

Biophysical characterization and comparison of rice cultivars for nutraceutical benefits

Anusha , Indira Govindaraju , Nirmal Mazumder*

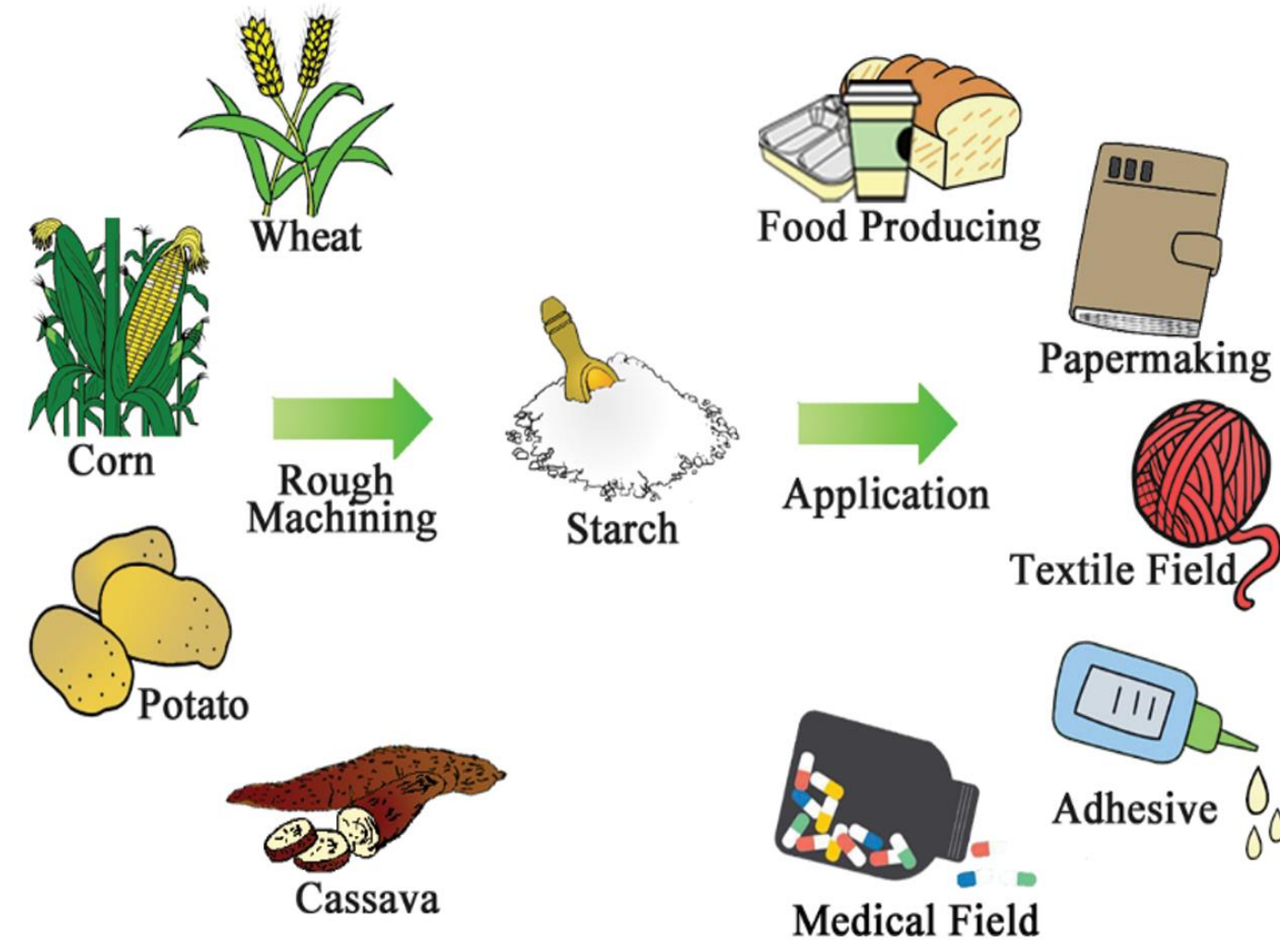
