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### SHRINKAGE, DENSITY AND POROSITY CHANGES DURING SUPERHEATED STEAM DRYING OF DISTILLER'S SPENT GRAIN

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**ABSTRACT** Computer modeling and simulation requires information on thermo-physical properties of the material being dried. These properties change during the course of drying affecting the validation results of computer simulations. Therefore, the objective of this paper was to investigate the effect of superheated steam (SS) on changes in physical properties of distiller's spent grain (DSG) during drying. The SS drying was conducted at temperature of 110, 130, 160°C and velocity ranging from 0.5 to 1.5 m/s. In particular, this paper examines the variability in the material's density, specific volume, porosity, volume shrinkage and surface area at various given moisture contents under the above drying regime. Image analysis was applied to measure the volume shrinkage and the surface area of DSG samples. Simple mathematical models were examined to correlate the above properties with the material moisture content. For comparison, the above properties were also measured during convective hot air drying at 110, 130, 160°C.

**Keywords:** Superheated Steam Drying; Distiller's Spent Grain; Density; Specific volume; Porosity; Volume Shrinkage; Surface Area