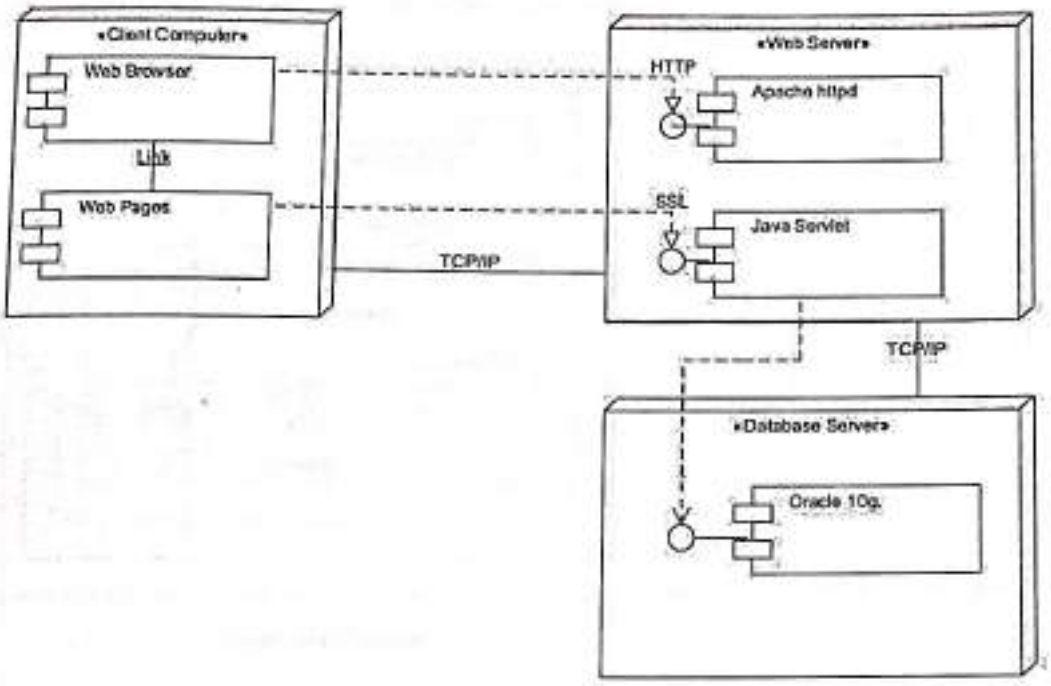
2. Customer


Login
Access Account
Manage Profile
Search Product
Give Order
Manage Msg
View order Status
Send Feedback
Change Password
Add to cart
Order
Work
No
yes
Logout

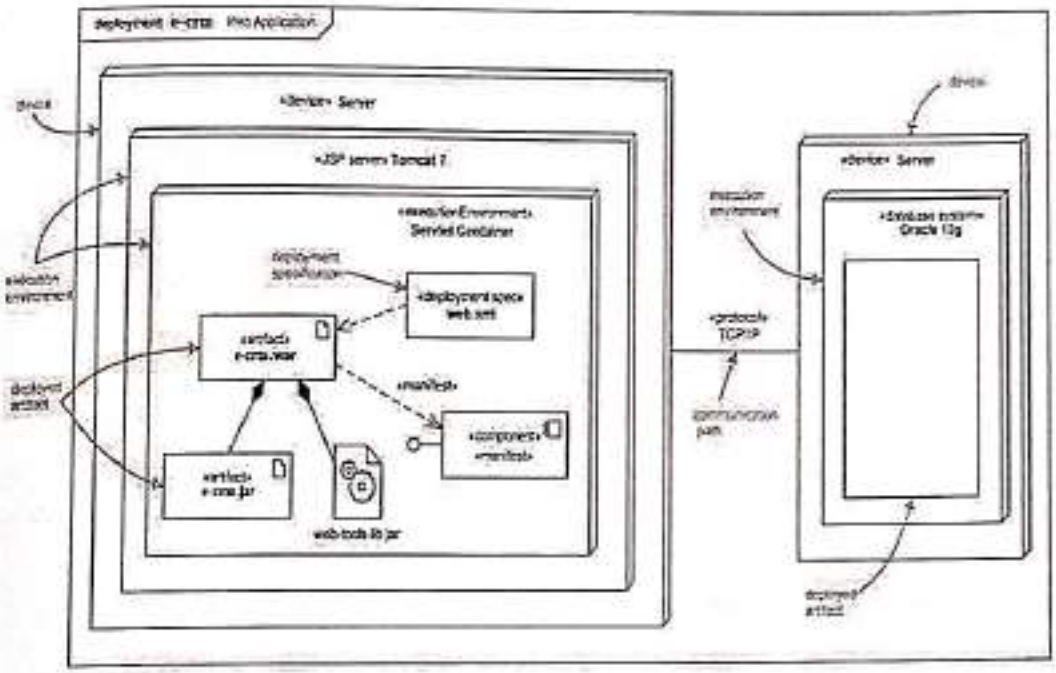
5. Object Diagram



6. Component diagram



7. Deployment diagram



Deployment Diagram of e-CRM

11. Module Specification

This is e-commerce application develop to Agriculture Product online in India. This Agriculture Application is developed in java for online shopping purpose. This website is useful for customer. Customer is able to register and login into system. Customer is able to purchase Agriculture product from this website he have a facility to pay amount online. Customer can create his shopping cart and manage his cart. Customer can also post his complaints on to the portal. Customer also facilities like wish list management, view order detail, order tracking, view shopping history, etc. In this website business owner is able to add his Agriculture product on shopping portal. Also able to view order

details of customers. Admin is able to view and control other user of the system. He is able to add new category on website. Also admin able to remove, blocks any user. He is able to manage package and security question on the portal. Also he can add new location or area in to the system. Employee on this portal is useful for providing support to customer for his order status and any other purpose.

He can solve the query posted by customer. Also able to view orders and feedback of customer.

The system contains different modules as:

- Administrator
- Customer

1. **Administrator**

Admin gets login by entering the username and password. Admin adds the new product and accessories and stores in the database which can be retrieved and used whenever needed and all the validation are performed during the entry of the data. Admin ensures that the user cannot enter any wrong data which would cause problem later.

- Admin has secure login.
- Admin can be able to add/delete Agriculture product Catagariwise on site
- Manage New Area of Location
- View orders Report Date wise.
- View Added Agriculture Product Details.
- View Out of Stock Product
- View Report of Cash Order and Cash on Delivery Order.
- Order Management(View Report of Delivered and Undelivered Product)

- Warehouse Management(Stock Management)
- View Report of Profit and the Loss.
- Forgot Password.
- Maintain Contact Us Data.
- Change Password.
- Logout.

2. Customer

User need to enter the personal details in the registration page. User can get login by entering the valid username and password. User can access all the products available in the application.

User can view place the order of the product.

- Customer has a secure login.
- Manage his profile.
- View and Search all Agriculture Product Catagariwise.
- View order status.
- Return the Damage Products.
- Send Feedback.
- Order Tracking Status.
- View all Reports of all products.
- Forgot Password.
- Change Password.
- Logout.

12. Data Dictionary

Sr.No	Field Name	Datatype	Constraint	Null	Description
1	User_id	Int(11)	Primary key	No	Unique Identifiacation number for user
2	User_email	Varchar(50)		No	User Email Address
3	User_pass	Varchar(30)		No	User Password
4	User_type	Varchar(2)		No	User Type
5	Security_question	Int	Foreign key	No	Security Question id
6	Security_answer	Varchar(20)		No	Security Answer
7	User_status	Varchar(2)		No	User Status
8	customer_id	Int(11)	Primary key	No	Unique Identifiacation number for customer
9	cust_first_name	Varchar(20)		No	Customer First Name

10	cust_middle_name	Varchar(20)		No	Customer Middle Name
11	cust_last_name	Varchar(20)		No	Customer Last Name
12	cust_dob	Date		No	Birthdate of customer.
13	cust_gender	Varchar(2)		No	Customer Gender
14	cust_contact	Varchar(15)		No	Customer contact number
15	cust_alternate_contact	Varchar(15)		No	Customer Alternate contact number
16	cust_permanent_add	Varchar(100)		No	Customer permanent address.
17	cust_alternate_add	Varchar(100)		No	Customer Alternate address.
18	cust_city	Varchar(20)		No	Customer City.
19	cust_landmark	Varchar(25)		No	Customer landmark..
20	cust_state	Varchar(25)		No	Customer State.

21	cust_country	Varchar(25)		No	Customer Country.
22	cust_zip	int(11)		No	Customer zip.
23	User_id	int(11)	Foreign key	No	User Identification no.
24	ship_partner_id	Int(11)	Primary key	No	Shipping partner Identification no.
25	ship_partner_name	Varchar(20)		No	Shipping partner name
26	ship_partner_contact	Varchar(20)		No	User Password
27	ship_partner_add	Varchar(50)		No	User Type
28	User_id	Int(11)	Foreign key	No	User Identification no.
29	Package_id	Int(11)	Primary key	No	Package Identification no.
30	Package_name	Varchar(20)		No	Package name
31	Package_description	Varchar(100)		No	Package description

32	Package_cost	double		No	Package cost
33	Total_items	Int(11)		No	Total items in package
34	Validity	Int(11)		No	Validity in days
35	product_category_id	Int(11)	Foreign key	No	product category Identification no.
36	product_category_name	Varchar(20)		No	product category name
37	product_category_description	Varchar(1000)		No	product category name description
38	product_id	Int(11)	Primary key	No	product Identification no.