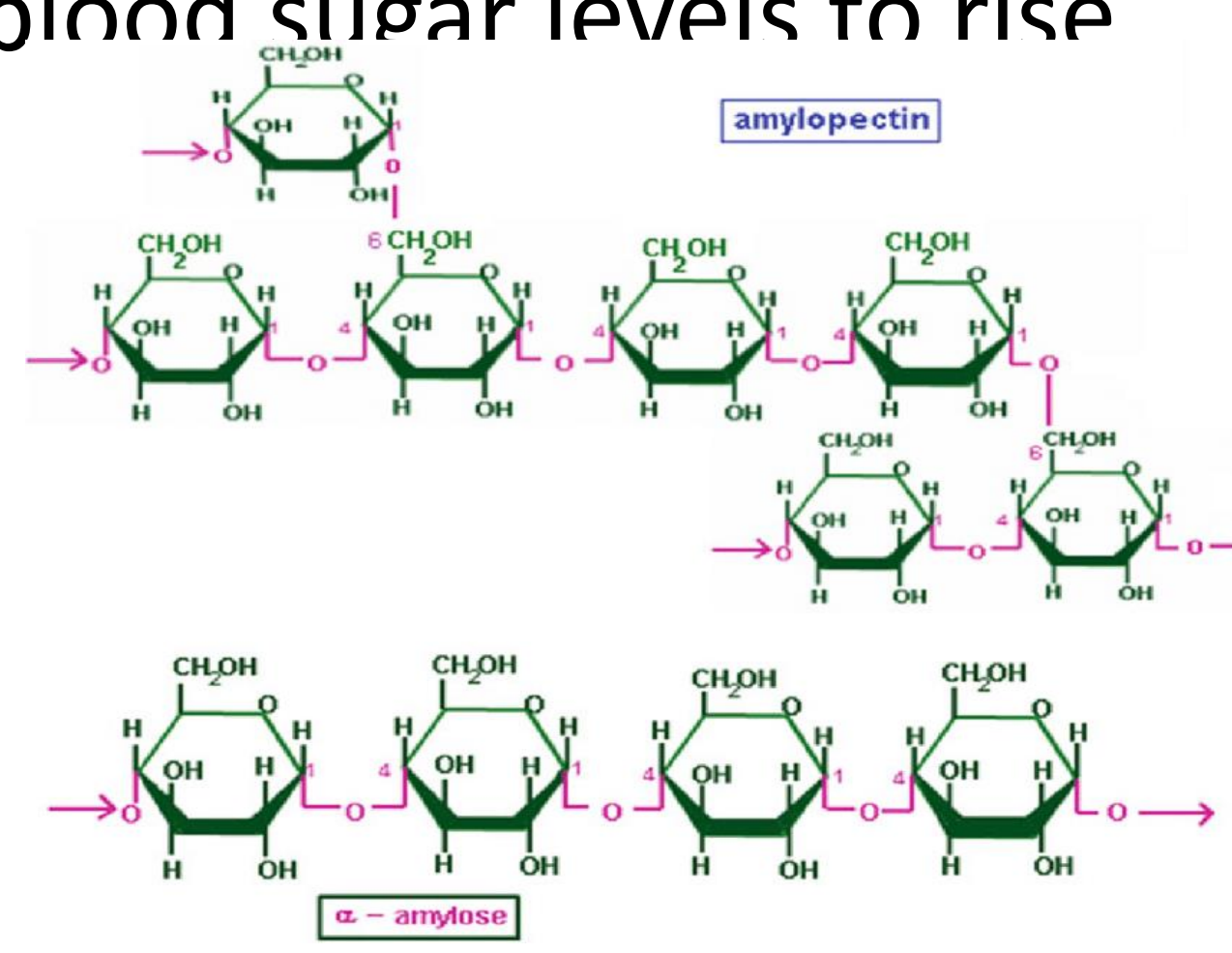
Department of Biophysics, Manipal School of Life Sciences, Manipal Academy of Higher Education, Manipal, Karnataka, 576104, India

