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Rice milling and parboiling trade-offs for economic and nutritional gains in West Africa

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Abstract

Rice is a major source of nutrients, largely contributing to the food and nutrition security of millions of people in West Africa. The role of rice in the diets of West Africans is projected to keep increasing with the triple influence of urbanisation, consumer preference and demographic growth. Rice's inherent properties and its suitability for the preparation of local dishes (specific culinary suitability) are affected by processing methods, which influence consumer acceptance and market price. To respond to consumer preferences and hence attract premium prices, rice processing commits to quality upgrading, but may compromise grain nutrient content – generally a credence attribute. Although consumers generally manifest heterogeneity in rice preferences, empirical evidence points to a few attributes guiding the choices that commonly define the premiums. Hedonic pricing models have steadily shown that consumers are willing to pay price premiums for head rice, rice that cooks fast, slender grains, low-intermediate amylose, parboiled rice, and rice with high swelling capacity. But they strongly discount rice that is chalky, high in amylose and with impurities. Higher milling degree increases grain crystallinity, slenderness, and lightness, while decreasing milling returns, head rice, proteins, lipids, micronutrient, phytate and arsenic contents. Rice parboiling increases milling returns, head rice, water soluble vitamins, Fe and arsenic content, and reduces crystallinity, starch digestibility, lipid, phytic acid and Zn content. Information on the optimum milling and parboiling regimes that provide both economic and nutritional gains to society is scanty in the literature and is organised in a way that does not easily inform technological and policy changes. If milling is not extensive, parboiling appears to provide a better economic and nutritional trade-off. However, the process consumes water, energy, time and generates GHG emissions, which can be mitigated when improved parboiling equipment and methods are used.

Keywords: Economic returns, milling degree, nutritional returns, parboiling