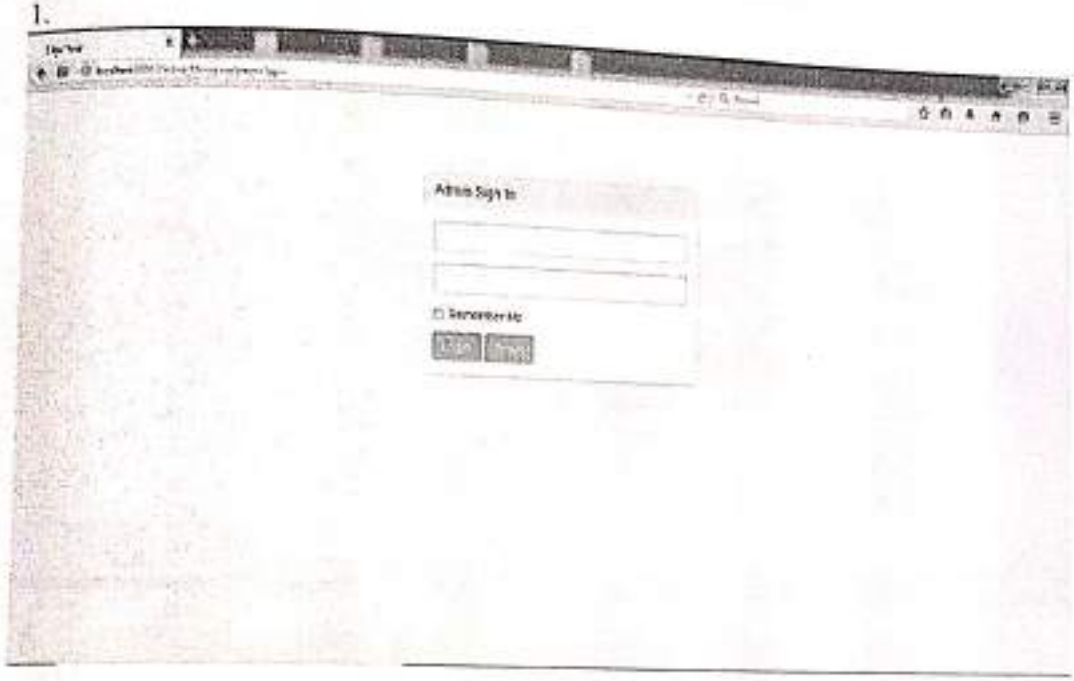
39	product_name	Varchar(20)		No	product name
40	product_stock	Int(11)		No	product stock
41	product_category_id	Int(11)	Foreign key	No	product category Identification no.

42	Business_partner_id	Int(11)	Foreign key	No	Business partner Identification no.
43	product_id	Int(11)	Foreign key	No	product Identification no.
44	product_description	Varchar(200)		No	product description
45	product_manufacturedby	Varchar(30)		No	product manufactured by.
46	product_warranty	Date		No	Product warranty
47	product_manufacturedate	Varchar(25)		No	Product manufacture date
48	product_brand	Date		No	Product brand
49	product_image	Longblob		No	Product image
50	product_price	double	Foreign key	No	Product price

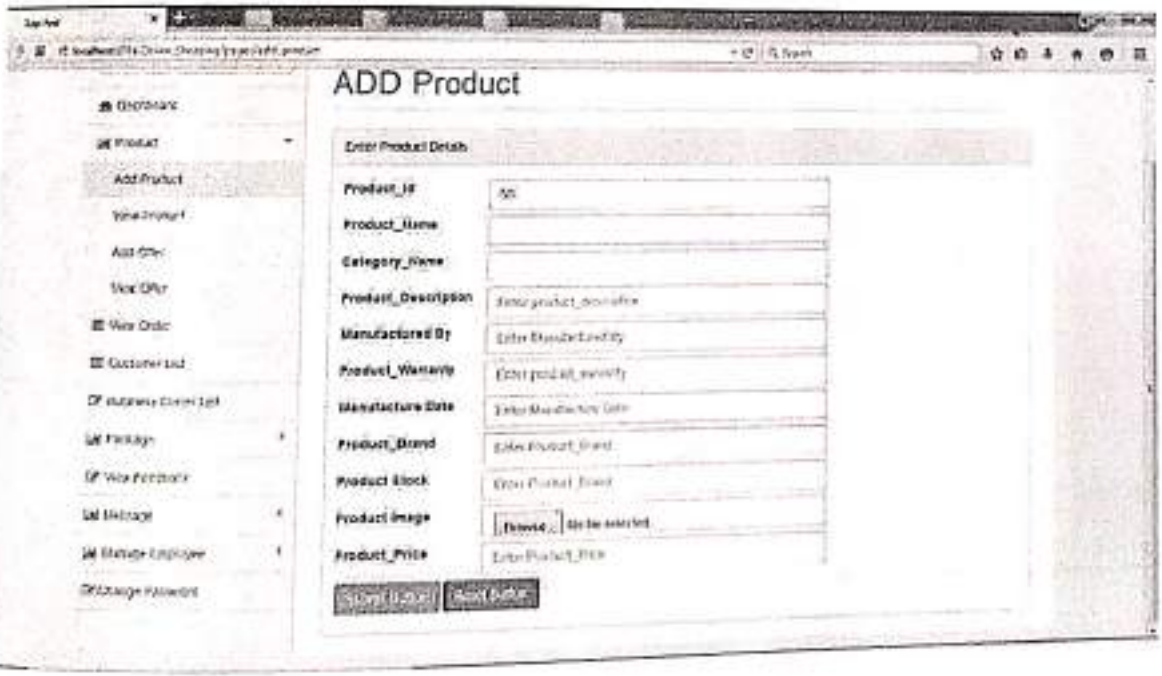
51	Cart_id	Int(11)	Primary key	No	cart Identification no.
52	Cust_id	Int(11)	Foreign key	No	customer Identification no.
53	Purchase_date	Date	Foreign key	No	Purchase date
54	Cart_id	Int(11)	Foreign key	No	cart Identification no.
55	product _id	Int(11)	Foreign key	No	Product Identification no.
56	Quantity	Date		No	Product quantity
57	order_id	Int(11)	Primary key	No	Order Identification no.
58	cart_id	Int(11)	Foreign key	No	cart Identification no.
59	User_id	Int(11)	Foreign key	No	User Identification no.

13. Screenshot

1.



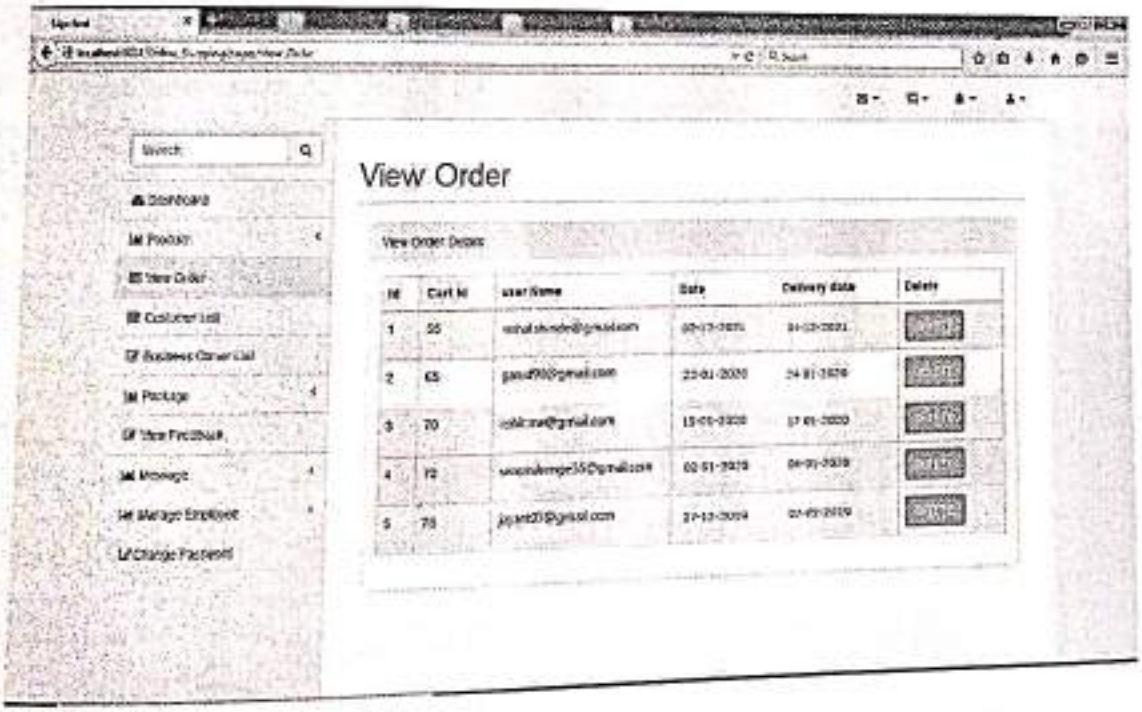
2.



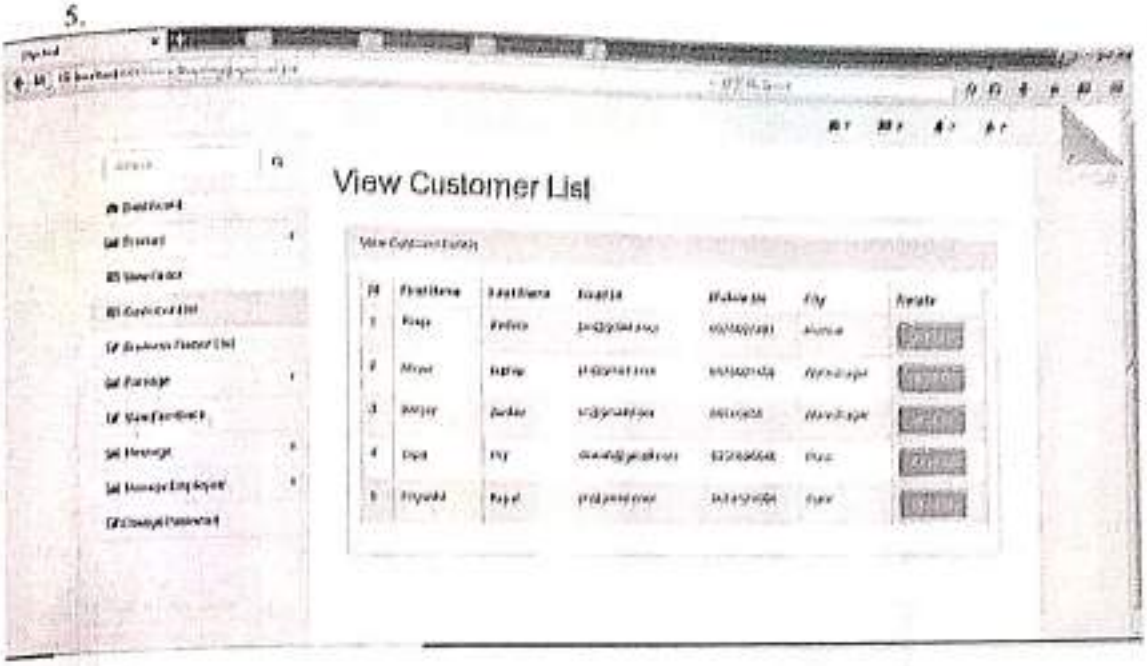
3.


