DEPARTMENT OF BIOTECHNOLOGY

Report –October 2021-April 2022

The department of Biotechnology conducts various programmes in order to motivate students to enlighten them about Science and Innoviations.



INDUSTRIAL VISIT

On the 9th of June 2022, the Department of Biotechnology and Botany conducted an industrial field visit to the Karnataka Milk Federation located in Mysore. A total of around 50 students attended the trip along with six teachers from the other department of chemistry attended the trip acting as chaperones.

The milk here is then pasteurized at about 63 °C (145 °F), maintained for 30 minutes or, alternatively, heated to a higher temperature, 72 °C (162 °F), and held for 15 seconds. The milk is then sent through a pipe to a cream separator. The cream is then extracted which leaves us with skimmed milk which is indicated by the iconic blue packet we all know of. Removal of fat is what makes the milk have lower viscosity. The orange packet indicates the presence of cream in milk.

The yellow packet indicates Pasteurized Double toned milk. It is homogenised milk with Min. 1.5% Fat and Min. 9.0 % SNF. Ideal for Health conscious people and senior citizens. There are various packets that vary for each state. For instance, Telangana, Andhra Pradesh and Tamil Nadu have different packaged milk.

The milk pasteurised and removed of cream now gets sent to a machine which helps in packing. The packing of an individual milk packet takes roughly around 2 to 3 seconds. So around 1800 packets are made in a span of one hour. They are then sent on a conveyor belt to the refrigerator units and are stored at $4\Box$ until they are ready for packaging. An average of around 2.5 to 2.75 lakh rupees per day.



The facility also makes other products such as ghee, paneer, curds, Mysore pak and their iconic peda. The paneer packaging is done manually due to its delicate nature.

The process of making paneer starts with boiling the milk taken from one of the many silos. To the milk citric acid is added in order for the milk to coagulate. After coagulation is achieved the cheese and the whey is separated. The cheese is then taken into the packaging unit where they are compressed to remove excess whey and are then placed in packages ready to be sent to the many Nandini units in Mysore. The equipment is then cleaned after every batch. Cleaning is automated with a combination of steam and caustic soda.

Curd is made by using culture powder which is pre-packaged and is up to Nandini's standards.



Samples from each batch are taken to the quality control (QC) lab to get the green signal for packaging. The products are stored large refrigerator. The refrigerator is directly linked to the loading aisle to make the process swifter in order to preserve the product at its cold temperature.

VISIT TO SULA WINES

On the 9th of June 2022, the Biotechnology and Botany department of Bishop cotton women's Christian college organised an industrial trip to Sula Vineyards and Nandini-Mysore milk union.



SULA VINEYARDS

After the grapes are picked, which happens during the month of March, they are dried on racks and through a drying method known as Pasito. They are dried for some time after which they are placed in a separator which helps separate out the grape pulp from the seed. The seeds are used to produce grapeseed oil which is one by-product sold by Sula vineyards.

The pitted grapes are then either pressed or crushed depending on the type of grape they are. If they are red grapes they are crushed, pressed if they are white grapes. The juices are extracted and then placed in large fermentor tanks and allowed to



ferment. They are then placed into large barrels. French oak is roasted prior in order to impart the flavour. Each barrel will hold up to 225 litres of wine and can be used for up to 10 years. The barrels are then placed in temperature-controlled rooms at around 12-20°C. Not all wines get better flavour as they age. They undergo the process of Oxidation in order to enhance the flavour and acidity of the wine.





FERMENTERS

PASITO

After that, we were escorted back to the reception area and allowed to purchase wine as a souvenir from the shop or grapeseed oil. Grapeseed oil is one of the sustainable products sold in Sula vineyards. The grapeseed oil is made by taking the pits of the grapes and is dried outside. Then placed into an extract which extracts the oil by pressing on the seeds. The waste of this extraction along with the skin of the grape seeds is then again dried to make the fertilizer which is locally known as Gobra. The gobra is used to help in the growth of grapes and excess fertilizer is sold locally.

Around 60% of the wine uses solar energy. Cleaner energies like solar, have been our focus from the very beginning. The infrastructure supports the use of solar energy or even direct sunlight, which reduces our dependence on electricity. This helps in preventing the release of close to 2000 metric tons of carbon dioxide into the atmosphere. We also use solar pumps for lifting water at our vineyards to further eliminate the use of any fuel, helping us save approximately 10,000 litres of diesel annually.

They are currently investing in ways to cut down our freshwater consumption by using natural structures like reservoirs and ponds to capture rainwater. They recycle water from various processes in effluent treatment plants and drive efficiency in the processes. Drip irrigation has shown significant results at our vineyards as it has helped reduce water consumption by 30-40%.

