

Defra Index Scale for P, K and Mg (mg/l) Concentrations in Soil and Sludge

TECHNICAL DATASHEET

ALS Environmental are able to provide analysis of Soils for a range of Inorganic parameters in soils and sludges. This analysis provides an estimate of available Phosphate (P), Potassium (K) and Magnesium (Mg) concentrations in soil to sampling depth, in practice this is equivalent to plough or cultivation depth because of the distribution of nutrients when the land is worked. Response experiments with different crop groups have demonstrated the relationship between crop yield and soil nutrient concentration. Typically, crop yields increase with increasing nutrient concentration to a maximum, beyond which there is no further benefit from additional nutrient. Below this value, which will vary with crop species, there is a yield penalty. To aid interpretation of the different concentrations of individual nutrients, Index or descriptive scales are used. These scales provide a general indication of the likely crop response and therefore a guide to the need for additional nutrient supplementation, as shown in the table below.

Defra Index	SAC Description	Yield response to added nutrient by	
		vegetable crops	arable crops and grass
0	Very low	highly likely	highly likely
1	Low	highly likely	probable
2	Moderate	likely	unlikely
3	High	possible	nil
4	Very High	unlikely	nil
5	Very High	nil	nil



PHOSPHORUS		POTASSIUM		MAGNESIUM	
Olsen extraction		Ammonium nitrate extraction			
Olsen P		exchangeable K		exchangeable Mg	
Index	mg/l	Index	mg/l	Index	mg/l
0	0-9	0	0-60	0	0-25
1	10-15	1	61-120	1	26-50
2	16-25	2	121-180 181-240	2	51-100
3	26-45	3	241-400	3	101-175
4	46-70	4	401-600	4	176-250
5	71-100	5	601-900	5	251-350
6	101-140	6	901-1500	6	351-600
7	141-200	7	1501-2400	7	601-1000
8	201-280	8	2401-3600	8	1001-1500
9	over 280	9	over 3600	9	over 1500

Note that the Index is split in half for potassium only and described as 2- (or lower Index 2) and 2+ (or upper Index 2). In the past, Index 2 was not divided in half for potassium but some soil reports used positive and negative signs to denote the extreme top and bottom 10% of each band.

In addition to providing a basis to decide fertiliser quantities, soil analysis can also be used to monitor changes in fertility especially where there are uncertainties in the amounts of nutrient removed (e.g. with forage crops) and in the amounts of nutrients applied (e.g. with manures and slurries). Where accurate nutrient balance information is used in conjunction with regular soil analysis, it is important to recognise the possibilities of variation as outlined above.