View Product
Id
Category
Product
Manufacture Date
Price
Stock
Delete

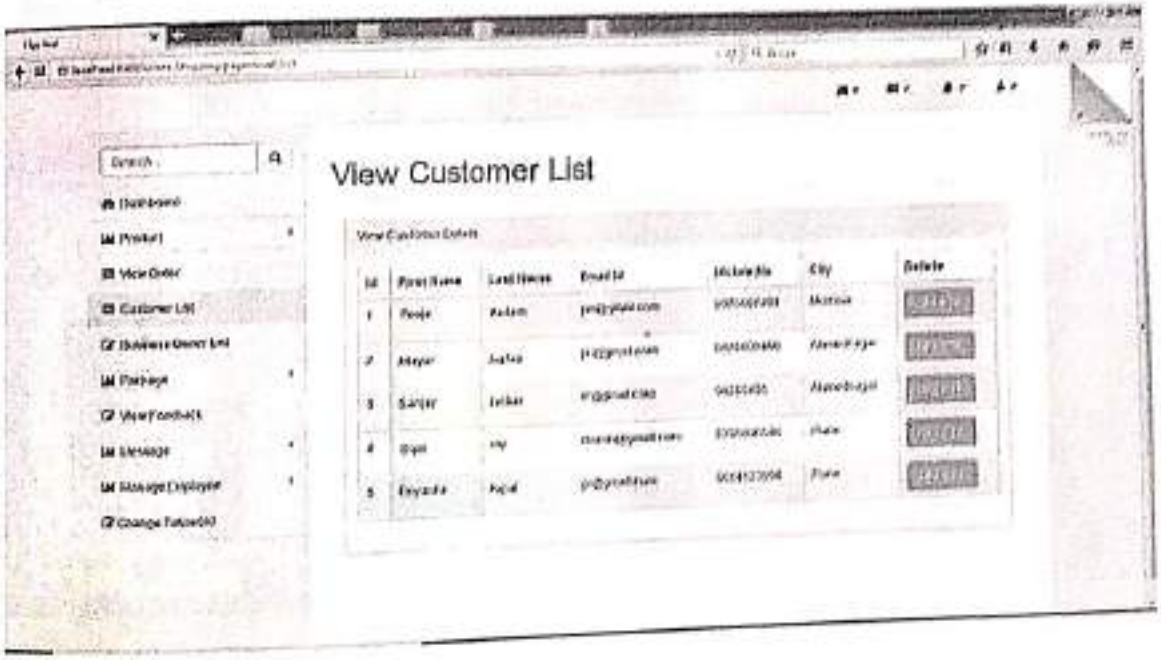
4.


View Order
Id
Cart Id
user Name
Date
Delivery date
Delete

5.



6.



7.


Combo Packs
Gardening
Seeds
Fertilisers
Pesticides
Organic Products
TAKII SEED
SARATA
PUSA
Rh Super 444
₹ 1049
₹ 899
₹ 999
₹ 1599

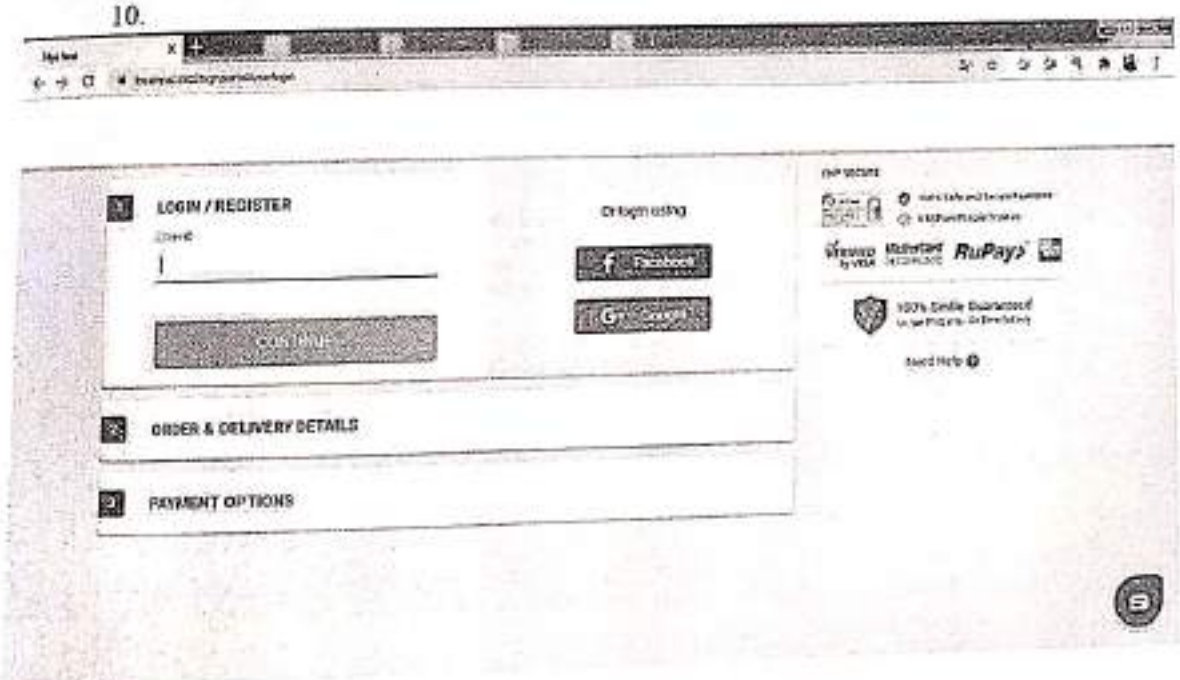
8.


Combo Packs
Gardening
Seeds
Fertilisers
Pesticides
Organic Products
IFFCO
0:52:34
₹ 1049
₹ 899
₹ 999
₹ 1599

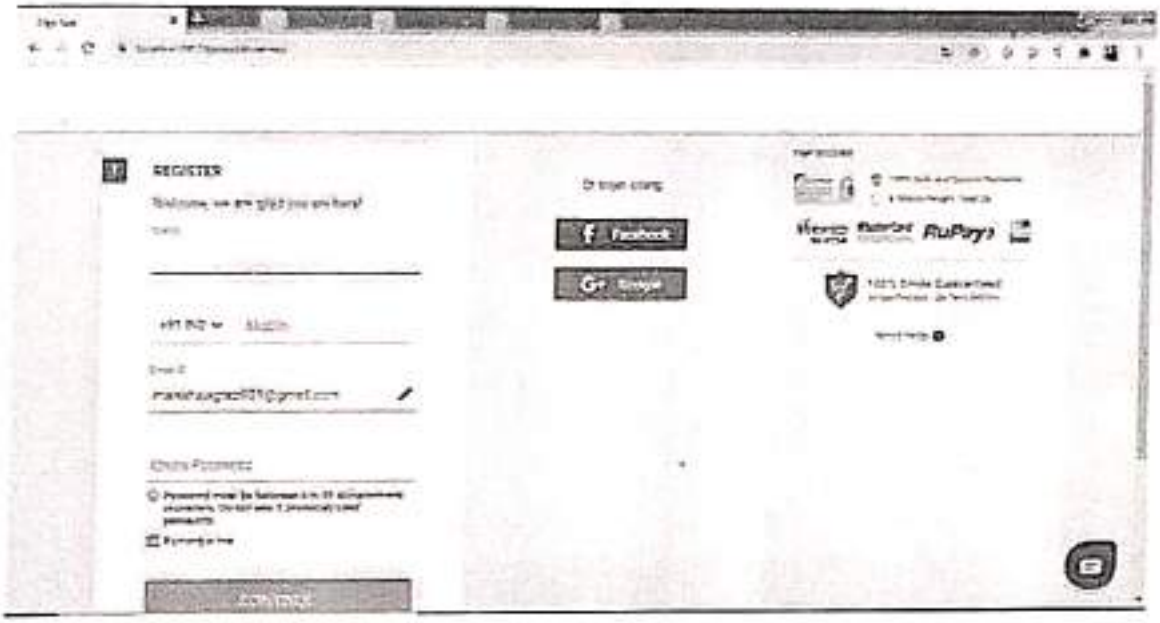
9.


