CHARACTERIZATION OF ANCIENT BURNT RICE EXCAVATED IN THAILAND ARCHAEOLOGICAL SITES

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Rice is the main foodstuff for about half of the world's population, especially in Asia [1]. In Thailand, it is the essence of life. Archaeological evidence which based on the paddy rice revealed that rice has been planted in northeastern area of Thailand more than 5,500 years ago. The burnt rice grains were found in various archaeological sites in Thailand which related with the religious ceremony and the home prosperity [2]. In this work, the ancient burnt rice from Nakorn Nayok, Suphan Buri and Prachin Buri Provinces was elementally analyzed using micro-beam XRF based on synchrotron radiation. SEM-EDS was carried out to characterize the structure and composition. IR spectroscopy was also used to study the chemical composition and bio-molecular structure. The grains were oblique in shape with a rough surface. It was found that major elements contained C, Si, Ca and Al. Other trace elements such as Ti, Mn, Fe, Cu and Zn were also detected. The IR spectra gave some information about the presence of molecular bonds.

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References

[1] K.A. Gomez, *Rice, the grain of culture* (Lecture of the Thai Rice Foundation at the Siam Society, Bangkok, Thailand 2001).

[2] T. Sako, *Archaeological excavation: Dong Lakon* (The Fine Arts Department, Bangkok, Thailand 2008).