

Abstract No: PP-05

Enhancement of physical properties of red clay based superior quality cookware.

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Red clay-based cookware has been used for centuries mainly due to its aesthetic appearance, eco-friendliness as well as the ability to enhance the quality and taste of foods. However, at present, cookware manufacturers can't stay in business without freshcutting-edge properties because the growing demand for superior quality cookware that not only performs well but also has enhanced physical properties such as durability, resistance to cracking, and improved thermal shock resistance. As a remediation, the present study explores various techniques that can be employed to enhance the physical properties of red clay-based cookware, by adding reinforcing materials (Ball clay, Quartz, and Feldspar), varying firing temperatures, and advanced-manufacturing techniques like casting clay methods. Eight samples with different compositions were prepared using red clay, four different weight percentages were chosen for each clay type from 15 wt.%, 20 wt.%, 25wt.%, and 30 wt.% in Colombo and Beliatta samples. Their physical properties such as density of a casing clay slip, drying or firing shrinkage, loss on ignition, water absorption, modulus of rupture (MOR), and thermal shock resistance were investigated with repetition. Among the prepared samples, low shrinkage was observed in each clay type resulting reduced risk of defects from warping and cracking. Colombo clay is more suitable in that respect. Due to higher MOR value, Beliatta clay has higher strength, durability, and stronger thermal shock resistance as well. Low water absorption was shown by Beliatta clay, indicating a more solid and impermeable structure, making the cookware less prone to discoloration, cracking, or degradation. Therefore, Beliatta clay is more suitable than Colombo clay to fabricate cookware. Overall, it was found that different compositions of red clay could be successfully incorporated to improve the properties of clay-based cookware. This study demonstrates that enhancement of the MOR value, low water absorption and low shrinkage for cookware manufacturers, researchers, and enthusiasts who are interested in improving the quality and performance of red clay-based cookware.

Keywords: Cookware, Loss on ignition, Modulus of rupture (MOR), Red clay, Shrinkage

Acknowledgment

This work was supported by ITI under the research grant TG/21/192.