RH Super 444
My Cart (2)
₹ 999
ADD TO CART
CART TOTAL
Offers Available

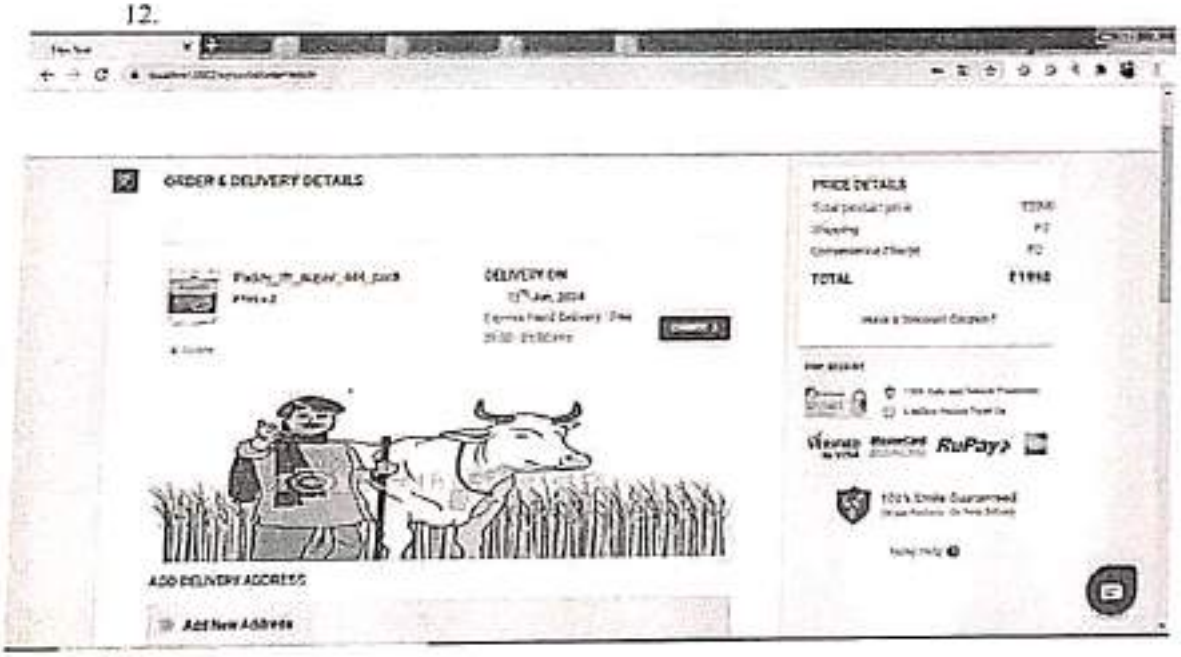
10.


LOGIN / REGISTER
Continue
Facebook
ORDER & DELIVERY DETAILS
PAYMENT OPTIONS

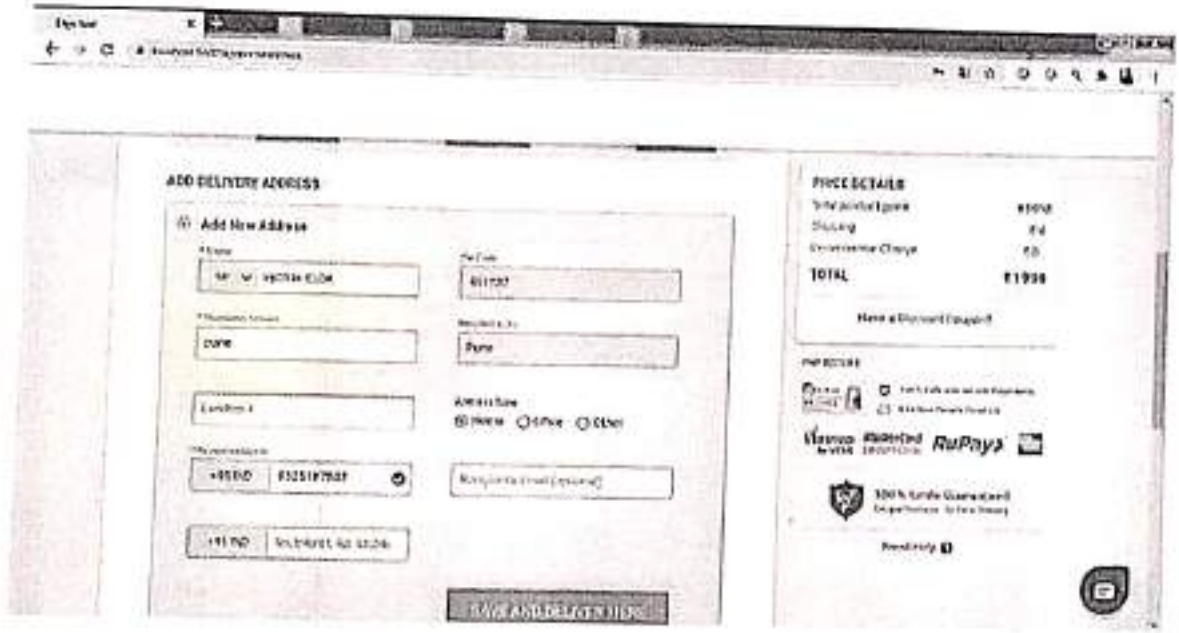
11.


REGISTER
Facebook
Google
RuPay

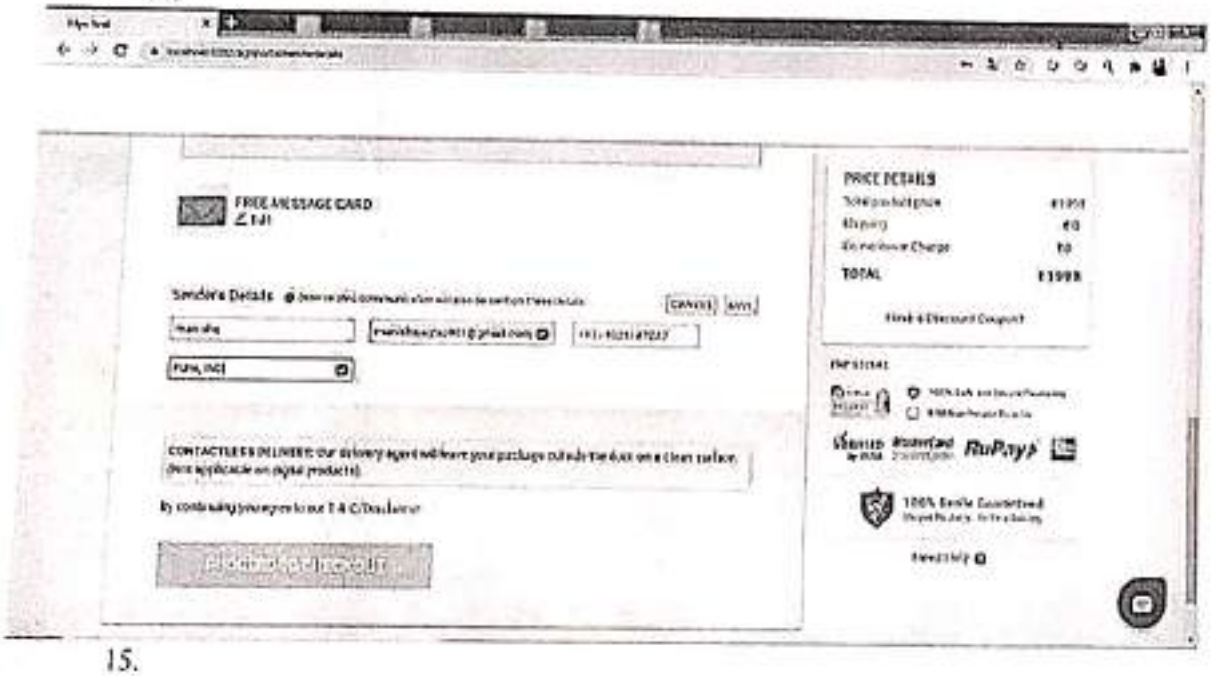
12.


ORDER & DELIVERY DETAILS
PRICE DETAILS
TOTAL
DELIVERY ON
RuPay
ADD DELIVERY ADDRESS
Add New Address

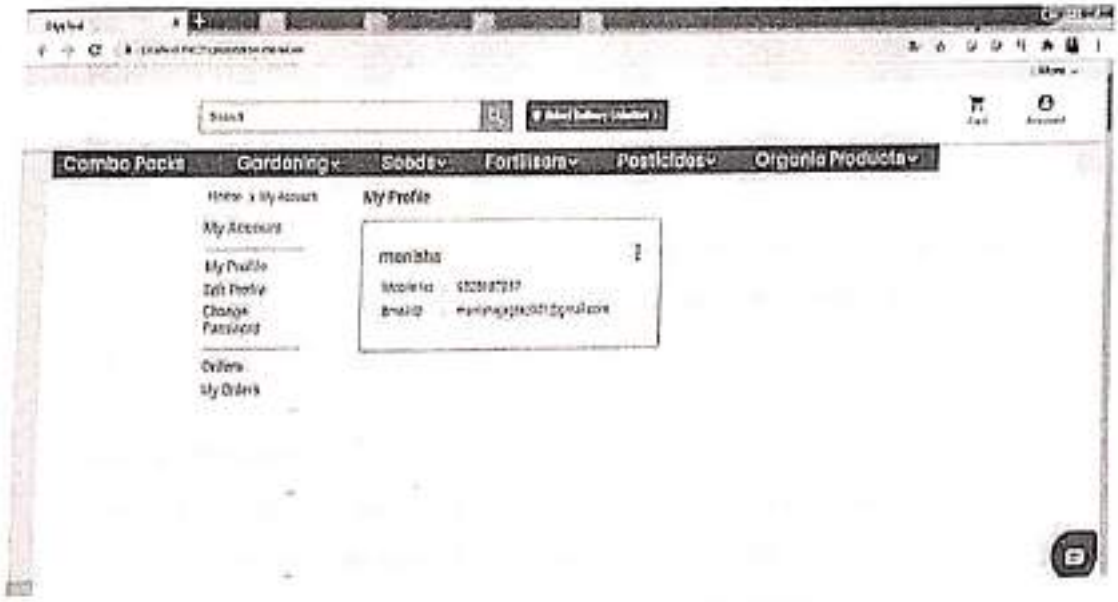
13.


