National Institute of Technology Rourkela

Departmental Seminar

Seminar Title	: Return Seminar-Effects of Extrusion Process Parameters on the Production of Sustainable Millet-Based Rice Analogues: Investigating Cooking, Physiochemical, Rheological and Structural Properties in Relation to Conventional Rice
Speaker	: S. Ganga Kishore
Supervisor	: 2910
Venue	: CH-306
Date and Time	: 12 Mar 2025 (17.10)
Abstract	: Millet analogue rice was made from pearl millet, sorghum, and parboiled rice using extrusion technology. The impact of extrusion process conditions in terms of screw speed (540- 900 rpm), feed rate (5- 9 kg/h), and die temperature (80-100◦C) and materials moisture content (28- 32 %wb) on cooking characteristics viz. water absorption ratio (WAR), cooking losses (CL) and cooking time (CT), and physiochemical properties viz. water solubility index (WSI) and water absorption index (WAI) were assessed to obtain a quality millet analogue rice using central composite design of RSM model. The optimized process condition of 28 %wb moisture content, 720 rpm screw speed, 5 kg/h feeder rate, and 80◦C die temperature showed 5.67 % CL, 943 s CT, 2.155 % WSI, 7.093 g/g WAI and 6.815 WAR had a significant effect of $p < 0.05$ with the desirability value of 0.858. Millet analogue rice exhibited a significant difference of $p< 0.05$ in the proximate analysis, physical characteristics, textural properties when related to the raw rice. The relative crystallinity of millet analogue rice was lower than raw rice with similar FTIR spectral patterns and showed surface cracks and internal voids during SEM analysis.