

## Rice for Ruminants: Race for a Science under Shadow

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### Commentary

This commentary article seeks to increase the global awareness on the special suitability of rice as both grain and roughage feed for livestock of particularly ruminants in modern animal agriculture. This article also proposes a novel ideology that artistic feeding of rice in both high- and low-energy forms grants ruminant enterprises an economical on-farm strategy to improve animal health and production and to reduce occurrence of metabolic disorders, such as fatty liver, hypocalcemia, subacute rumen acidosis (SARA), immune deficiency, metritis and mastitis.

Rice has been grown and fielded for centuries as the immune feed for humans [1]. Rice grains and by-products have great value as livestock feed. In many regions, traditional farmers include rice grain and roughage as supplement in cattle, buffalo and non-ruminant diets, especially during pregnancy and lactation. However, this reality seems to have been overlooked by the modern animal industry.

Despite the rich store of uniquenesses in rice, limited production and availability in many regions introduces challenges in feeding rice by farmers. However, such a limitation must not be exacerbated by misinformation in how to feed rice to livestock during times of lower availability. Effective management of feeding rice during such periods becomes an art. That is because provision of rice as both grain and roughage can efficaciously complement dietary starch and cell wall in development of firm rumen fiber mat and stimulating adequate chewing, insalivations, rumen buffering capacity, and healthy acids absorption through rumen wall. This cascade can successfully minimize risks from subacute rumen acidosis and compromised immunity that are usually followed by significant drops in productivity and longevity [2-4]. Such a resourceful capacity for rice has recently been demonstrated in pig nutrition [5].

Although rice is not a high-protein feed, its protein quality and amino acid profile is unique and can greatly improve rumen microbial protein synthesis and nitrogen balance when fed in harmony with other cereals including corn, barley and wheat grains. After removing husk from rice kernel (20%), brown rice (80%) that includes pollard, bran and white rice. These parts contain mainly starch (with both high and low degradability) and considerable proportions of fat, making brown rice suitable for inclusion in energy-dense diets that should improve palatability and energy intake and not off-feed the animal. This makes rice an exclusive grain for lactating dairy cows and fattening beef cattle. In addition, rice straw retains reasonable levels of protein and digestible dry matter that may be fed not for its partly nutritious nature but mainly for its physically effective cell wall to help improve functional rumen and microbial health. Rice straw and bran can well be utilized towards meeting physically and chemically effective fiber requirements of high-producing dairy and beef cattle. Processing and treating rice straw with slight chemicals (urea and calcium hydroxide) is suggested for improving its nutritive value [6]. However, feeding rice straw in controlled amount is a best practice to minimize its unfavorable anti-nutritive effects. Moderate heat treatment of rice grain can increase starch gelatinization and improve digestibility but elevated heat may also increase resistant starch and reduce digestibility in non-ruminants [5,7]. The effects of such processing techniques and conditions need

to be determined in ruminants of varying physiological states. Rice is rich in vitamin B-complex especially niacin that is highly required for healthy cell metabolism, and vitamin E functioning as antioxidant.

When less available, cracked rice supplied during white rice production may be reasonably fed to ruminants and also poultry as a palatable supplement. The future of rice feeding for modern ruminant production lies in increased education of educators, researchers, extensionists, specialists, and farmers on how different rice products and by-products complement other ingredients in precise meeting of nutrient requirements and artistic management of rumen health, immunity, and persistency of production. For winning the race, rice science must come out of the conventional shadow that keeps the gold cereal for preferential and expensive use by humans.

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