ADD DELIVERY ADDRESS
Add New Address
PRICE DETAILS
TOTAL

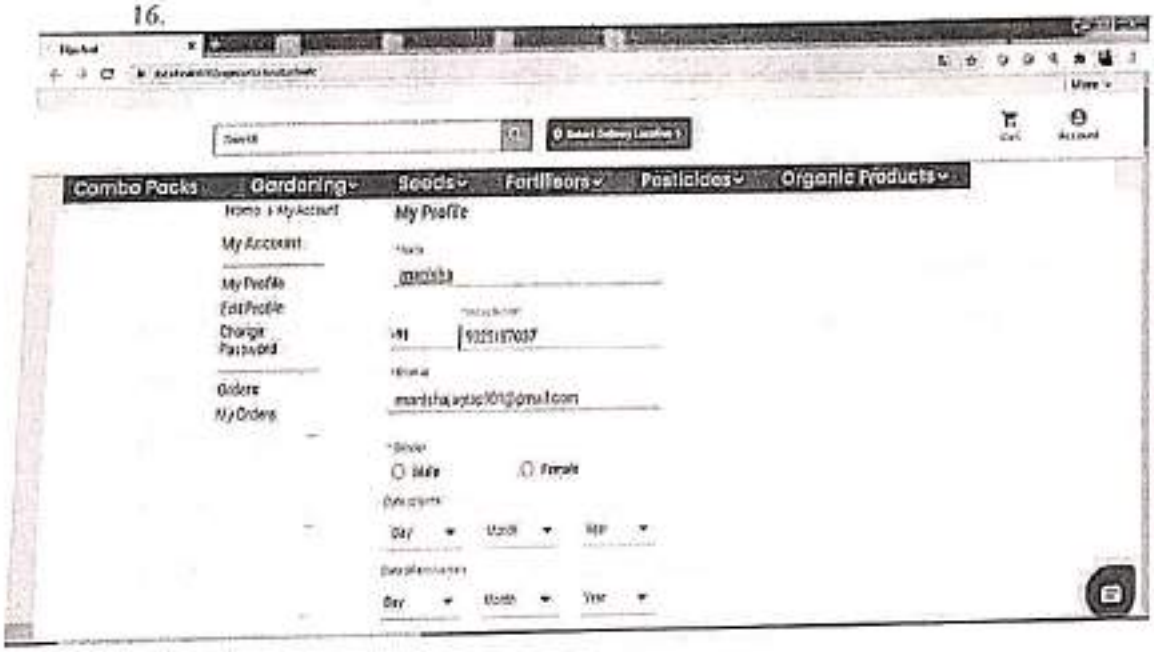
14.


FREE MESSAGE CARD
PRICE DETAILS
TOTAL

15.


Combo Packs
Gardening
Seeds
Fertilizers
Pesticides
Organic Products
My Profile
My Account
My Profile
Edit Profile
Change Password
Orders
My Orders
manisha

16.


Combo Packs
Gardening
Seeds
Fertilizers
Pesticides
Organic Products
My Profile
My Account
My Profile
Edit Profile
Change Password
Orders
My Orders
manisha
+91
9025187037
Male
Female

14. Testing
Implementation

Strategies used for Testing

1. Unit Testing

Unit testing concentrates verification on the smallest element of the program – the module. Using the detailed design description important control paths are tested to establish errors within the bounds of the module.

2. Integration testing

Once all the individual units have been tested there is a need to test how they were put together to ensure no data is lost across interface, one module does not have an adverse impact on another and a function is not performed correctly.

System testing for the current system:

In this level of testing we are testing the system as a whole after integrating all the main modules of the project. We are testing whether system is giving correct output or not. All the modules were integrated and the flow of information among different modules was checked. It was also checked that whether the flow of data is as per the requirements or not. It was also checked that whether any particular module is non-functioning or not i.e. once the integration is over each and every module is functioning in its entirety or not.

In this level of testing we tested the following: -

- Whether all the forms are properly working or not.
- Whether all the forms are properly linked or not.
- Whether all the images are properly displayed or not.
- Whether data retrieval is proper or not.

15. CONCLUSION

"Completing the Agro Portal Fertilizer Project fills me with joy. I'm happy to see how it's helping farmers find better fertilizers and take care of their farms. It shows that using computers and phones for farming can be really helpful. I can't wait to do more to help farmers in the future!"

"As I come to the end of the Agro Portal Fertilizer Project, I am filled with a deep sense of satisfaction. Witnessing the tangible impact of this endeavor on farmers' lives, from facilitating access to quality fertilizers to fostering sustainable agricultural practices, has been profoundly rewarding. It underscores the immense potential of technology to address critical challenges in our agricultural systems. Looking ahead, I am eager to continue this journey of innovation and collaboration, driven by a heartfelt commitment to empowering farming communities and advancing the future of agriculture."

16.DRAWBACK AND LIMITATIONS OF THE SYSTEM

- This system is not supported for multicurrency.
- This system is available in limited area.
- This system is not supported for Multilanguage's.
- Product view in not in video format.

PROPOSED ENHANCEMENT

- Develop module for multicurrency.
- Adding new delivery location.
- Adding module for Multilanguage support.
- Adding product comparison.
- Adding product view in video format

17.Bibliography

Reference-

1. stackoverflow.com
2. dzone.com
3. leetcode.com
4.Myntra.com

P.D.E.A.'s

Waghire College of Arts, Commerce and Science, Saswad

Department of Computer Science

Academic Year (2023-24)

IN PARTIAL FULFILLMENT OF

T.Y.B.Sc.(Computer Science)

(SEM-VI)

UNDER

SAVITIBAI PHULE PUNE UNIVERSITY

A Project Report on

"Beauty Parlour Management System"

Submitted By

Ms. Bhujbal Priya Satish

Ms. Chavan Snehal Sunil

P.D.E.A.'s

Waghire College of Arts, Commerce and Science, Saswad

CERTIFICATE

Department of Computer Science

This is to certify that, **Ms. Bhujbal Priya Satish** and **Ms. Chavan Snehal Sunil** of class T.Y.B.Sc. (Computer Science) SEM-VI seat no: 7262 & 7267 has completed the project on **"Beauty Parlour Management System"** as a partial fulfilment and requirement as per SPPU curriculum for the project in the academic year 2023-24.

(Mr.Jadhavrao S.S.)
Project Guide

Dr. Wani V. R.
H.O.D.
(Department of Comp.Sci.)

Internal Examiner

External Examiner

Acknowledgement

We would like to express our sincere gratitude to all those who have contributed to the development and completion of the Online Beauty Parlour Management System project.

First and foremost, we extend our heartfelt appreciation to Mr. Jadhavrao S.S., our project supervisor, for their invaluable guidance, support, and encouragement throughout the duration of this project. Their expertise and insights have been instrumental in shaping the direction of our work.

We also wish to thank the members of our development team for their dedication,creativity, and collaborative efforts in bringing this project to fruition. Each team member has

played a significant role in contributing to the success of the Online Beauty Parlour Management System application.

Furthermore, we are grateful to Mr. Jadhavrao S.S. for their assistance in testing the application and providing valuable feedback for improvement. Their input has helped us identify and address various issues, ensuring the reliability and usability of the system.

Additionally, we would like to acknowledge the open-source community for their contributions, which have enriched our development process and provided us with valuable resources and tools.

Last but not least, we express our appreciation to our families and friends for their unwavering support and understanding throughout this project.

Thank you all for your contributions, encouragement, and support. Your involvement has been indispensable in making the Online Beauty Parlour Management System project a reality.

Index

Introduction

"Beauty parlor Management System" is a web based application with appointment scheduling functionality. It provides the interface between the salon and clients.

In this web application clients take an appointment online and salon administrators approves and cancel that appointment

It provides tools for handling customer orders, managing stocks, appointments, clients, services. The system aims to simplify administrative tasks and enhance customer service.

It is a network-based system that handles customer orders easily

Problem Definition

The **Beauty Parlour Management System** is like a special computer program designed specifically for beauty parlors. It helps parlour owners and staff manage everything easily.

Running a beauty parlor can be tricky. There are many things to keep track of inventory management, like appointments, products, and money. The beauty parlour management system makes all these tasks easier.

To eliminate this manual system and making the task easier, beauty parlour management system has been developed. It will handle all the current issues faced by the client and by its admin person and make the task easier.

Scope of Beauty Parlour Management System

- Appoiment scheduling
- Client management
- Inventry management
- Reporting and anylitics
- Online Booking
- Stock management

Objective of Proposed system

The project objective that will be achieved after completion of this project. The objective are as follows.

- To automate various tasks within a beauty salon .
- To provide a appointment scheduling facility.
- To provide staff management, inventory tracking and client records.
- To Enhance efficiency, improve customer experience, and facilitied better overall management

Fact finding techniques

To system investigation, there should be master plan, detailing the step to be taken, the people to be questioned and outcome expected. the initial investigation has the objective of determining whether the user request has potential merit.

The inputs to the system, various condition and tests to the various factfinding methods described below.

- Interview: It is most commonly used factfinding technique by the analyst. Analyst asks different types of question to the source of information i.e. the user of the system, all persons related to the system.

- Record review: In this analyst sees all the related records used an organization. But the analyst can not get the relation between these records used. But this technique may be useful in designing of the screen of the system.

- Observation: To get as close as possible to the real system, onside observation become useful.in this method work flow is observation and behavior of particular user is observed.

Hardware and Software Specifications

- Hardware requirements:

  Processor of Pentium or above.

  Minimum of 256 MB ram.

  Minimum of 256MB hard disk.

