



**REPLENISH
NUTRIENTS LTD.**

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Replenish™ 0-17-0-12 Organic Dryland PAC

Part 1 of the Replenish™ Keep It Simple Series

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Replenish™ is a nutritional soil amendment containing rock phosphate (RP), elemental sulphur (ES) and a proprietary activated compost (PAC) that provides plant essential phosphorus (P) and sulphur (S) biologically throughout a crop's growing cycle.

The application of **Replenish™** creates billions of micro-sized biological RP fertilizer production factories in the soil. The accelerated oxidation of ES (conversion of ES to crop available SO_4 -S, initially as H_2SO_4), facilitated by PAC, creates a halo of acidity around each ES/RP particle that releases crop available P, S and other nutrients from both the **Replenish™** and the soil.

P and S Uptake Balance is Absolutely Critical

As an industry, we have mined soil P and S (also K and micronutrients) for decades to the point where action is desperately needed. Based on total nutrient uptake requirements, different crops require a specific P:S uptake ratio to optimize yield and quality (generally between 0.6 to 1.8).

For oilseeds (mustard, flax) the ratio is roughly 0.6 which means for every 1 lb of S the crop requires it also requires 0.6 lbs of P (or 1.4 lbs of P_2O_5). For spring wheat the P:S ratio is 1.4, while corn is 1.7.

Why is P Essential?

- Energy transfer
- Photosynthesis
- DNA integrity and genetic transfer
- Nutrient transport
- Maturation

Why is S Essential?

- Formation of chlorophyll and ultimately photosynthetic efficiency
- Efficient amino acid and protein production
- Oil synthesis
- Enzyme activation
- Plant stress relief
- Enhanced utilization of all other nutrients

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**Approved input under the Canadian
Organic Standards and the USDA
National Organic Program**



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Why is Replenish™ such a unique product?

The biological release of P and S from **Replenish™** provides the necessary P:S balance for all crops, enhancing soil health in a natural, low saline manner.

Third Party Greenhouse Research (Winter 2017/2018)

Evaluated the effectiveness of beta **Replenish™** products on the growth of canola and HRS wheat. Soil deficient in P (4 ppm P₁) and S (3 ppm SO₄-S) was utilized (Cooking Lake series) with five treatments replicated three times. All other significant nutrients (N, K, B) were balanced.

Treatment Parameters	Details	Wheat Yield (g/pot)	Wheat Yield % Increase	Canola Yield (g/pot)
Check	P and S Deficient Soil	2.43		0.03
Rock P	200 ppm P ₂ O ₅	3.61	49	0.08
11-52-0	50 ppm P ₂ O ₅	3.42	41	0.06
Replenish 70:30 blend (70% RP, 21% ES, 9% PAC)	200 ppm P ₂ O ₅ , 60 ppm S	4.21	73	5.46
Replenish 80:20 granules (70% RP, 14% ES, 16% PAC)	200 ppm P ₂ O ₅ , 35 ppm S	3.91	61	7.22

Wheat showed highest yields with the **Replenish™** treatments.

Nutrient Removal

Crop nutrient removal contributes to substantial nutrient loss over one growing season. Continuous soil nutrient depletion will reach a critical point where quality and ultimately crop yield diminish without a nutrient replacement program.

Crop	Nutrient Removal			
	N	P ₂ O ₅	K ₂ O	S
Peas (30 Bushels)	100	26	82	10
Wheat (30 Bushels)	78	24	60	8
Mustard (25 Bushels)	70	27	79	9
Oats (60 Bushels)	88	38	64	8

Application of **Replenish™** on an annual basis can help replace P and S removed by the crop while building soil nutrients to acceptable levels for optimum plant growth.