

MEAT QUALITY AND MOLECULAR CHARACTERIZATION
OF DOMESTICATED SWINE BREEDS OF ASSAM, INDIA



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Submitted by,

Miss Rijumoni Daimari

Registration no. – FINAL/03BIO0023 OF 2017-18

Department of Biotechnology

Bodoland University, Kokrajhar- 783370

Assam, India.

Summary and Conclusion

In India, majority of the pork meat production is contributed by northeastern states. Among the northeastern states, pig production is highest in Assam. In Assam, the meat of indigenous pig breed, Doom is highly demanded and sold in high market prices than other pigs, due to its palatability. On the other hand, meat of another indigenous breed Ghungroo is also highly preferred by the local consumers. Along with the consumption of meat muscles, viscera of pigs are also widely consumed. Even though their meats and viscera are widely consumed, the population of these indigenous pig breeds are declining, due to increasing rate of crossbreeding between exotic and native breeds. The meat quality traits and molecular characterization of these pig breeds are poorly documented. Therefore, the present work aimed to assess the meat quality and molecular characters of Doom and Ghungroo pig breeds.

Meat quality analysis based on pH level suggests, muscles and viscera of Doom and Ghungroo pigs depicted good quality in terms of acidity of a meat. While nutritional analysis reveals that muscles, *longissimus dorsi* and *tensor fasciae latae* contain high concentration of protein, EAA's, essential fatty acids and minerals. These muscles are located in loin and ham region. Therefore, meat from these regions can be suggested for consumption to gain high quality nutritional benefits. Furthermore, the muscles found in shoulder region had low fat content compared with other red meats like goat, sheep and beef. While the protein content in pig muscles and viscera was found similar to that of goat, sheep and beef. The EAA's phenylalanine content was recorded the highest in muscles and viscera of pig breeds, compared to other red meats. Proteins are made up of amino acids, it is imperative that pig muscles and viscera provide higher nutritional value than other red meats, even though their protein content was found similar. Pig muscles also depicted high concentration of potassium, sodium, iron and zinc content and the potentially toxic elements did not exceed the recommended intakes. However, potentially toxic elements studied in viscera, nickel and lead was found to exceed the recommended intakes. In this study, feed and drinking water exceeds the allowed intakes for lead, and nickel concentration in soil was high. The correlation matrix for mineral concentration studied between the tissues (muscles and viscera) and feed, drinking water and soil, depicted positive correlation highest with feed > soil > drinking water. So, viscera

resulting in high concentration of lead and nickel can attributed to feed and exposure to soil. Thereby, it can be suggested that mineral deposition in tissues (muscles and viscera) can be influenced by feed, drinking water and soil. Therefore, it can be concluded that Doom and Ghungroo pig breeds produce nutritionally valuable meat, especially from the loin and ham regions. However, regarding the consumption of viscera due to potential accumulation of toxic elements caution is advisable, which are influenced by environmental exposures, particularly from feed, drinking water and soil. Improving feed quality and monitoring environmental contamination may enhance meat safety and quality further.

The genetic analysis of '*cytochrome b*' gene of Doom and Ghungroo pig reveals that Doom pig shared six similar nucleotides with Indian wild pig than Ghungroo pig. Therefore, these sites common only to Doom and Indian wild pig can be used to distinguish between indigenous pigs and wild boars. Furthermore, the least genetic distance between Doom pig and Indian wild pig also shows their close resemblance maternally revealing that Doom pig is recently domesticated pig breed. Furthermore, Ghungroo pig generating the farthest distance from Doom pig and other wild boars, shows the low genetic diversity of Ghungroo pig which might be due to use of full-sibling individuals in this study. This reflects familial relatedness rather than the overall genetic diversity of the breed. The results of the phylogenetic tree corroborate with the results of genetic distance suggesting Indian wild pig and Doom pig are genetically closely related to each other. This draws to the conclusion that Doom pig is the most primitive among the registered indigenous pig breeds of India.