Introduction

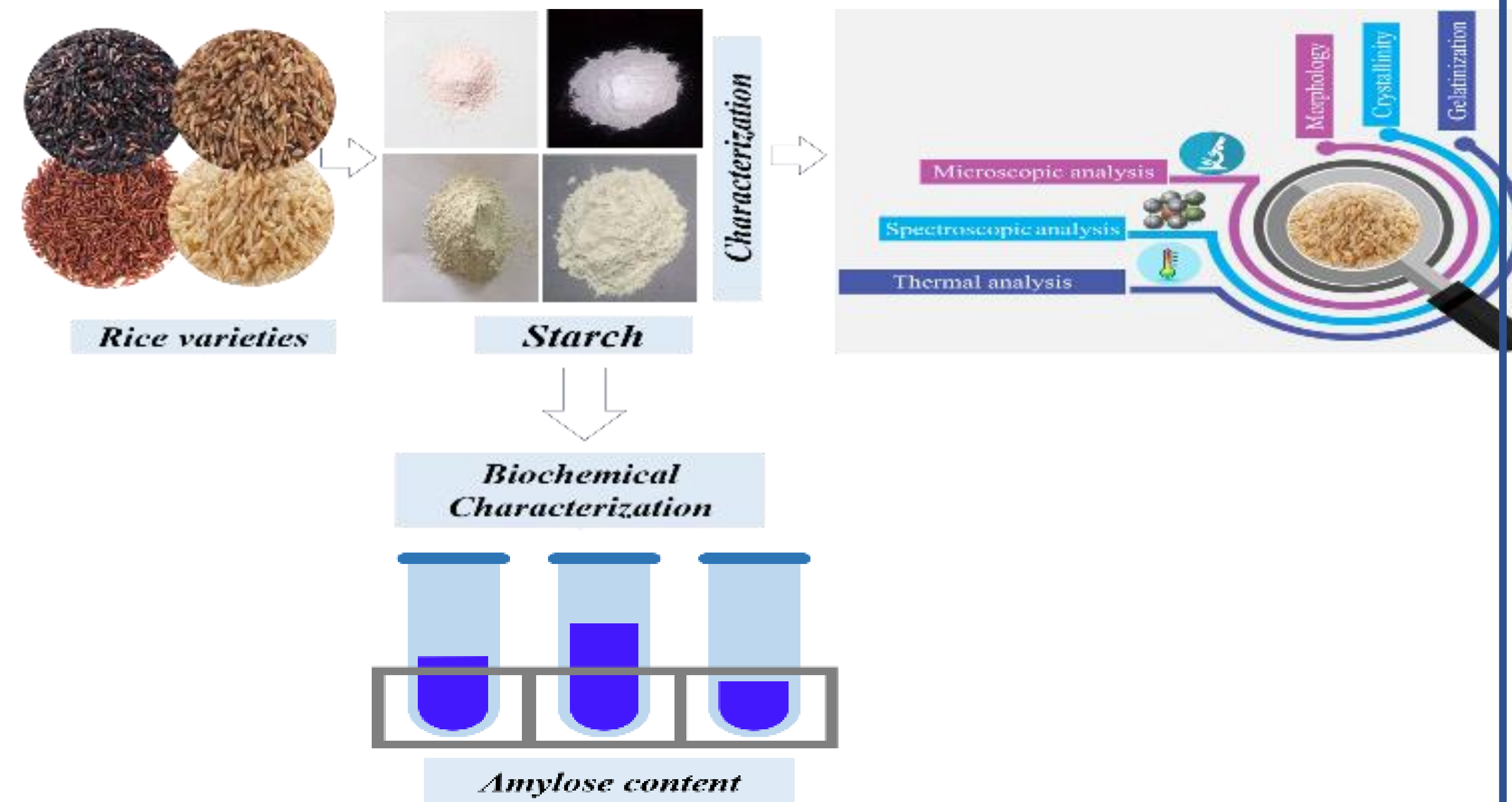
Rice (*Oryza sativa* L) is the most important staple food with 6-8% protein, 2-3% lipids and 73-75% carbohydrates.

