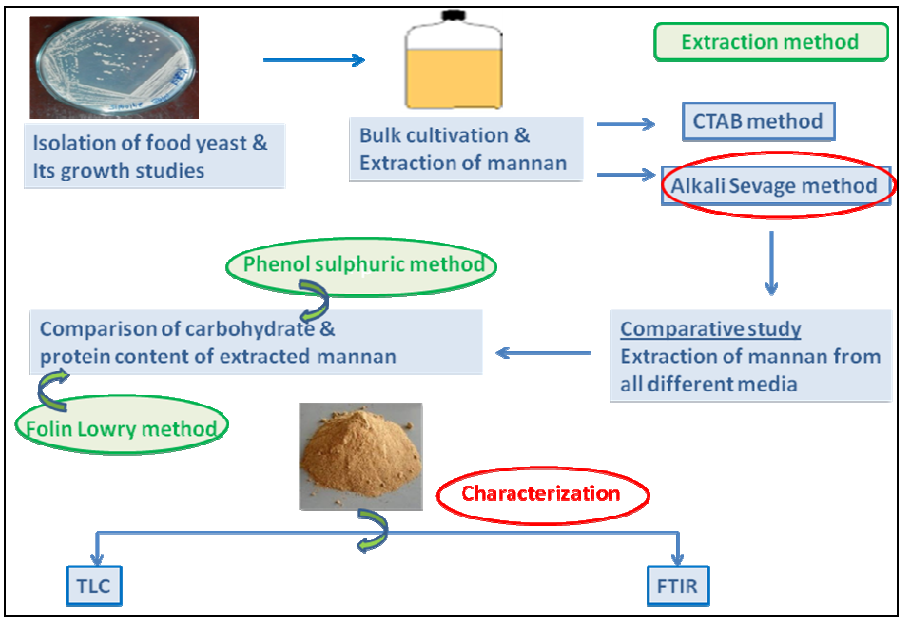
Study of Mannan from food yeast.

Participants: Harshita Mantri
Supriya Hewale

Expert: Dr. Vaijayanti Ranade

Aim of the project:
Mannan oligosaccharides have immense potential application in use as animal feed, immunomodulators, fermentation additive etc. Anti adhesive nature of mannan prevents colonisation of intestinal pathogen. Due to these several important application, study of mannan was done. Mannan is found in plant as well as yeast, however yeast being a GRAS product was used for the study.

Overview of the experimental process:



Inferences and Conclusion:

Yeast being a GRAS product is safe to use and easy to cultivate. Growth curve was performed in order to study the effect of media constituents on the growth and generation time of the culture. As per the shake flask data, GYEA and YPgal were found to show maximum growth for yeast as compared to other media. Carbon and nitrogen source when provided in adequate quantities along with sufficient aeration allows aerobic respiration in yeasts which results in increased biomass.

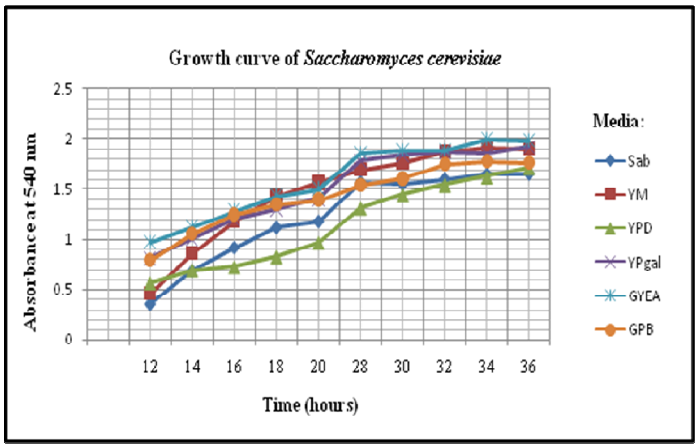


Figure 2: Growth curve of *Saccharomyces cerevisiae* using different media.

MOS obtained from yeast cultivated on YM medium showed highest carbohydrate content of 30% followed by GPB of 25%. However, the protein content for MOS from YM medium was found to be 18% and that from GPB was 20% as shown in figure 3. Our data is in accordance with the data obtained by White et al (23). MOS content in commercially available sources such as that from Agrimos, Advanta, etc. is found to be in the range of 26-33%. Alkali extraction was selected as the method of choice, since it extracts larger amounts of mannan as mentioned by Nelson et al 1991(16).

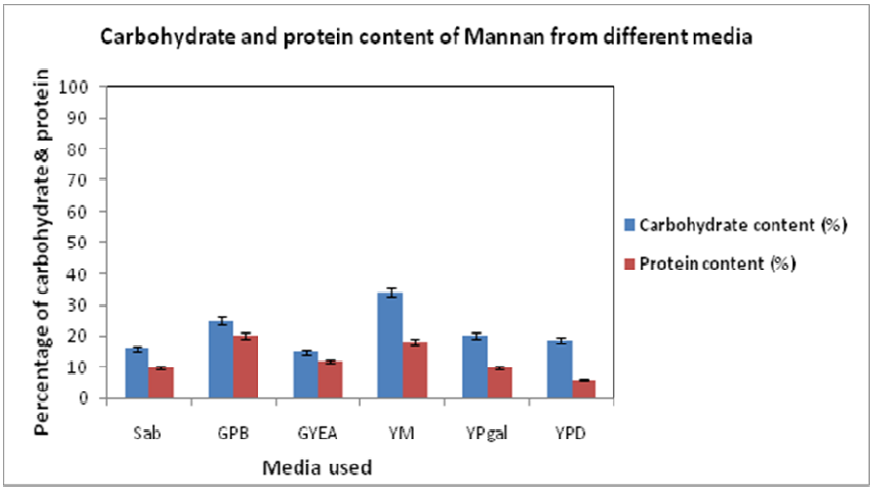


Figure 3: Carbohydrate & protein content of Mannan from different media.

