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Correlation between Contact Angle and Stain Susceptibility in Ornamental Stones

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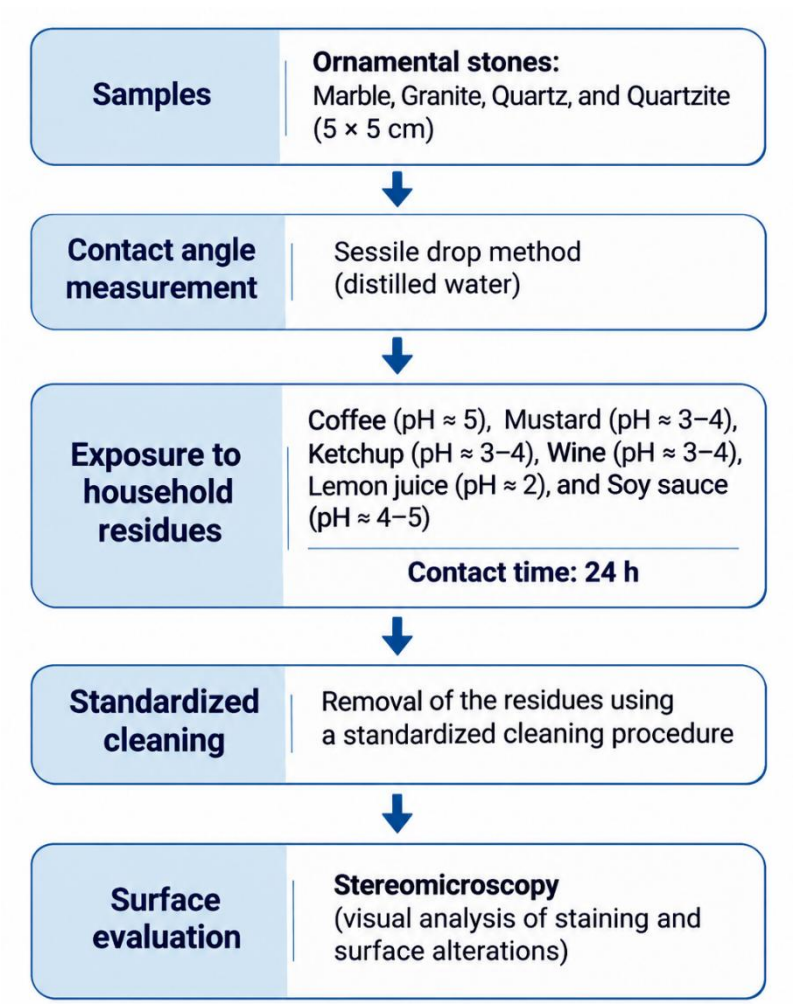
INTRODUCTION

Ornamental stones are widely used in kitchen countertops due to their aesthetic and functional properties. However, these surfaces are frequently exposed to household residues that may cause staining and physicochemical alterations [1].Surface wettability plays an important role in liquid–solid interactions and can be evaluated through contact angle measurements. Lower contact angles indicate greater wettability and liquid spreading, whereas higher values indicate lower surface wettability [2].The surface characteristics of ornamental stones, including lithology, texture, and roughness, influence their wetting behavior and interaction with liquids [3]. Therefore, investigating contact angle and staining behavior provides complementary information for understanding the surface performance of these materials.

OBJECTIVES

To evaluate the relationship between contact angle and staining susceptibility of different ornamental stones (marble, granite, quartz, and quartzite) after exposure to household residues with different chemical characteristics.

METHODOLOGY



RESULTS AND DISCUSSION

The highest mean contact angle was observed for Paraná Marble (73.06°), while Branco Itaúnas Granite presented the lowest value (32.50°).Both materials exhibited hydrophilic behavior (contact angle below 90°). However, the lower contact angle observed for Branco Itaúnas Granite indicates greater surface wettability and droplet spreading compared to Paraná Marble.These differences suggest distinct interactions between water and the stone surfaces, which may contribute to variations in their behavior when exposed to household staining agents.

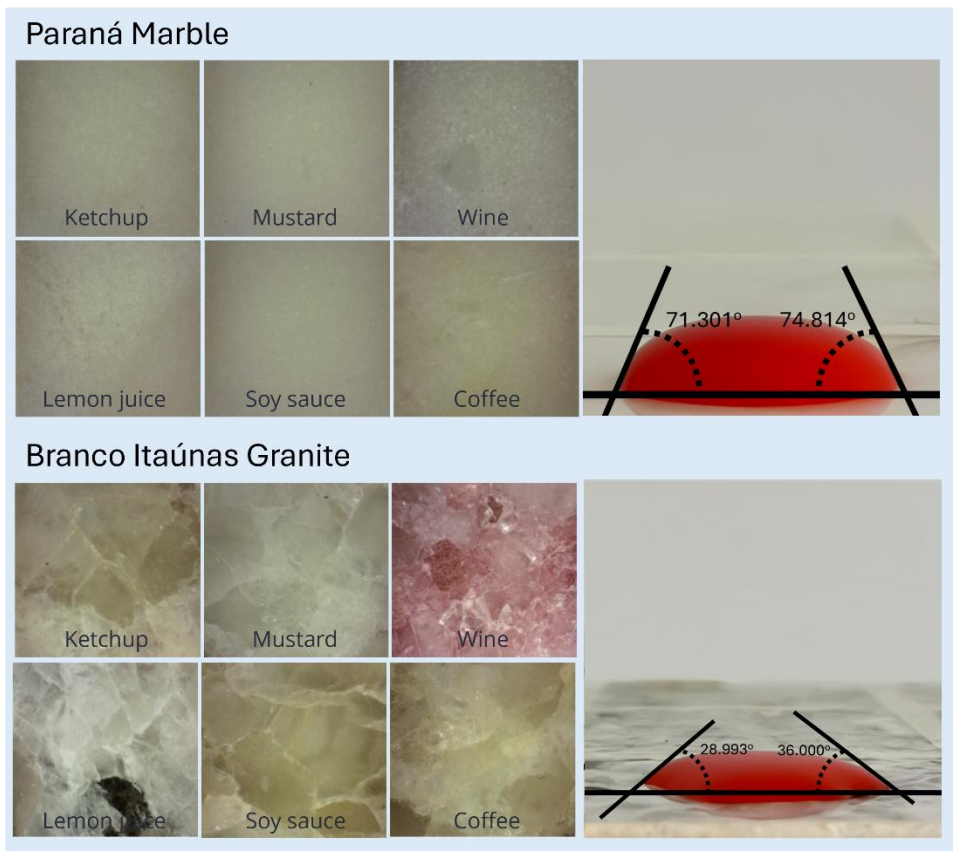


Figure 1. Visual appearance of Paraná Marble and Branco Itaúnas Granite after exposure to household residues, and representative contact angle measurements obtained using the sessile drop method.

CONCLUSION

The results highlighted distinct wettability behaviors among the ornamental stones, with Branco Itaúnas Granite exhibiting greater wettability and Paraná Marble presenting a higher contact angle. These differences emphasize the role of surface properties in liquid interactions and their potential contribution to staining susceptibility, providing useful insights for material selection in kitchen countertops.

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