Comparison of fluidized-bed paddy drying between using superheated steam and hot air was conducted to investigate rice qualities in terms of head rice yield, whiteness, and white belly. The experimental conditions were set at initial paddy moisture content of 43.3 and 45.5% dry basis, drying temperature of 150 °C, bed depth of paddy of 10 cm, and superficial velocities of 1.3 and 1.5 U\text{mf}. The experimental results showed the advantage of superheated steam drying in head rice yield over hot air drying. Gelatinization process activated by suitable paddy temperature and moisture content, which resulted from high heat transfer rate of steam and early-stage condensation, was the main effect to this benefit. Higher increasing rates of head rice yield were seen in higher superficial velocities of steam and hot air due to high heat transfer rate of both media to paddy, which finally resulted in longer time for gelatinization process. The early-stage condensation and Mallard reaction; activated by heat, cause the whiteness of paddy dried by superheated steam decreased below that of hot air drying, which the change in color was only affected by the latter reaction. The gelatinization process also helped reducing white belly of milled rice in superheated steam and hot air drying, especially living the first minute of drying. Percentage of white belly below 1.5% (good commercial level) could be achieved after five-minute drying.