On TLC plate, the hydrolysed product migrated with R_f value similar to that of glucose and mannose. Mannans obtained from yeasts are generally glucomannan (13) as opposed to galactomannans found in some plants.

The IR spectrum of mannan oligosaccharides shown in Figure 3 shows absorption bands arising from the *v*(CH) and the *v*(CO) stretching vibrations and high intensity of the *v*(OH) band. The presence of a carbonyl group and amide bond clearly suggests that Mannan oligosaccharides are tightly associated with proteins and together they form mannoprotein complex. Probable functional groups represented by each band are explained in table 2. Commercially available MOS of Praj Industries Ltd, Pune was used as standard. FTIR data of extracted sample was found to be quite similar with that of the standard. Alkali extraction is thus a quite simple, inexpensive and less time consuming method of extraction.

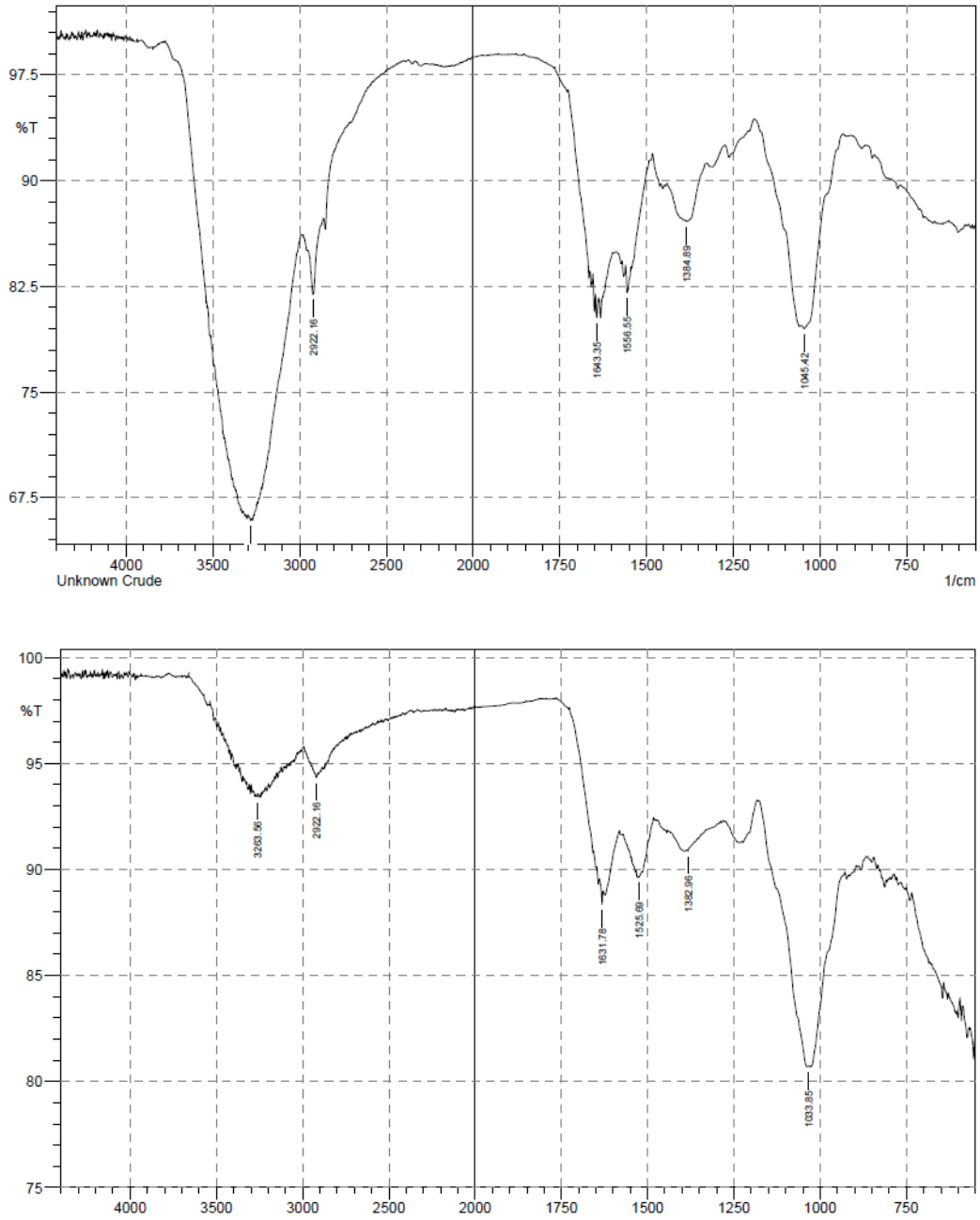


Figure 4: (a) and (b) FTIR spectra of (a) extracted mannan, (b) standard mannan.