INDUSTRIAL VISIT

On March 3rd 2022 the Biotechnology department headed by Dr.Sharmila Wesley along with Dr. Susanna and the Botany department headed by Mrs. Esther Watson collaborated with Bayer to have a virtual tour of the lab located in Manyata Tech Park. The tour lasted two hours, which was guided to us by Dr.AniklukeDhanaraj, Senior CI Analyst | Science Fellow. The tour started at 10: 30 a.m. with a game which was basically a medium of introducing the participants with basic facts and history of the company where students from not only BCWCC were present but also from Oxford and Ramaiah College.



Later the students were introduced on how various modifications on various vegetables were to obtain the desired yield, what changes in the seeds were done and cultivated, they also threw light on the sponsorship programmes that the company has and how they are collaborating with the farmers nearby regarding modified seed, pesticides, insecticides etc.

Then Mr.ThillaichidambaPonnaswamy explained his projects of GMO'S (genetically modified organisms) in collaboration with Bayer Monsanto.

At the end, a video on the virtual tour of the lab was presented where the functioning of several equipment and their purposes was clarified, after which the students asked their doubts regarding the topic which were clarified by speakers.

NATIONAL SCIENCE DAY

The department of Biotechnology celebrated National Science Day on 28th February 2022 by conducting an online essay writing topic- "Integrated Approach in Science and Technology for Sustainable Future" and working model of DNA. The objective is to spread the message of the importance of science and its application among people, to motivate students to pursue their higher education in the field of Science and create scientific temper.

BISHOP COTTON WOMEN'S CHRISTIAN COLLEGE No.19, 3rdCross, CSI Compound , Mission Road, Bengaluru-560027 DEPARTMENT OF BIOTECHNOLOGY CELEBRATES Mational Science Day - 2022 Theme For 2022 "Integrated Approach In Science And Technology For Sustainable Future" Inter-Collegiate Competation -Online Essay writing -Charts/Working Model of DNA DATE:28/02/2022 E-mail.ID: biotech.bewcc@gmail .com Organizers Dr.Sharmila Wesley HOD, Dept. Of Biotechnology Dr.Susanna P Dept. Of Biotechnology 9620251184



Certificate Course: CRISPR Course

Topic: Next Generation Therapeutics

Duration: 30 hours

Students: 15

The department of Biotechnology in collaboration with Vowels Advanced School of Learning and Research (VASLR) Private Limited, conducted a certificate course for 30 hours, 15 students from III B.Sc attended the course.

Dr.Gokul Kesavan explained the applications, genome editing, r-DNA technology, how to cut target DNA and further for ligation with the plasmid vector. He summarised CRISPR/ CAS gene editing can be done using cas 9 and cas protein.Mini project was done to remove envelope gene protein to eliminate HIV proteinusing pam sequence for cas9.

The embryos of zebrafish was focussed under microscope to observe the developmental changes and differentiate between male and female fish.



Skill Enhancement Program- The objective was to provide workshops, training programs and skill development for both Faculty and Students. Department

organised this program in collaboration with VASLR for IBsc and II Bsc Biotechnology with Introductory class from December 3rd 2021, 3h of class was conducted once in a week.

Topic:*CRISPR – Applications and Principles*

Dr.GokulKesavan from Vowels Advanced School of Learning and Research (VASLR) Private Limited, He trained the students how to use software in the Biological field; he shared the knowledge about Bioinformatics related to Gene sequencing. The selection of primer for gene editing in some of the diseases was taught to the students. Chop-Chop software was used to specifically identify the sequences.

The MOU was signed between Mr.Midhun A Kunj, Director of Vowels Advanced School of Learning and Research Private Limited and Department of Biotechnology for 5yrs. Effective from 10/1/2022 upto 9/1/2027.

Commemoration 75th Independence day

On 17th December 2021, Indian Defence collaborated with Army, Airforce and Navy organised a exhibition-DGQA local Exhibition, Bangalore on the eve of Azadi Ka Amrit Mahotsav. Students of III B.Sc attended this exhibition.

Ajeya battle tank T-72, a tank of Russian origin inducted in 1980, performed at the exhibition, started indigenous production of Ajeya with complete transfer of technology from Russia in 1988. Similarly, T-90S Bhishma, the Russian origin tank, has been manufactured in India, with more than 98% of the 1272 components manufactured indigenously, said an official. The tank can even withstand a nuclear attack. Bridge laying tank B80 also performed at the exhibition. Main battle tank Arjun MK-1, the state of the art combat vehicle with advanced technology for superior fire power, mobility and protection coupled with ease and comfort in handling, was also exhibited. Several defence suppliers exhibited indigenous components used in combat vehicles and warship projects.

