Characterization of Brazilian Prehistoric Ceramics

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Fragments from broken ceramic vessels are the most common artifacts found during the excavation of archaeological sites. The microscopic properties of ceramic such as chemical composition may answer questions the concerning to origin. Ceramic can be considered as a recording medium that, either singly or in combination with other evidence, is capable of revealing many aspects concerning a prehistorical culture, including probable place of manufacturing, the origins of raw materials, production method, trade, etc.

In this project, fragments, whole and partially reconstructed pieces of prehistoric ceramics were collected in two sites: Agua Limpa and Prado. The excavations were carried out using the wide surface method developed by Leroi-Gourhan(l) and adapted to tropical Brazilian soils by Palestrini(2). The theoretical lines are based in the French rationalism and in the English empiricism paradigms(3) and in the material culture concept.

Agua Limpa site is located in Monte Alto city, north of Sao Paulo State. This site was dated 1524y before Present. Excavations began in 1993 in the scope of the Turvo Project(4). Archaeological studies evidenced an area of primary burying of adult person without urn and secondary burying into ceramic urns. Fires for food preparation, where mammal and fish bones and shells were found, indicated a completely balanced diet. Ceramics found were associated to food preparation, funeral urns and decorative uses.

Prado site is located at Engenho Velho Farm, in Perdizes city, State of Minas Gerais. Excavations began in 1980 in the scope of the Quebra Anzol Project(5,6). The utility ceramic was associated to fires, which exist into and out of dark spots. The funeral ceramics was associated to primary burying (in foetal position) into covered ceramics urns.

Both sites are superficial with an unique stratigraphic level (litho-ceramic) located in the intermediary part of a hill with a water course in its interior part.

Indirect testimonies showed a horticulture practice by means of polished]ethic artifacts as polished axe lamine, mortar, polished pestle and grinder.

Splited samples were partially reconstituted providing information about ceramic shape and volume. Studies about the mineralogical composition of the ceramic paste by transmitted light microscopy, burning temperature determination by X-ray difractometry, coloring substance

detection by electronic microscopy analysis and typological classification of Shepard(7), Seronie-Vivien(8) and Leite(9) were carried out.

This study aims to contribute within the analytical chemistry field with the Brazilian ceramic study. Analysis of ceramic raw materials requires an analytical technique that would be sensitive enough to reflect potentially suitable differences among resources areas and differences due to production technique. More complete analytical technique, especially one which determines the trace elements will increase the probability of success when using chemical characterization for source determination. Instrumental Neutron Activation Analysis, INAA, has been chosen because it combines great sensitivity, accuracy and precision for simultaneous determination of more than 20 trace elements

Ceramic sample are being prepared by cleaning ceramic fragment. Inner and outer surfaces of the piece are scraped using a tungsten-carbide drill burr. The powdered samples are dried in an oven at 100 C for 24h and stored in a polyethylene container.

Sample and standard are irradiated for 5 min under a thermal neutron flux about 10^{12} n cm^{-2} s^{-1}, for the analysis of elements that give rise to short-lived radionuclides. To analyze long lived radionuclides, samples are irradiated for 8h. Standards are being prepared by pipetting suitable aliquots of standard solutions on pieces of Whatman 41 filter paper and dried under an infrared lamp.

Gamma ray measurements are being carried out after suitable cooling times using a EG & GORTEC Ge hiperpure detector model 20190 P, with resolution of 1.82keV at the 1332 keV gamma peak of ^{60}Co coupled to a EG & G ORTEC 8192 channel ACE CARD model 916A MCB.

In order to test the accuracy of the method, two reference materials (Ohio Red Clay and Buffalo River Sediment) will be analyzed.

Data obtained will help archaeological studies already made in this region with the objective of making spacial temporal and cultural reconstruction.

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