  Moniter

  Mouse

  Keyboard

- Software requirements:

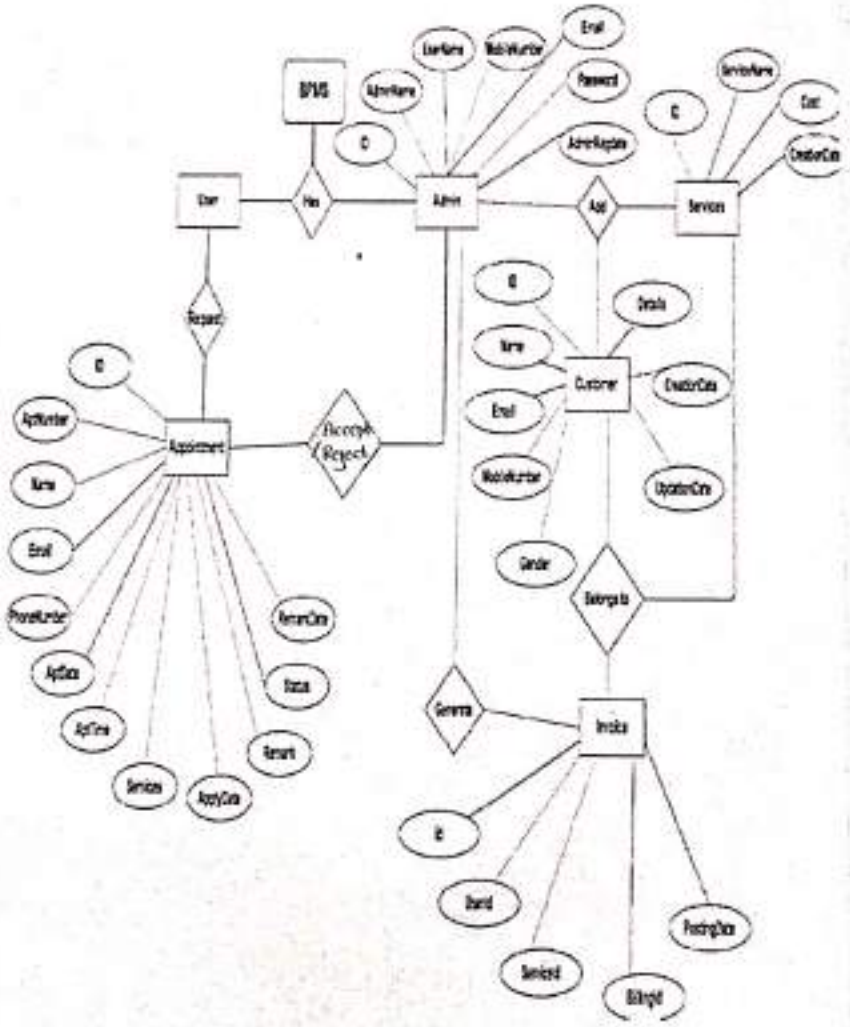
  Operating system: Centos

  Client side technologies: html,css,JavaScript

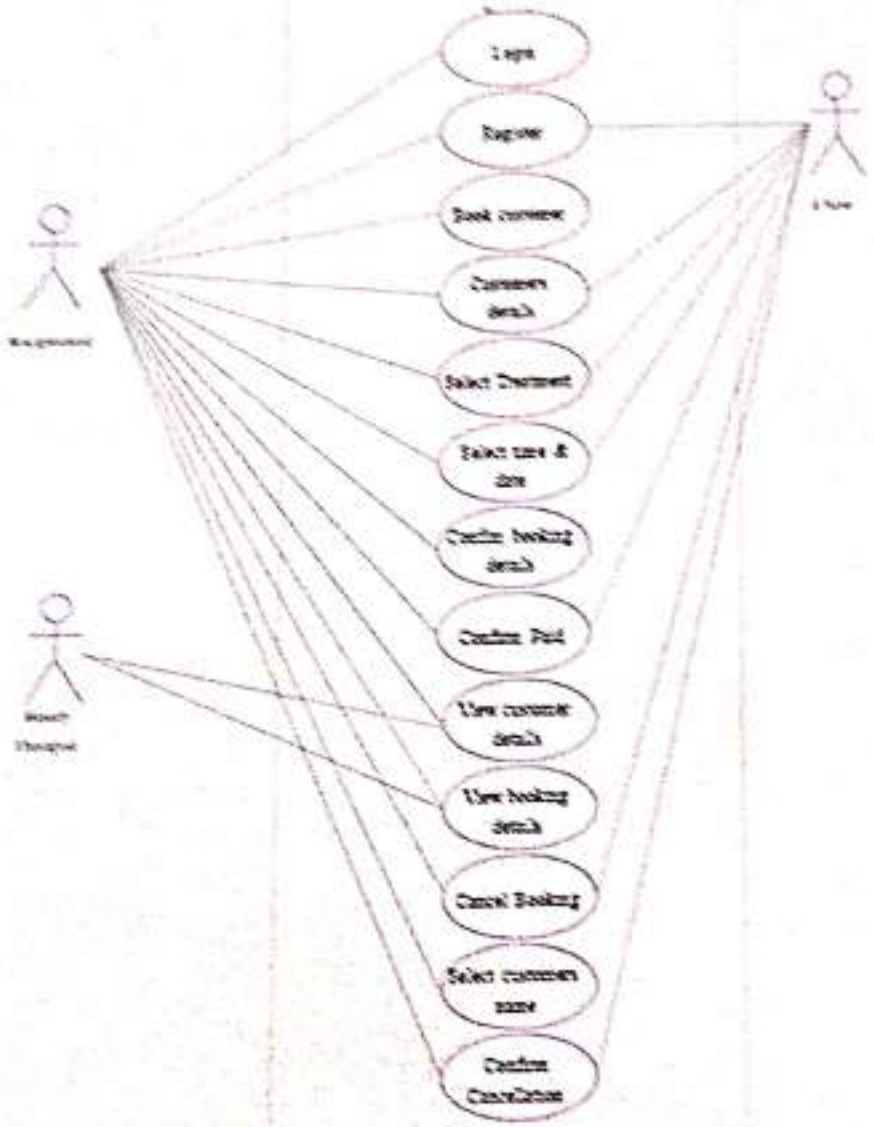
  Server side technologies:php

E-R Diagram

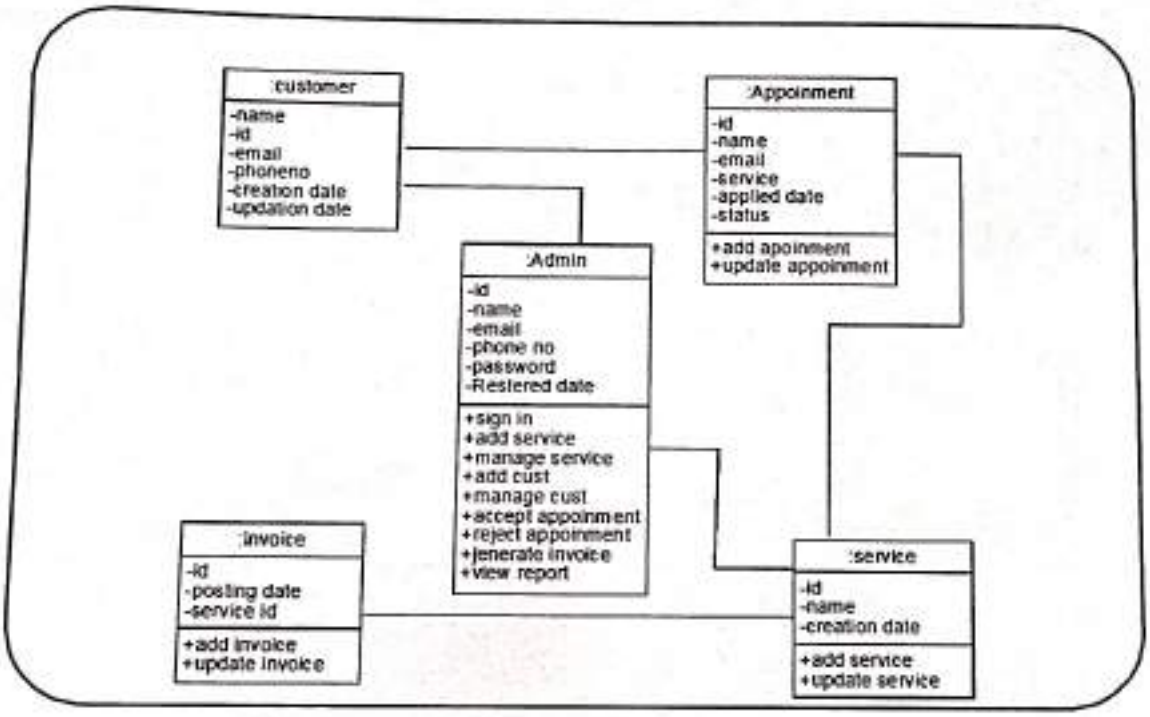
ERD :-



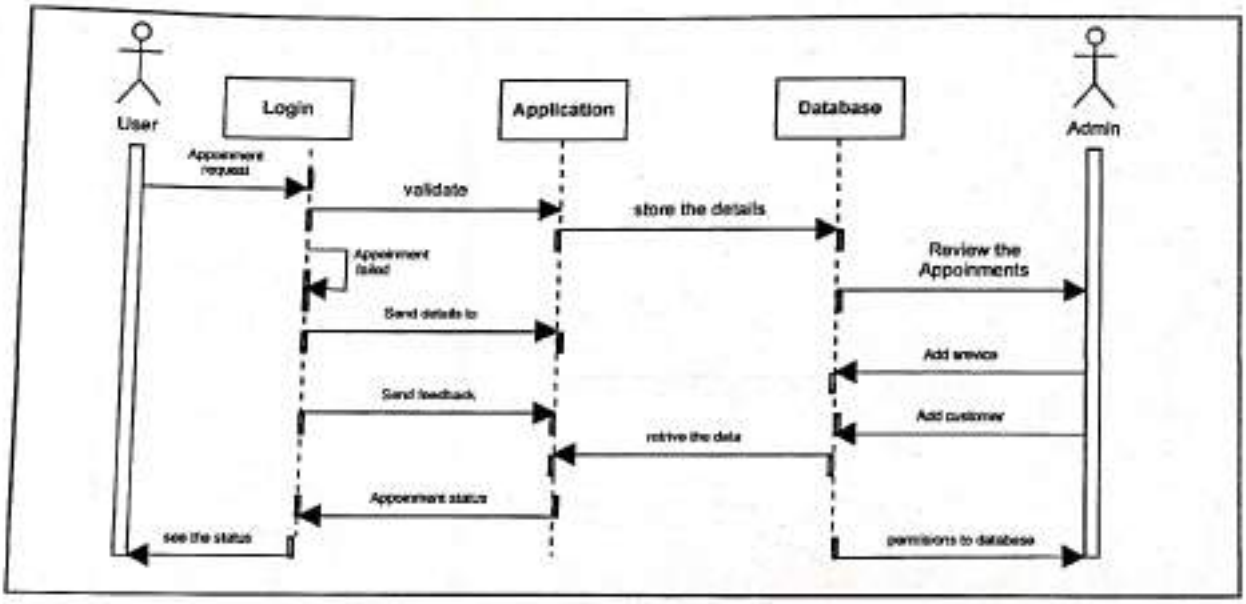
USE CASE DIAGRAM:



