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## Hardness Distribution and Endosperm Structure on Polishing Characteristics of Brewer's Rice Kernels

[Masahiko Tamaki](#)<sup>1)</sup>, [Shingo Kurita](#)<sup>2)</sup>, [Miyuki Toyomaru](#)<sup>2)</sup> and [Takao Tsuchiya](#)<sup>3)</sup>

1) Faculty of Agriculture, Meiji University

2) School of Bioresources, Hiroshima Prefectural University

3) Hiroshima Agricultural Extension Centre

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**Abstract:** This study was designed to determine the effects of the hardness distribution and the endosperm structure on the polishing characteristics of brewer's rice kernels. We used four brewer's rice cultivars, Kairyō-omachi, Hattan-nishiki No. 1, Senbon-nishiki and Yamada-nishiki. The broken kernel ratios in Kairyō-omachi and Hattan-nishiki No. 1 were significantly higher than those in Senbon-nishiki and Yamada-nishiki. Vickers hardness (VH) values in white-core tissues in kernels differed among varieties, which were significantly lower in Kairyō-omachi and Hattan-nishiki No. 1. However, no varietal differences were observed in VH values in the peripheral translucent tissues surrounding the white-core tissues. The tissues along the dorsoventral axis were softer than those along the longitudinal axis of the kernels. The tissues on the ventral side were softer than those on the dorsal side. Scanning electron microscopy (SEM) observations revealed the presence of closely arranged compound starch granules and few varietal differences in the peripheral translucent tissues surrounding the white-core tissues. However, as compared with Yamada-nishiki and Senbon-nishiki, in Hattan-nishiki No. 1 and Kairyō-omachi, the starch granules were loosely packed and the airspaces between the starch granules were more numerous in the white-core tissues. A higher number of airspaces and less starch were present in the endosperm cells along the dorsoventral axis when compared with along the longitudinal axis and on the ventral side than on the dorsal side. The present study showed that polishing characteristics are closely related with the endosperm structure, which is characterized as

the density of starch granules.

**Keywords:** [Brewer's rice](#), [Endosperm structure](#), [Hardness distribution](#), [Polishing characteristics](#), [SEM](#)

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