ST. XAVIER'S COLLEGE, MAPUSA GOA

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Nature of Event (Workshop, Guest Lecture, Add-on Course, Seminar, etc.)	Field Trip
Name of Department	Biotechnology
Faculty In-Charge	Ms. Jocelyn Fernandes, Ms. Swaroopa Naik.
Stratum of Event (College, State, Regional, National)	State
Title of Event	Maka Di Brewery
Date of Event	10th April 2023
Venue	Latambarcem Brewers Private Limited, Bicholim, Goa
Objective/ Scope of Event	To familiarize students with the overall functioning of a bioprocess plant.
Particulars of Event	On 10th April 2023, the students of T.Y.B.Sc. Biotechnology along with 2 faculty members Ms. Swaroopa Naik and Ms. Jocelyn Fernandes visited Maka Di Brewery situated in Nanoda, Bicholim, North Goa. The objective of the field trip was to study, observe, understand the various aspects and the functioning of a bioprocess plant. Maka Di is Goa's own bespoke craft beer brand produced by Latambarcem Brewers Pvt. Ltd and has recently launched international quality craft beers both for the domestic and international markets. On our arrival, we were welcomed by Ms. Prajkta and were served with a welcome cold brewed sparkling iced tea of different flavors. Mr. Santosh, gave us an overview of the tour. He also explained to us the general working plant, fermentation and production of beer. Maki Di manufactures varieties of beer such as Belgian Blanche, Bavarian Keller, Belgian Tripel, Honey Ale etc. The visit commenced to various areas of the brewery plant i.e. right from the raw material section to packaging of the products. Mr. Santosh highlighted the importance of water in crafting the beers as per the tastes of clients from India, Europe , America etc. Craft water, used for brewing process has an ideal composition of minerals and certain chemicals and indeed will be helpful for a better fermentation process by yeasts. Next, he explained the

	importance is choosing the right material for beer production i.e. Barley. He showed us the malt houses when barley is germinated under controlled conditions and the quality tests done to check the sugar content in them. We also witnessed huge stainless steel tanks called the fermenters/ bioreactors used for different purposes in beer production. The process of beer production involves mashing, lautering, boiling, addition of Hops, Separation of hops, cooling, fermentation, pasteurization and packaging. The malt is sent to the first unit called the masher, where hot water and malt are mashed and mixed together. The amylases in the malt are broken down simpler sugars such as maltose, fructose that could be utilized by yeast for fermentation. The next step involved the addition of Hops which contributes to bitterness flavor of the beer. After the addition the mixture is sent to whirlpool unit where separation of solids is done the liquid component is sent to the next tank where fermentation takes place in conico-cylindrical tanks of 5000L. The choice of yeast strains for better production alcohol is taken into considerations and performed in seed fermenters to build a suitable biomass for fermentation. As during the fermentation yeast converts sugars into alcohol, cell viability and the counts of yeast cells play a crucial role in beer production. Phenolic off flavor yeast is used that's gives specific taste to the beer. Carbon dioxide , the by product of fermentation is constantly removed during fermentation and various tests such as pH, specific gravity are done. After fermentation, rinsing – filling- capping is done for the bottles and pasteurization is done to ensure the shelf life of beer. An insight into the interior of the fermenters was an advantage as the production was halted, for better understanding of the construction. The trip ended with a question answer session, where the brew master Dr. Dhavan Patel and students interacted.
Outcome of Event	Students acquired in depth knowledge of the steps involved in production of fermented beverages.
Feedback	Overall, the trip was educative, informative and allowed the students to understand the theoretical aspects in bioprocess plant. The students also appreciated the fact of the entire plant being controlled automatically by computers.

Total No. of Participants	31

Photographs