

Lipid content composition and mineralogic characterization of kidney stones

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Nephrolithiasis, or kidney stone (Figure 1), is the presence of renal calculi caused by disruption in the balance between solubility and precipitation of salts in the urinary tract and kidneys. Kidney stones develop when urine becomes “supersaturated” with insoluble compounds containing calcium, oxalate (CaOx), and phosphate (CaP), resulting from dehydration or a genetic predisposition to over-excrete these ions in the urine. However, the real mechanism is still under debate and might be influenced by diet and microbial activity, for example. Here, the lipid content and mineralogic composition of twenty three samples of kidney stones was examined. The stones were identified as mostly monomineralic, composed by calcium oxalates (whewellite and weddellite) and phosphates (struvite and apatite). Few of them contained cistine and uric acid, being classified as organic minerals. To better understand and elucidate the formation of kidney stones, the lipid composition of them was analysed. Mainly, the kidney stones were composed by cholesterol and phospholipids. In minor content we identified the presence of mono saturated fatty acids ranged from C₁₉ to C₂₄. Phospholipids were analysed as methyl fatty esters. Hexadecanoic acid was predominant and found in all samples. It suspected that nucleation and growth of stones is driven by bacteria. In conclusion, it seems that bacteria plays important role in development of cristal.



Figure 1. Images of whewellite (kidney stones of calcium oxalate) with different shapes and forms.