Sulfur concentration in saliva using EDXRF technique

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In the last decade, human saliva has been used for clinical analyses by investigations of its molecular components, hormones, enzymes, proteins and more recently for inorganic elements. The major advantage for using saliva in diagnosis is the ease access collection and be non-invasive. Saliva consists mainly of water (~98%) in addition to electrolytes and enzymes. Particularly, sulfur levels in saliva can act as an indicator of an inflammatory process of the gingiva (gingivitis and halitosis), which has a high incidence in the Brazilian population. The World Health Organization (WHO) estimates that one in four adults has some type of bacterial infection. Specifically, halitosis (chronic bad breath) is overlooked and has several possible causes: cavities, broken fillings, and poor partial or full dentures cleaning. This oral dysfunction can be classified as physiological or pathological. Physiological halitosis is caused by inadequate oral hygiene. It is significantly related to symptoms of depression, while pathological halitosis is a result of chronic inflammatory periodontal disease. In this investigation, sulfur concentration in saliva were investigated using Energy Dispersive X-ray Fluorescence (EDXRF) technique. Unstimulated whole saliva samples (~3mL) were collected from healthy subject, in a dental office. All participants were inhabitants of São Paulo city. Samples were excited and measured using a portable X-Ray Spectrometer: Ag X-Ray target and Si Drift detector (25 mm^2 x 500 μm /12.5 μm Be window) and counting time of 600s measured with 30kV and 10μA. The spectrometer was calibrated for sulfur using linear regression method for concentration up to 500 ppm. The availability of accurate reference value for sulfur in human saliva provides a scientific basis for biomedical research of specific diseases in oral cavity. In addition, the use of the XRF compact spectrometer to perform clinical tests on saliva is a fast and effective procedure, within the quality standards required by Good Laboratory Practices (GLP) for early diagnosis in dentistry.