



## **Traditional rice and their eating qualities**

**By**

**Senior Research Officer**


**Teo Gien Kheng**

**Email address : [jeantgk@sarawaknet.gov.my](mailto:jeantgk@sarawaknet.gov.my)**

Sarawak cannot compete with West Malaysia in rice cultivation as she lacks the prerequisites of basic infrastructure namely, efficient drainage and irrigation system. For the past 40 years cultivation has remained mainly a monoculture except in a few irrigation schemes. It is costly to invest in effective drainage and irrigation facilities especially in hilly and undulating terrain. Therefore, most of Sarawak's rice lands are still upland and rain fed. Most of these farms have never been ploughed and there are no bunds around the rice fields to help retain the rain water. The rice environment in Sarawak is therefore very diverse and unpredictable. Rice fields are prone to floods, drought and other soil constraints. Due to these prevailing problems, farmers plant a single crop of rice per season. Their choice of rice is usually their own traditional variety which has been well adapted to uncertain changes in the environment. Most of the popularly planted and excellent tasting rice thrive in these environments as these are the farmers' selections and require low farm inputs. In fact many traditional rice growers do not apply fertilizers as the riverine soil is continually enriched by daily tidal flooding.

Modern or improved varieties which are bred for more favorable rice lands fail to express their full potential in the farmers' fields because of the physical constraints of the ground. In this respect, Sarawak has the physical setting and socio economic backdrop for the cultivation of good tasting rice varieties which are low yielding but can command a premium price. Moreover, Sarawak is unique compared to west Malaysia as she can boast of many specialized and sophisticated rice markets where rice is sold by variety. This is a critical prerequisite for the increased production of good tasting traditional rice and the transmission of higher rice prices back to farmers growing such good eating traditional rice. This gives Sarawak a head start in good tasting traditional rice production. Sarawak therefore should focus and exploit the niche markets for products like aromatic and coloured rice varieties.

Physical constraints such as the poor conditions of rice fields dictate current rice production technology leaving production in its primitive and traditional state. Majority of the rice farms still practise transplanting. Farmers practise the 3 'T's technology i.e. 'tanam' (plant), 'tunggu' (wait) and 'tuai' (harvest). This production technology is suitable for stable long term traditional varieties that do not require high agricultural inputs and management practices. This form of cultivation is referred to as natural farming where minimum agro chemicals and inputs are used. Naturally grown products are fast gaining a place in the supermarket shelves as society becomes more health conscious and affluent.



Since the 1980s, the Research Branch of the Department of Agriculture has made evaluations on many traditional varieties for their physical and chemical properties that relate to eating quality. The physical properties which were evaluated were appearance, grain size and shape. The cooking and eating properties which also were evaluated were the gelatinisation temperature and the amylose content of the cooked rice.

Preference for grain size, shape and appearance vary from one group of consumers to another. There is, however, a strong demand for long grain rice in the international market. Grain appearance is determined by endosperm (starchy part) opacity, the amount of chalkiness either in the dorsal or in the centre (white centre). The starch granules in the chalky area are less densely packed than in the translucent areas. Therefore, the chalky areas are not as hard as the translucent areas. Chalky grains break easily during the milling process. Biris, a Sarawak traditional rice is a translucent long grain variety while the popular Bario rice has a medium (in length) and slightly opaque grain.

Cooking and eating properties are largely determined by the properties of the starch that makes up 90% of the milled rice. The time required for cooking is determined by the gelatinisation temperature. Gelatinisation temperature is the range of temperature within which the starch granules begin to swell irreversibly in hot water. Final gelatinisation temperature ranges from 59-79 degrees Celsius. Studies done by the International Rice Research Institute seem to indicate a distinct preference by consumers for rices with intermediate (70-74 degrees Celsius) gelatinisation temperature. The popular traditional varieties from Sarawak namely Biris, Lemak and Bario have intermediate gelatinisation temperature.

The cooking and eating characteristics of milled rice are influenced by two kinds of starch: amylose and amylopectin. Amylose is not present in glutinous (pulut or sticky) rice. Nonglutinous rice may have high (25-30%), low (10-20%) or intermediate (20-25%) amylose content. Low amylose rice cooks moist and sticky while high amylose rice cooks dry and is less tender and becomes hard when it is cooled. Texture of cooked rice is determined largely by the amylose/amylopectin ratio of the starch. The two attributes of cooked rice that are commonly determined by a panel are tenderness (softness) or hardness and cohesiveness (stickiness). Biris, Rotan (Wai), Bario, Serendah Kuning, Kenawit, Lemak and Wangi have low to intermediate amylose content and they cook moist and slightly sticky.

## Captions

Rice 1 & 2 Different degrees of chalkiness in the rice grains

Rice 3 Transplanting of rice seedlings is still widely practised in Sarawak

Rice 4 Harvesting paddy panicles by hand