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Characterization of peach stones and analysis of their use as pore former in ceramic materials

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Numerous residual biomasses have been studied in a variety of uses, including biomass-energy processes, as adsorbent of heavy metals contained in liquid effluents, as source of chemicals with higher added value, as raw materials in construction industry, etc. In this work, a very common and abundant residual biomass, which is found in the area of fruit production in Argentina, peach stones, is studied. This material has been characterized in relation to its possible use as pore former in ceramic matrices, with the following techniques: scanning electron microscopy with semi quantitative chemical analysis (SEM-EDS), differential thermal and thermogravimetric analysis (DTA-TGA), X ray diffraction (XRD), loss weight on ignition (LOI), among others. Figure 1 shows the microscopic appearance of the stones by SEM. A fibrous structure on the outer surface and granular on the inside are observed. The semi-quantitative chemical analysis by EDS shows, in addition to large quantities of C and O, the presence of elements such as Na, K, Mg, Al, Si and Fe. DTA-TGA results show some exothermic peaks corresponding to the combustion of hemicellulose, cellulose and lignin phases. From these curves, it is possible to estimate the composition of this material in relation to the content of adsorbed gases and water, biopolymers and inorganic fraction (ash formation). As the structure of the biopolymers (hemicellulose, cellulose and lignin) becomes more complex, the combustion temperatures are higher. The DTA-TGA analysis shows that this organic material is burned in a wide temperature range, between 300°C and 550°C. This is important to ensure that when this material is incorporated into clay mixtures as pore former, the sintering process takes place without crack formation in the brick. This test further indicates that after the heat treatment, the residual material that will eventually be incorporated into the bricks (ashes) is less than 2%. XRD analysis reveals the presence of some peaks corresponding to semi crystalline cellulose.

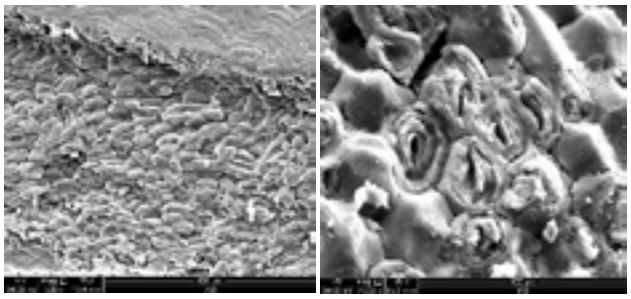

Figure1: *SEM images of peach stones surface.*

Biography

Nancy Quaranta obtained her Ph.D. in Chemistry at the National University of South (UNS-Argentina). She is a researcher of the Scientific Research Commission of Buenos Aires Province. She is the head of Environmental Studies Group and Materials Program Coordinator at the National Technological University. Her current research fields are materials and environmental sciences. She is author of numerous publications and presentations at international congresses. In the last years, her work has been oriented to the study and valorisation of industrial wastes, in particular residual biomasses of the agroindustry.

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