THE COMPOSITION OF KIDNEY STONES: COMPOSITIONAL FEATURES AND ENVIRONMENTAL INFLUENCE ON BASILICATA (SOUTHERN ITALY) CASE STUDY

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The aims of this study are to analyze the geo-environmental factors, which can influence the kidney stones formation and identify the main types of kidney stones to be found in Basilicata, through a chemical-mineralogical and petro-morphologic study. A three-year-long epidemiological study was carried out in order to identify the prevalent nephrolithiasis. A representative sample of the Basilicata inhabitants hospitalized at San Carlo Regional Health Service Trust in Potenza was chosen in order to find out their dietary and behavioural habits through the submission of a questionnaire during the observation period. In order to identify a statistical relation between a supposed factor (or exposition to a certain factor) and the development of kidney stones in Basilicata, parameters of statistical association will be determined: Odds ratio. A morphological and compositional characterization together with the use of integrated techniques - optical and scanning electron microscopy and X-ray powder diffraction - were performed on more than 80 kidney stones collected in three years. Some thin petrographic sections were obtained for a representative number of bigger kidney stones. The amount of some chemical elements specifically involved in the kidney stone crystallization process (Ca, Mg) or potentially toxic (Pb, Cr) was found by means of optical and atomic absorption spectrometry. This scientific activity is a first example of Italian study of kidney stones carried out at regional level with a multidisciplinary approach which made it possible significant achievements in the field of human health protection. This morpho-compositional data are useful for classifying each type of kidney stone, and, therefore, each patient in more than 30 different subgroups characterized by specific etiologic factors necessary to determine the treatment and disease prevention, especially in the presence of mixed stones requiring proper intervention for each mineral phase present. Kidney stones, being so widely spread in many stone types, can be considered as markers to evaluate the presence of trace elements, especially those potentially toxic, in human body as well as in the environment. Several kinds of kidney stones with a new mineral assemblage have been found and this represents a further step forward in understanding this widespread disease and stimulates further research.

Keywords: kidney stones, classification and composition, environmental influence