

Potassium in Potatoes

- Potassium in potatoes is required in the largest amounts of all fertilizer elements applied to potatoes. A 9.5% petiole-K is approximately 95,000 ppm K in plant tissue. A 500 cwt crop removes about 275 lb K₂O in the tubers alone; this amount does not include K removed in vines.
- Potassium is mostly supplied from the mineral part of the soil and also from organic matter. In general, soils higher in clay content will usually have higher soil test K values. Also fields that have had manure or compost applied at high rates also have higher soil test K values. A farmer should test their manure or compost piles to determine approximate nutrient content of NPK and salts.
- In a hypothetical three year crop rotation where a potato crop yielded 450 cwt, a wheat crop yielded 140 bushels, and a 35 ton sugar-beet crop will remove a total of about 530 lb K₂O per acre. In Idaho, a total K₂O applied to this rotation would be about 250 K₂O lb/acre; thus a **negative 280 K₂O lb/acre** of removal rates. With time, soil K values will deplete even in soils higher in clay content.
- A 6 ton alfalfa crop over 5 years will remove about 1450 lb K₂O per acre. Typical K₂O fertilizer rates during this same time period are usually under 500 lbs K₂O; thus a soil depletion of soil K of at least a **negative 950 lbs K₂O per acre**.

Crop Removal K₂O lb/Acre of Selected Crops and Yields

Crop	Yield	K ₂ O removed	Crop	Yield	K ₂ O removed
Wheat	100 bu	35	Potatoes	350 cwt	200
Wheat	140 bu	50	Potatoes	450 cwt	250
Barley	120 bu	40	Potatoes	600 cwt	330
Sugar Beets	25 T	175	Potatoes	800 cwt	410
Sugar Beets	30 T	200	Ear Corn	220 bu	80
Sugar Beets	35 T	230	Silage Corn	25 T	180
Alfalfa	4 T	200	Silage Corn	35 T	260
Alfalfa	6 T	290	Canola	1000 lb	50
Alfalfa	8 T	380	Bailed Straw	2 T	50

General Rule-Of-Thumb for K₂O in Manures or Compost

Gross Lb of K₂O per Ton applied

- Compost—20 to 40 lbs K₂O per ton applied (about 15% available 1st year after application)
- Manures—10 to 20 lbs K₂O per ton applied (about 25% available 1st year after application)

Modified Fertilizer K₂O Guide for Potato Yields and Soil Maintenance

Soil K ppm	University of Idaho K ₂ O Needs for Yield Goal + Crop Removal (K >200 ppm)													
Yields Cwt	350	400	425	450	500	600	800	350	400	425	450	500	600	800
75	450	500	510	530	550	600	700	375	400	420	430	450	500	600
125	250	300	310	330	350	400	500	260	280	290	310	330	380	450
175	50	100	120	130	150	200	300	230	270	290	310	330	360	425
200	50	100	100	120	140	200	240	200	240	250	260	280	320	360
225	50	100	100	110	130	175	210	175	225	240	250	260	280	300
275	50	100	100	100	120	150	180	150	200	210	230	240	250	260
300	50	80	100	100	120	130	160	100	150	170	190	200	220	240
350	40	60	80	100	110	120	140	80	120	140	160	170	190	200
400	0	60	60	80	100	110	120	60	90	100	110	120	130	140
450	0	0	40	60	80	100	100	50	60	70	80	90	100	110
500	0	0	0	0	60	80	80	0	0	50	50	50	50	50
600	0	0	0	0	0	60	60	0	0	0	0	0	0	0

- To build soil K, manures and compost can be used as fertilizer K
- Watch salts in KCl; should mix KCl with a lower salt K such as potassium sulfate (0-0-52)
- K₂O suggestion are from Agronomy and Soils; not just yields only

The University of Idaho Potassium fertilizer guide K₂O lb/acre for Russet Burbank (Stark & Westermann)

Yield Potential (cwt/acre)				
Soil Test K*	300	400	500	600
50	550	600	650	700
75	450	500	550	600
100	350	400	450	500
125	250	300	350	400
150	150	200	250	300
175	50	100	150	200
200	0	0	50	100
250	0	0	0	0

* Numbers are modified for the Ammonium Acetate extraction method. Assumes 0-12 inch soil sample

**Source 'Potato Production Systems' (page 131)—eds. Drs. Jeffrey C. Stark & Stephen L. Love

***Original numbers are Sodium Bicarbonate method used by the University of Idaho (page 131)