Following a request from the European Commission, the risks to human health related to the presence of chlorate in food were assessed by the EFSA Panel on Contaminants in the Food Chain (CONTAM Panel). The presence of chlorate in food can arise from the use of chlorinated water for food processing and the disinfection of food-processing equipment. Inhibition of iodine uptake in humans was identified as the critical effect for chronic exposure to chlorate. A tolerable daily intake (TDI) of 3 µg chlorate/kg body weight (b.w.) was set by read-across from a TDI of 0.3 µg/kg b.w. derived for this effect for perchlorate, multiplied by a factor of 10 to account for the lower potency of chlorate. Formation of methaemoglobin was identified as the critical acute effect of chlorate. An acute reference dose (ARfD) of 36 µg chlorate/kg b.w. was derived from a no-observed-effect-level for chlorate in a controlled clinical study. Chronic exposure of adolescent and adult age classes did not exceed the TDI. However, at the 95th percentile the TDI was exceeded in all surveys in ‘Infants’ and ‘Toddlers’ and in some surveys in ‘Other children’. Chronic exposures are of concern in particular in younger age groups with mild or moderate iodine deficiency. Mean and 95th percentile acute exposures were below the ARfD for all age groups indicating no concern. Based on the current practices in food industry, application of a hypothetical maximum residue limit (MRL) of 0.7 mg/kg for all foodstuffs and drinking water would only minimally reduce acute/chronic exposures and related risks. Assuming chlorate concentrations of 0.7 mg/kg for all foods and drinking water consumed in a day, acute exposures would increase by up to about 5-fold and the ARfD be exceeded at mean estimates in ‘Infants’ and ‘Toddlers’ and at 95th percentile also in ‘Other children’ and ‘Adults’.