Resistant starch is a type of starch that is not digested in small intestine and is fermented by bacteria (microbiota) in large intestine.

Glycemic index can be defined as measure of how quickly a food causes our blood sugar levels to rise

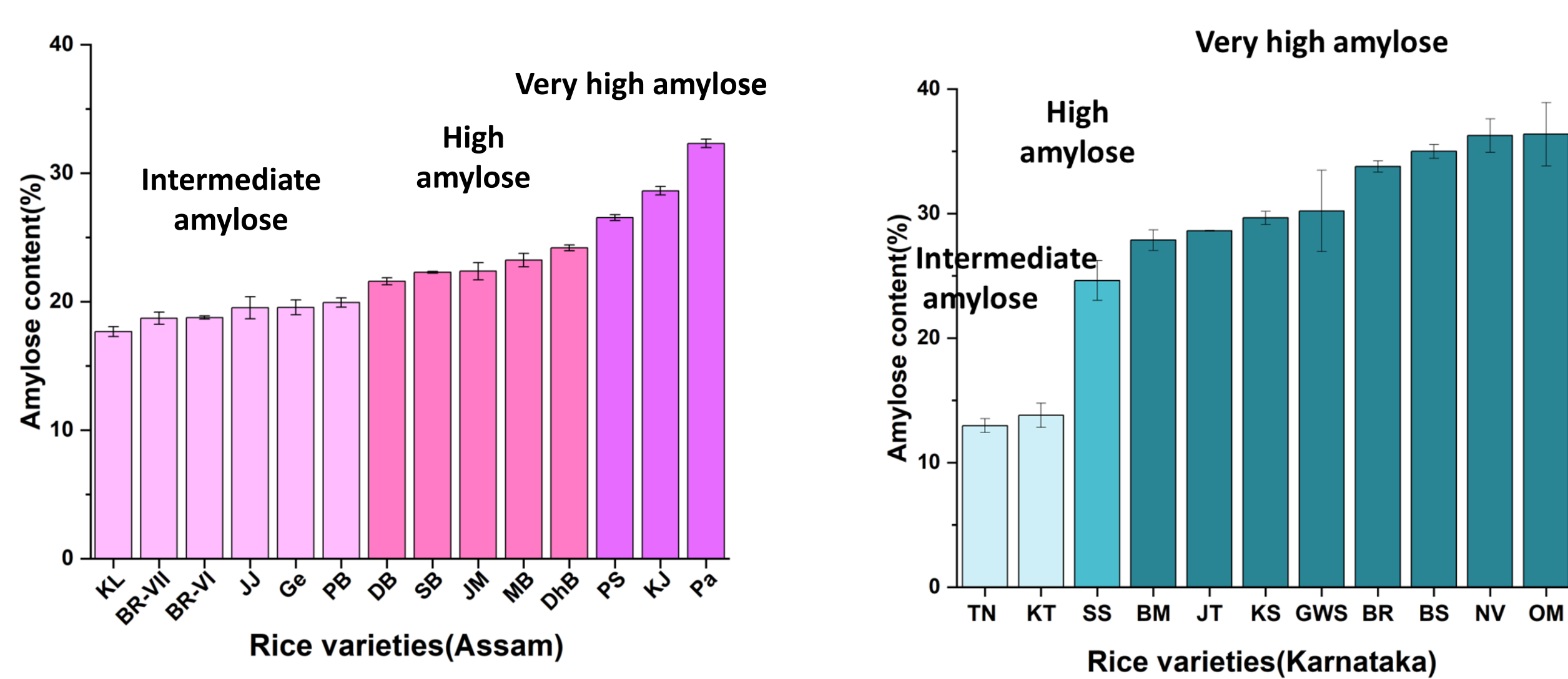


Methodology

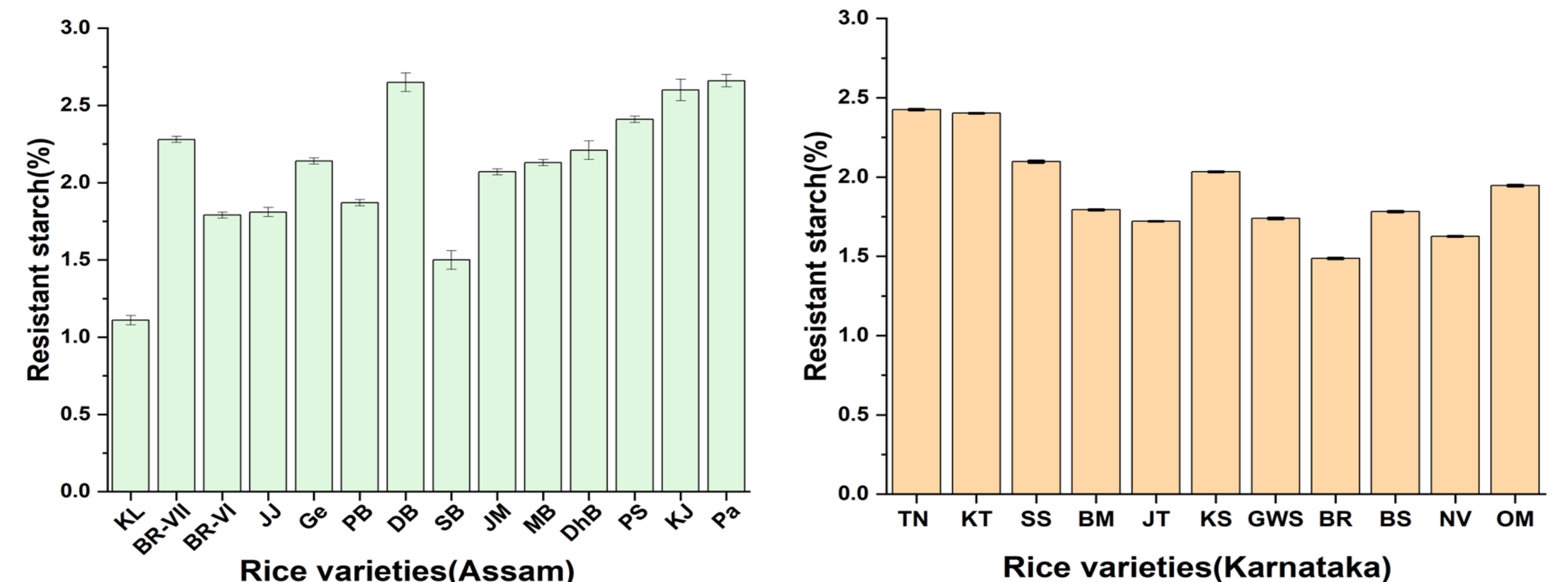


Results

