

Abstract

Freeze-drying (FD) and three different combinations of drying methods: freeze-drying combined with hot air drying (FD + AD), freeze-drying combined with vacuum drying (FD + VD) and freeze-drying combined with microwave vacuum drying (FD + MVD) were used to dry button mushroom slices. A comprehensive analysis of dried products was performed on their colour, texture, nutrient retention, microstructure and energy consumption. The results showed that, under conditions of 38 % moisture content changing point, most of the parameters including L^* values, a^* values, average density and hardness of FD + VD and FD + MVD samples had no remarkable changes ($p > 0.05$) compared with FD samples. However, only FD + MVD method can reduce drying time by 35.63 % in comparison of FD method, although all the combination drying methods can reduce the energy consumption. Moreover, FD + VD and FD + MVD products were better than FD + AD products in nutrient retention except that content of vitamin C was comparatively lower during FD + MVD process. In conclusion, the FD + MVD method has advantages in terms of efficiency and energy saving and could be preferred to produce high-quality products.