

## Characterization of muddy clays for Ohshima Tsumugi using traditional dye method

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'Dorozome' is one of the traditional dyeing method with muddy clays in Amami-Oshima Island, Kagoshima, Japan. The brilliant black color of dyed 'Ohshima Tsumugi' derive from muddy clays in Dorota (muddy clay small ponds). In this study, the characterization of muddy clays for dyeing were mineralogically, chemically and microbiologically studied.

Clay minerals of the muddy clays consist of Fe-rich chlorite, vermiculite, mica clay minerals, kaolin minerals and hydrous iron oxides. The muddy clays contain large amount of iron hydroxides with organic materials. Especially, reduced iron contents increase in fallow field after one year. The P, N, C and S contents in Dorota are also quite high in the active field. The Fe<sup>2+</sup> ion is contained not only in crystalline minerals but also in amorphous hydroxides and clay minerals. After one year using the muddy clays, the Eh and DO values decreased. Various microorganisms are observed such as coccus and bacillus typed bacteria and fungi in the muddy clays. The dyed silk in black parts of 'Ohshima Tsumugi' contains K, Cr, Mn and Fe elements whereas white part without dye has no these elements. The heavy metals (Cr, Mn, Fe) are originated from muddy field. Suggesting the specific condition of iron hydroxides is important factor for brilliant black dye. The reduction condition of iron hydroxides is essential for the black dye with silk. The chelate complex of an organic matter (silk component) and a heavy metals from clays reacted on the surface of 'Ohshima Tsumugi' thread. Bacterial activity in the muddy field may be contributed for the Fe reduction conditions.