

## Innovative & New Ideas adopted

To develop scientific temper in students the teachers of chemistry department of our college has taken new initiative to introduce research experiments among their students which are as:

### Innovative & New Ideas adopted

#### Experiment: Exploration of polysaccharides to design hydrogels

A number of polymeric based devices have been proposed to achieve drug delivery systems for efficient therapy. Among them, hydrogels (copolymers), specially based on the polysaccharides, have attracted considerable attention to act as smart candidates for the controlled release of therapeutic agents to the specific sites in the gastrointestinal (GI) tract. These hydrogels could be formed by grafting of monomers on the polysaccharides. Polysaccharides are readily available, cheap, non-toxic and are biodegradable. Hydrogels are a class of crosslinked polymers that, due to their hydrophilic nature, can absorb large quantities of water. These materials uniquely offer moderate to high physical, chemical, and mechanical stability in their swollen state. Hydrogels can swell quickly by imbibing a large amount of water or de-swell in response to changes in their external environment and this property makes them suitable materials for biomedical applications including controlled drug delivery application.

### Response

Through experiments students were able to

- conduct experiments independently
- understand applications of designed bio-material
- develop research ethics.



(a) acrylamide with psyllium

(b) acrylamide without psyllium

Students of B.Sc. 3<sup>rd</sup> and 2<sup>nd</sup> years formulated hydrogel of acrylamide with psyllium (a) and without psyllium (b) on dated 8<sup>th</sup> and 9<sup>th</sup> November 2023 in chemistry lab and throughout synthesis they were instructed by Dr Man Mohan. He also explained various characterization, evaluation techniques and biomedical applications of these formulated material devices.

Teacher In charge,

*Man Mohan*  
Dr. Man Mohan

Department of chemistry

Principal,

*Atal Bihari Vajpayee*

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**\*Project Report:** Preparation of Organic Soaps (Honey, Turmeric, Tulsi, and Rose) Using Soap Base\*

1. **\*Objective\*:** The objective of this project was to prepare organic soaps utilizing natural ingredients such as honey, turmeric, tulsi, and rose, with the aim of promoting skin health and environmental sustainability.
2. **\*Materials and Methodology\*:** BSC 3 Chemistry students selected a glycerin soap base as the primary component, and incorporated natural extracts and essential oils from honey, turmeric, tulsi, and rose. The process involved melting the soap base, blending the ingredients, pouring into molds, and allowing sufficient time for cooling and solidification.
3. **\*Results\*:** The final products were four distinct organic soaps, each exhibiting unique fragrances, colors, and beneficial properties, such as antibacterial, anti-inflammatory, and moisturizing effects.



4. **\*Evaluation\*:** The soaps were tested for pH levels, texture, and lathering capacity, confirming that they are skin-friendly and effective for daily use, as well as biodegradable and environmentally safe.
5. **\*Conclusion\*:** The project successfully demonstrated the feasibility of leveraging natural ingredients for soap production. It promoted awareness of organic skincare options while emphasizing the importance of sustainability in everyday products.

Teacher In charge,

Prof. Subhash Chand  
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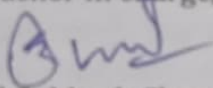
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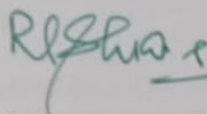
**Project Summary: Production of Activated Carbon from Pine Needles for Water Purification**

- 1. Objective:** The project aimed to produce activated carbon using pine needles as a sustainable and cost-effective precursor for water purification.
- 2. Methodology:** BSC 3 Chemistry students employed a carbonization process involving pyrolyzation of dried pine needles, followed by activation using chemical agents.
- 3. Results:** The produced activated carbon exhibited an adsorption capacity for contaminants, demonstrating its effectiveness in improving water quality.
- 4. Analysis:** Characterization of the activated carbon was conducted using XRD FTIR, confirming its amorphous nature and Functional groups suitable for water treatment applications.
- 5. Conclusion:** The project successfully highlighted the viability of utilizing agricultural waste, such as pine needles, for producing eco-friendly activated carbon in water purification processes.

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### Experiment: Determination of pH various nearby village soil samples:

The study of soil pH is very important in agriculture due to the fact that soil pH regulates plant nutrient availability by controlling the chemical forms of the different nutrients and also influences their chemical reactions. As a result, soil and crop productivities are linked to soil pH value. Soil pH is the measure of soil acidity or alkalinity, specifically the inverse log of the Hydrogen ion concentration on a scale from 0-14. Neutral pH is around 7, with 'acids' being below 7 and 'bases' being from 7 to 14. Most soils have pH values between 4 to 10. Soil pH is sometimes considered the "master variable" that has several impacts on plant nutrients and plant growth. Soil pH also impacts or interacts with other properties in the soil. Soil pH is an important factor in the soil, influencing nutrient availability and organism activity. pH value of soil is impacted by management, such as crop removal or liming. pH value can be increased by application of liming materials, or decreased by sulfur-containing materials.

Students of B.Sc. 3<sup>rd</sup> and 2<sup>nd</sup> years pH various 5 soil samples enlisted in table. In the chemistry lab, the pH of a soil solution it was measured first with universal pH paper and then followed by measurement of pH with pH meter. The soil sample were prepared with double distilled water solution. These samples were brought my students from their own fields at nearby village. Here are the results of the observations recorded by different groups of students:

#### Observations:

Sr. No	Sample / village name	Mean of pH value recorded
1	Basantpur	7.6
2	College NSS Vaatika	7.1
3	Thali	6.7
4	Tatapani	6.2
5	Gharyana	6.9

This entire experiment was performed on dated 28<sup>th</sup> November 2023 in chemistry lab and throughout experiment students were instructed by Dr Man Mohan. He also explained various factors that control pH of soil and advise students to assist their family member in soil pH measurements before cultivation of their fields and choose crops of suitable pH to their land and environments.

Teacher In Charge,

Dr. Man Mohan

Department of chemistry

## Response

Through experiments students were able to

- conduct experiments independently
- understand impact of pH and environment on crop selection.
- develop research ethics.

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