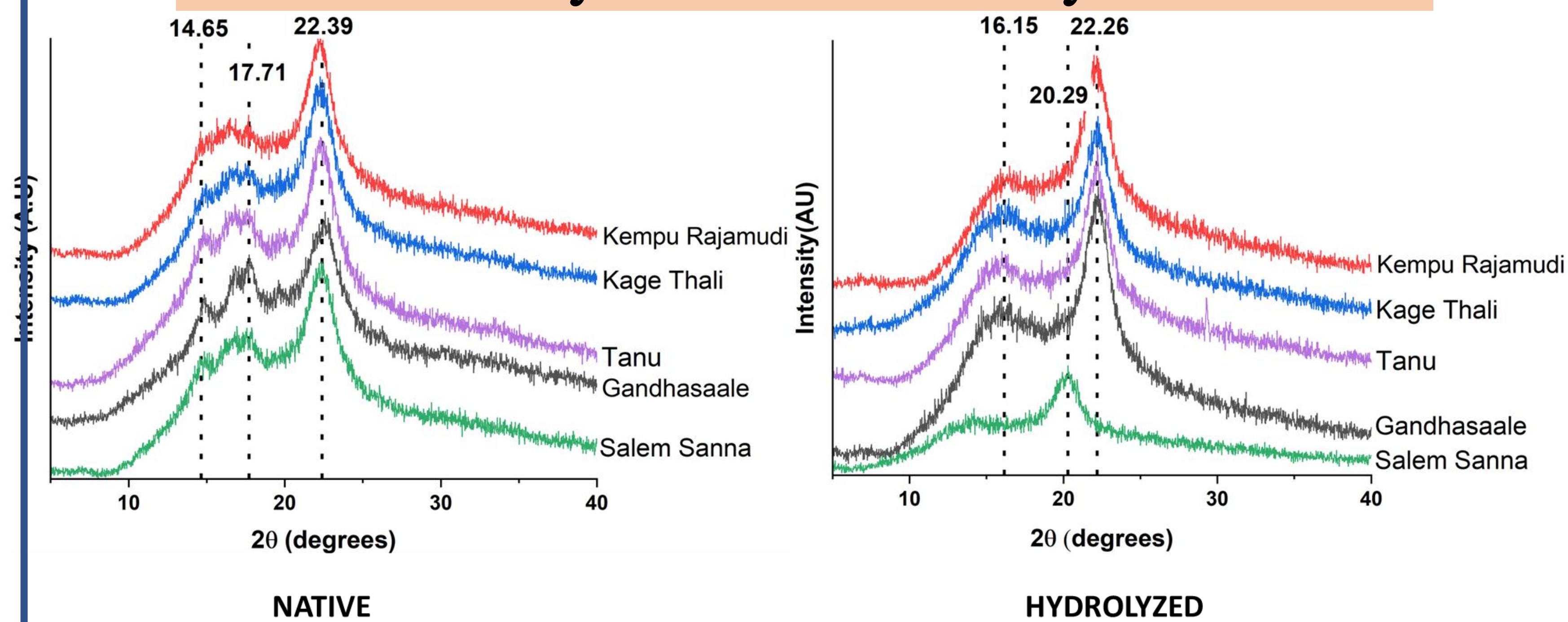
Amylose content



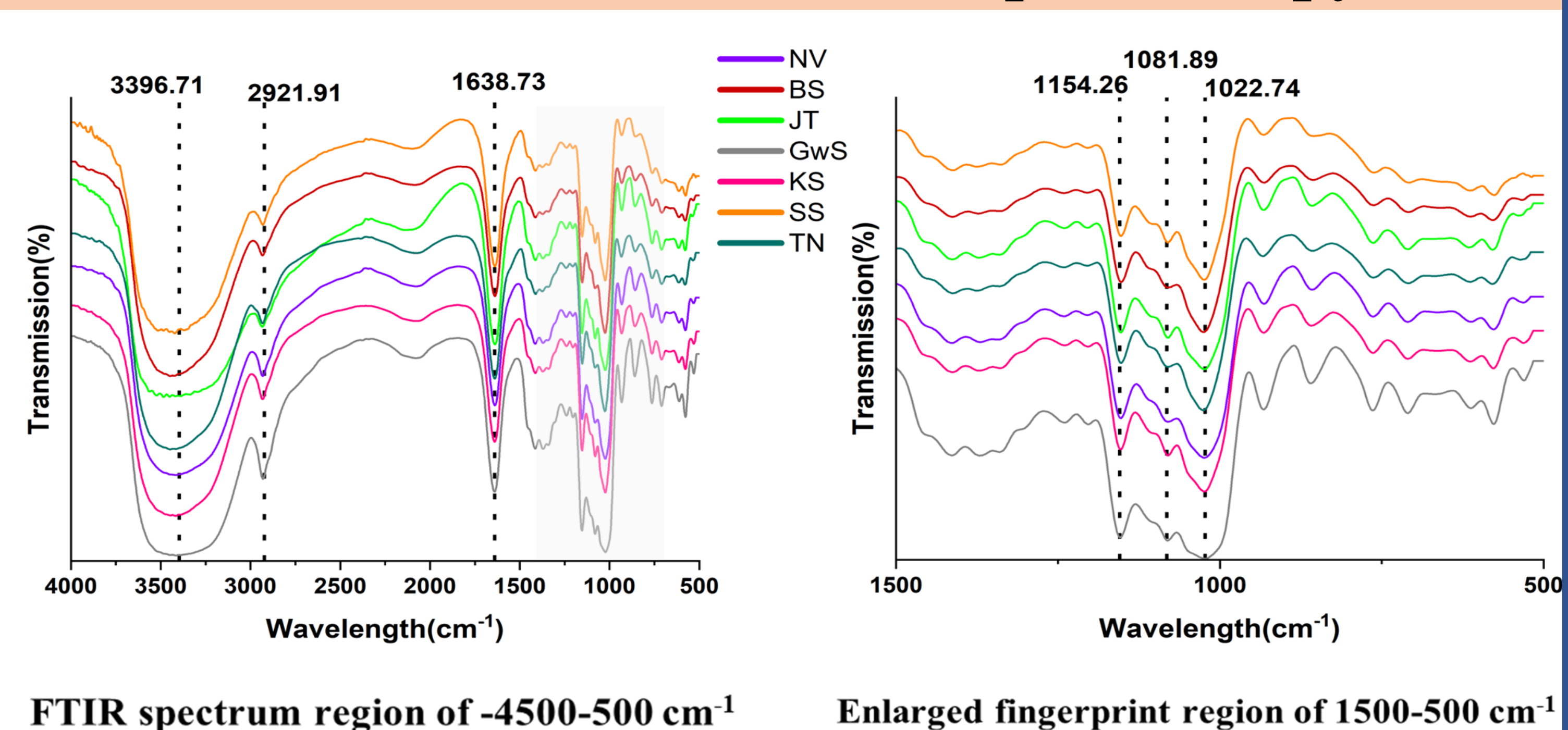
Resistant Starch content



X-ray diffraction analysis

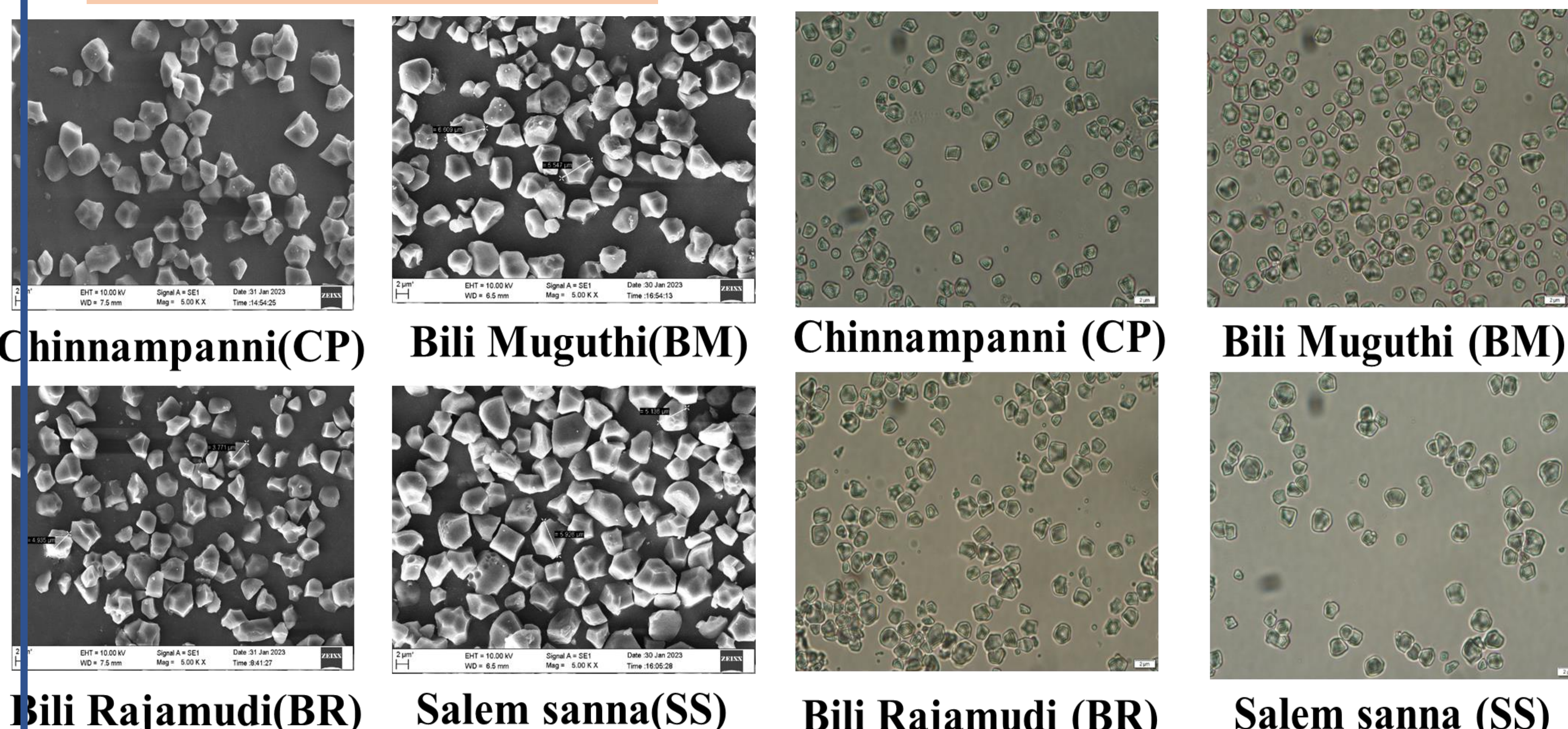


Fourier transformed infrared spectroscopy



SEM Images

Optical Images



Conclusion

- Low amylose rice- highest digestibility
- High amylose rice – least digestibility
- XRD – A-type crystallinity
- The rice varieties are classified based on digestibility and glycemic index
- Application in tailoring food for personalized nutrition

References

- ❖ Govindaraju, I., Zhuo, G.-Y., Chakraborty, I., Melanthota, S. K., Mal, S. S., Sarmah, B., Baruah, V. J., Mahato, K. K., & Mazumder, N. (2022). Investigation of structural and physico-chemical properties of rice starch with varied amylose content: A combined microscopy, spectroscopy, and thermal study. *Food Hydrocolloids*, 122, 107093.
- ❖ Magallanes-Cruz, P. A., Flores-Silva, P. C., & Bello-Perez, L. A. (2017). Starch structure influences its digestibility: A Review. *Journal of Food Science*, 82(9), 2016– 2023.
- ❖ Mohamad Yazid, N. S., Abdullah, N., Muhammad, N., & Matias-Peralta, H. M. (2018). Application of starch and starch-based products in food industry. *Journal of Science and Technology*, 10(2).

Acknowledgement:

We thank Manipal Academy of Higher Education (MAHE) and Manipal School of Life Sciences for the infrastructure and laboratory facilities for conducting this research.