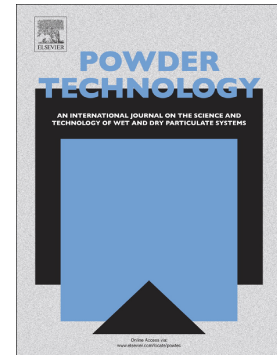


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## The effects of egg shell and shrimp shell on the properties of baked starch foam

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The objectives of this work were to improve the properties of starch foam modified with egg shell and shrimp shell, and to compare with the effects of modification with commercial calcium carbonate. The amount of these fillers added to the starch foam was in the range of 5 wt% to 20 wt% (dry starch basis). All the starch foams were prepared using a baking process. Agglomerations of calcium carbonate in the starch matrix and the high protein content in the shrimp shell had a huge impact on the formation of steam bubbles during the baking process, reducing the izod impact strength at the higher filler contents (15 and 20 wt%) and increasing the density of the starch foam. In contrast, starch foam with egg shell had a low density ( $0.2056 \text{ g/cm}^3$ ), high izod impact strength ( $167 \text{ J/m}^2$ ) and a narrow cell size distribution because the egg shell acted as a nucleating agent with less protein content in its structure. The thermogravimetric analysis (TGA) showed that the temperature at the maximum weight loss of the starch foam was slightly reduced by the addition of the bio-fillers because of the low thermal stability of the organic components in the egg shell and shrimp shell.

Keywords: Egg shell; Shrimp shell; Starch foam; Calcium carbonate

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