Table 10.2. Dietary nutritional deficiency of common carp (*Cyprinus carpio*) – minerals[1]

Minerals	Deficiency signs/syndrome
Phosphorus	Reduced growth, poor food conversion efficiency, bone demineralization, skeletal deformity, abnormal calcification of ribs and the soft rays of pectoral fins, cranial deformity, increased visceral fat (1) Poor growth, skeletal abnormality, low feed efficiency, low ash in whole body and vertebrae, increased visceral fat (2)
Magnesium	Reduced growth, sluggishness, anorexia, convulsions, high mortality, reduced bone magnesium content, cataracts (1) Poor growth, anorexia, high mortality, sluggishness and convulsions, cataracts, high mortality, high calcium content in bone, reduced magnesium in bone (2)
Iron	Hypochromic microcytic anaemia (1) Low specific gravity, haemoglobin content and haematocrit values; abnormal mean corpuscular diameter (2)
Manganese	Reduced growth, short body dwarfism, cataracts (1) Poor growth, dwarfism, skeletal abnormalities, high mortality; low calcium, magnesium, phosphorus, zinc and manganese in bone (2)
Cobalt	Poor growth (2)
Zinc	Reduced growth, cataracts, loss of appetite, high mortality, erosion of fins and skin, elevated tissue concentration of Fe and Cu in intestine and hepatopancreas (1) Poor growth, high mortality, erosion of fins and skin, low zinc content in bone (2)
Copper	Reduced growth, cataracts (1); poor growth (2)
Selenium	Reduced growth, cataracts, anaemia (1)
Iodine	Reduced growth, poor food conversion efficiency, bone demineralization, skeletal deformity, abnormal calcification of ribs and the soft rays of pectoral fins, cranial deformity, increased visceral fat (1)

[1]Source: (1) Tacon (1992); (2) Takeuchi, Satoh and Kiron (2002).