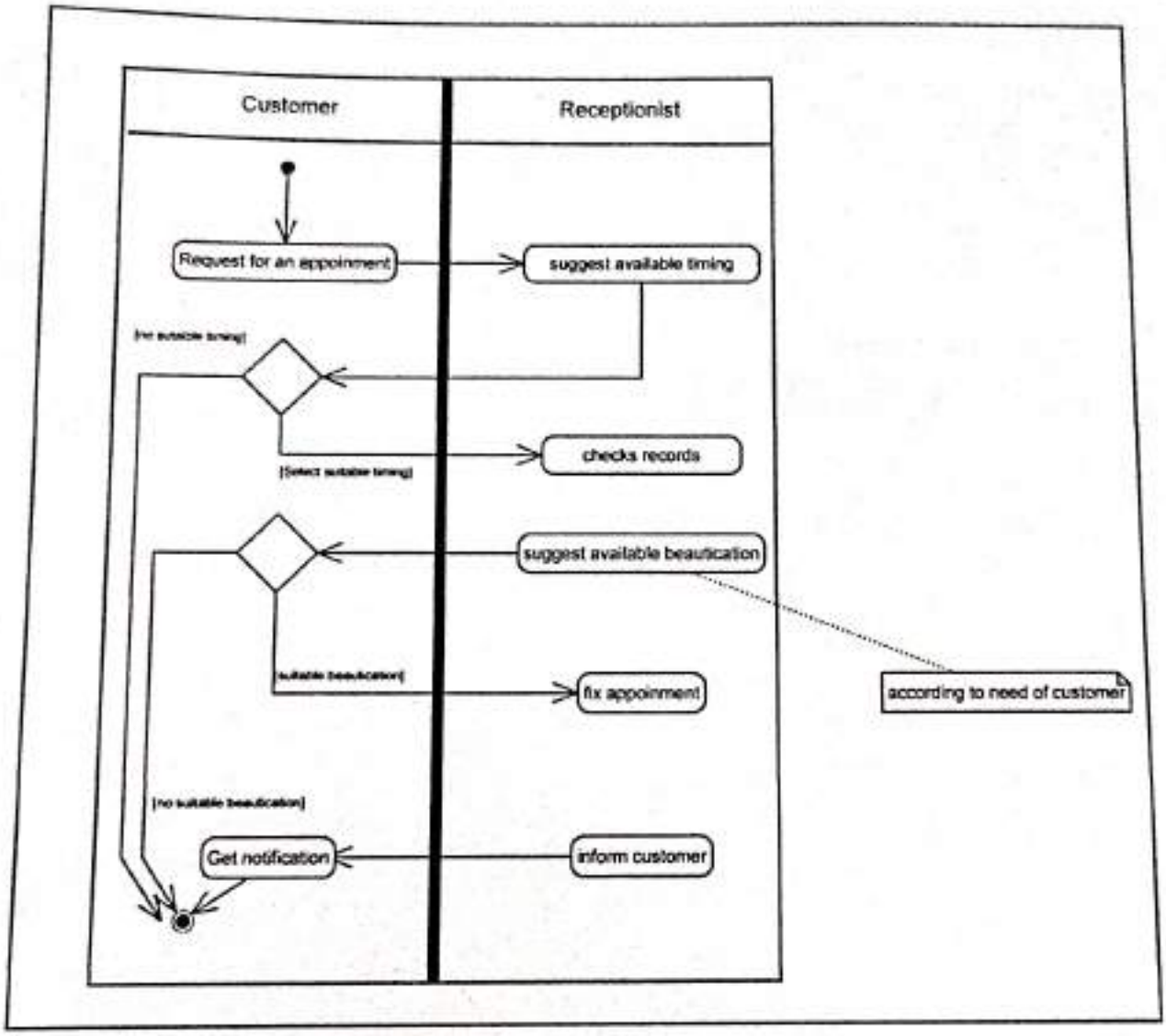
CLASS DIAGRAM:



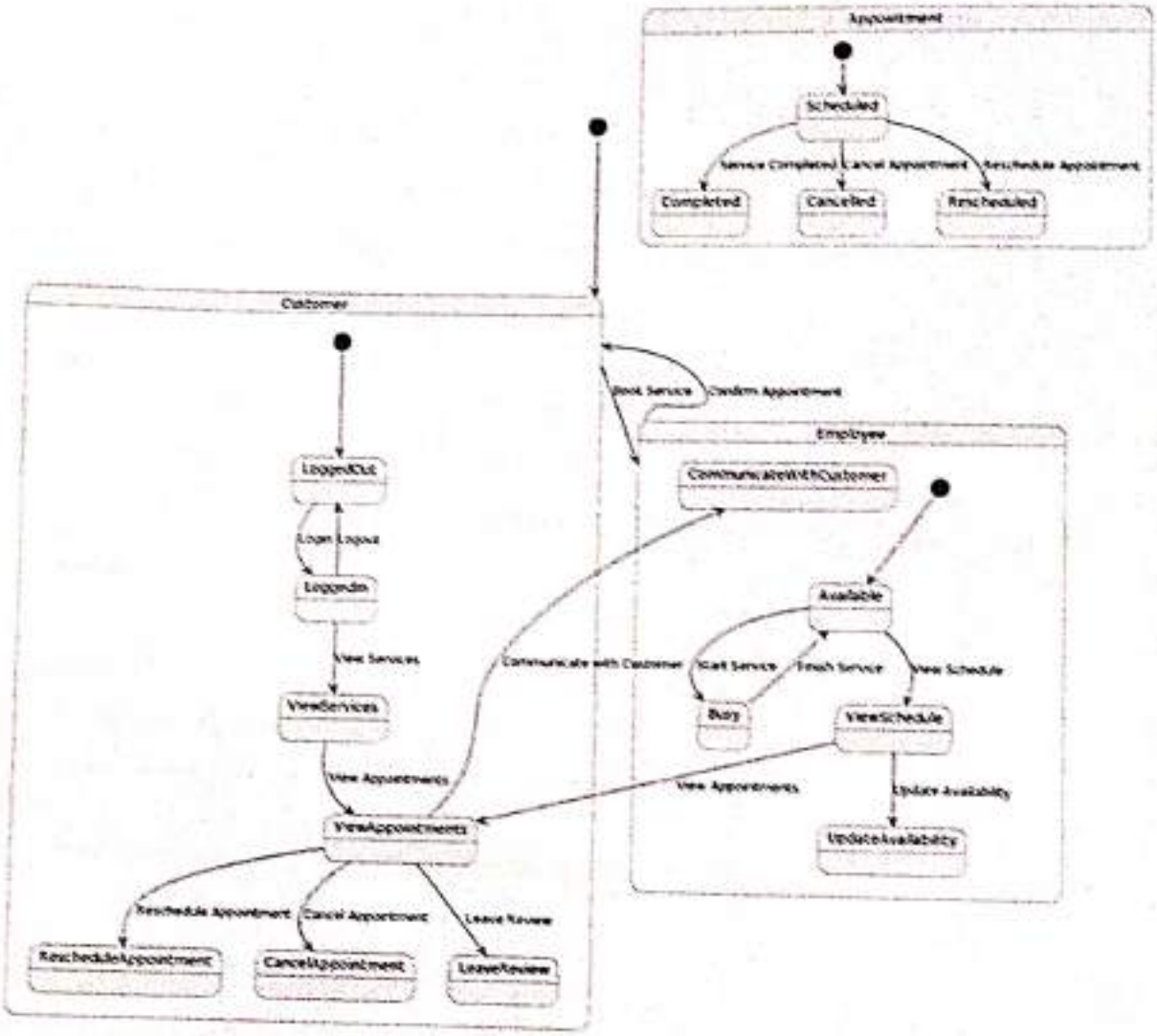
SEQUENCE DIAGRAM:–



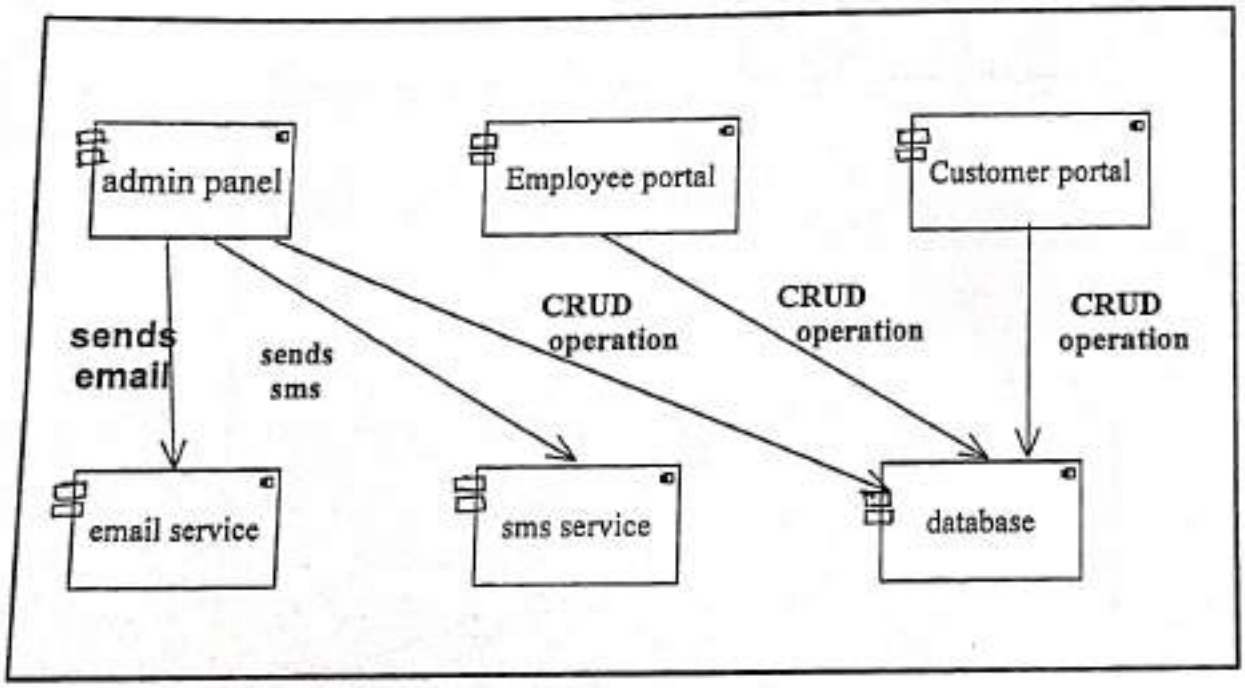
ACTIVITY DIAGRAM:



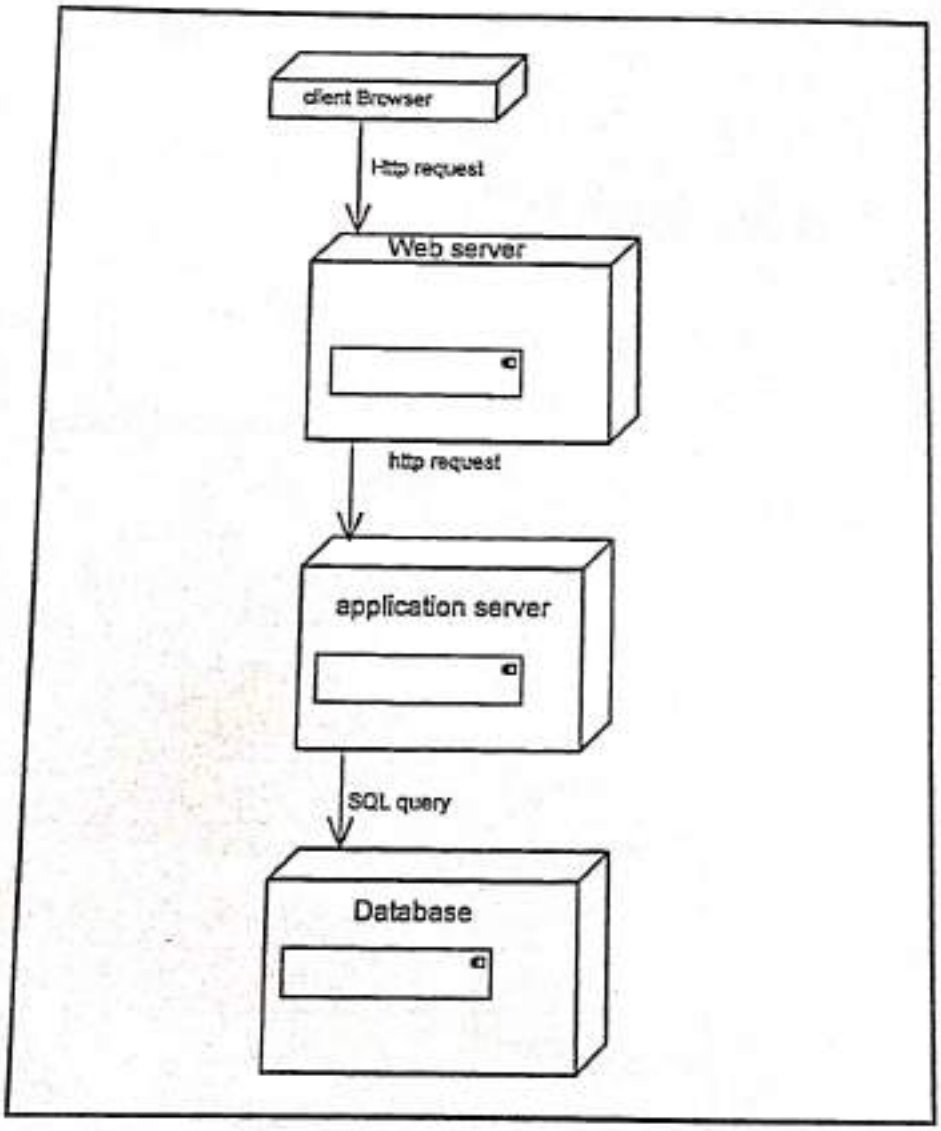
State Diagram



Component diagram:



Deployment Diagram:



Data dictionary

1)Table Name -Admin

Field Name	Field type
User_id	Int
AdminName	Char
MobileNo	Int
Email	Varchar
Password	Varchar
AdminRegDate	Date

2)Table Name-Booking

Field Name	Field type
Id	Int
Userid	Int
AptNumber	Int
AptDate	Date
AptTime	Time
Message	varchar
BookingDate	Date
Remark	varchar
Status	varchar
RemarkDate	Date

3)Table Name-Contact

Field Name	Field type
Id	Int
Frist name	varchar
Last name	varchar
Phone	Int
Email	varchar
Message	varchar
Enqury Date	date

4)Table Name – Invoice

Field Name	Field Type
Id	Int
User id	Int
Billing id	Int
Service id	Int
Posting date	Date

5)Table Name - page

Field Name	Field Type
Id	Int
Page type	varchar
Page title	varchar
Page description	varchar
Email	varchar
Mobile no	Int
Updation date	Date
Timing	Time

6)Table Name-service

Field Name	Field Type
Id	int
Service name	varchar
Service description	varchar
Cost	int
Creation date	date

7)Table Name-User

Field Name	Field type
Id	Int
Frist name	Varchar
Last name	Varchar
Mobile no	Int
Email	Varchar
Password	Varchar
Regdate	Date

Output screen

Home Page

Admin Dashboard

User Signup

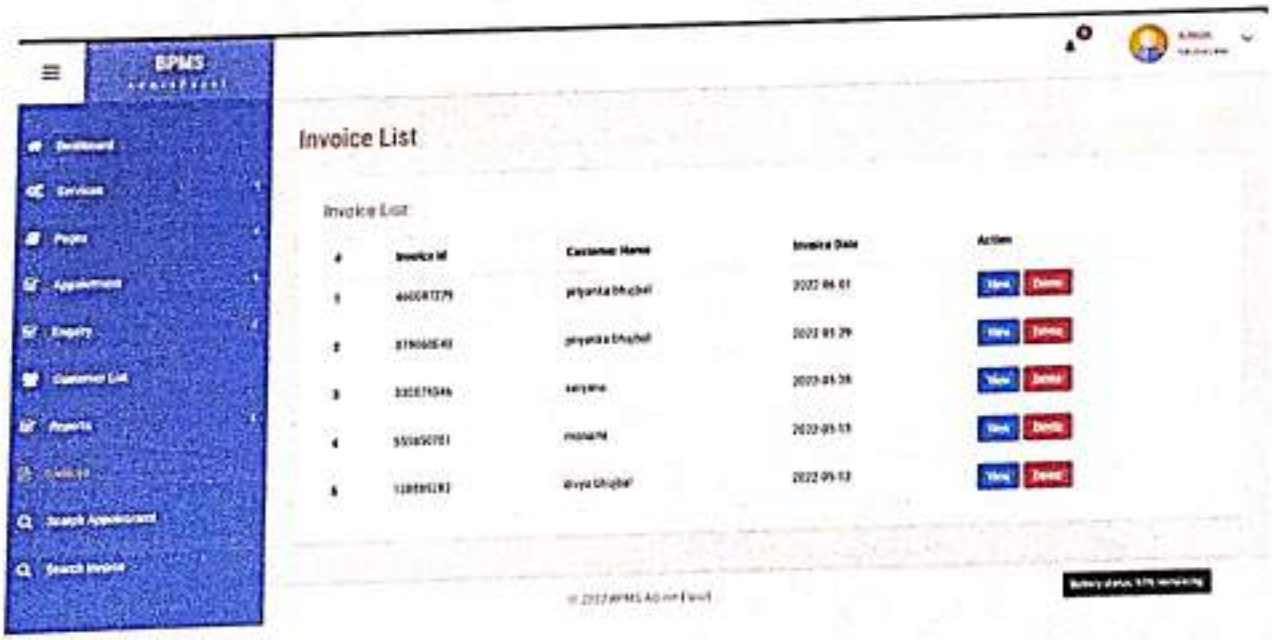
Add Services

Manage Services

All Appoinment

Customer List

Invoice List



Report generated


BPMS
Sales Reports
Sales Report Month Wise
Sales Report from May-2022 to June-2022
S.NO
Month / Year
Sales
Total


BPMS
Between dates reports
Between dates reports:
#
Invoice Id
Customer Name
Invoice Date
Action
View

Testing

Testing System testing is nothing but the process of finding errors in the system, if any. This is done with the help of following steps.

1]Modular Testing

2]Integrated Testing

3]System Testing

1] Modular Testing: After writing code for each model that code is tested individually. If satisfied output is returned by the module further testing starts then only.

2] Integrated Testing: After Insuring the errorless execution of each module, all modules are linked together and check for syntactical and logical errors. In this testing all forms are execution together according to the code specification.

3]System Testing: In this testing the entire system is checked whether is it giving the desired output or not.

Limitations

- Requires an internet connection.
- It supports only English language.
- Complexity and Learning Curve
- May need regular updates.

Future Enhancement

In any system there is always chance for its enhancement and extension.

This system can also be enhanced with the change facilities.

also with the progress of the beauty parlour management

system can also be enhance in future.

More facilities can be added to the system for its growth.

There is always scope for enhancements in any system, especially in the ever changing world of computers.

The beauty parlour management System can also be modified

according to the feature requirements the advancement of the technology.

Bibliography

For the completion of our project and documentation we have refered the following :

1. Duckett, jon. "HTML and CSS: Design and Build Websites."John wley and sons, 2011[Book]
2. W3Scholls. "HTML Tutorial." Available at: http://www.w3schools.com/html/.
3. Stack Overflow. Various HTML-related discussion and code examples available at : http://www.stackoverflow.com/.
4. Codecademy. "Learn HTML" available at: http://www.codecademy.com/learn/learn-html