

Raw Spent *Pleurotus* Substrate effects on Soil Fertility and Enzymatic Activity in Baby Leaf Lettuce Cultivation

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INTRODUCTION & AIM

Baby leaf production is one of the most impactful agricultural production systems. Quick growing cycles, frequent tillage, and continuous chemical fertilization can decrease soil fertility and affect microbial community activity. Organic fertilization can help growers in maintaining adequate yields while improving soil quality. *Pleurotus spp.* is a mushroom widely cultivated worldwide, and the resulting spent *Pleurotus* substrate (SPS) can be used as an organic fertilizer to improve the fertility and physical properties of different crop systems. However, the effects of raw SPS on soil microbial activity have not yet been studied in baby leaf crop systems.

This study evaluated the use of raw SPS as an organic fertilizer for baby leaf lettuce, focusing on the crop's yield, mineral content, and soil enzymatic activity.

METHODS

In a greenhouse tunnel in Az. Ag. Mancon (Loreggia), Padova (IT)

2 VARIETIES



Doge Imperiale

2 SEASONS

- October - December
- December – March

Treatments:

T0	Unfertilized control
TMIN	100% N supplied with mineral fertilizer (35 kg ha ⁻¹)
T100+50	100% N supplied by SPS (35 kg ha ⁻¹) + 50% mineral fertilizer (17.5 kg ha ⁻¹)
T200	200% N requirement supplied with SPS (70 kg ha ⁻¹)
T200+50	200% N supplied by SPS (70 kg ha ⁻¹) + 50% mineral fertilizer (17.5 kg ha ⁻¹)

Harvest time

Aerial Biomass

Crop mineral content

Soil Samples

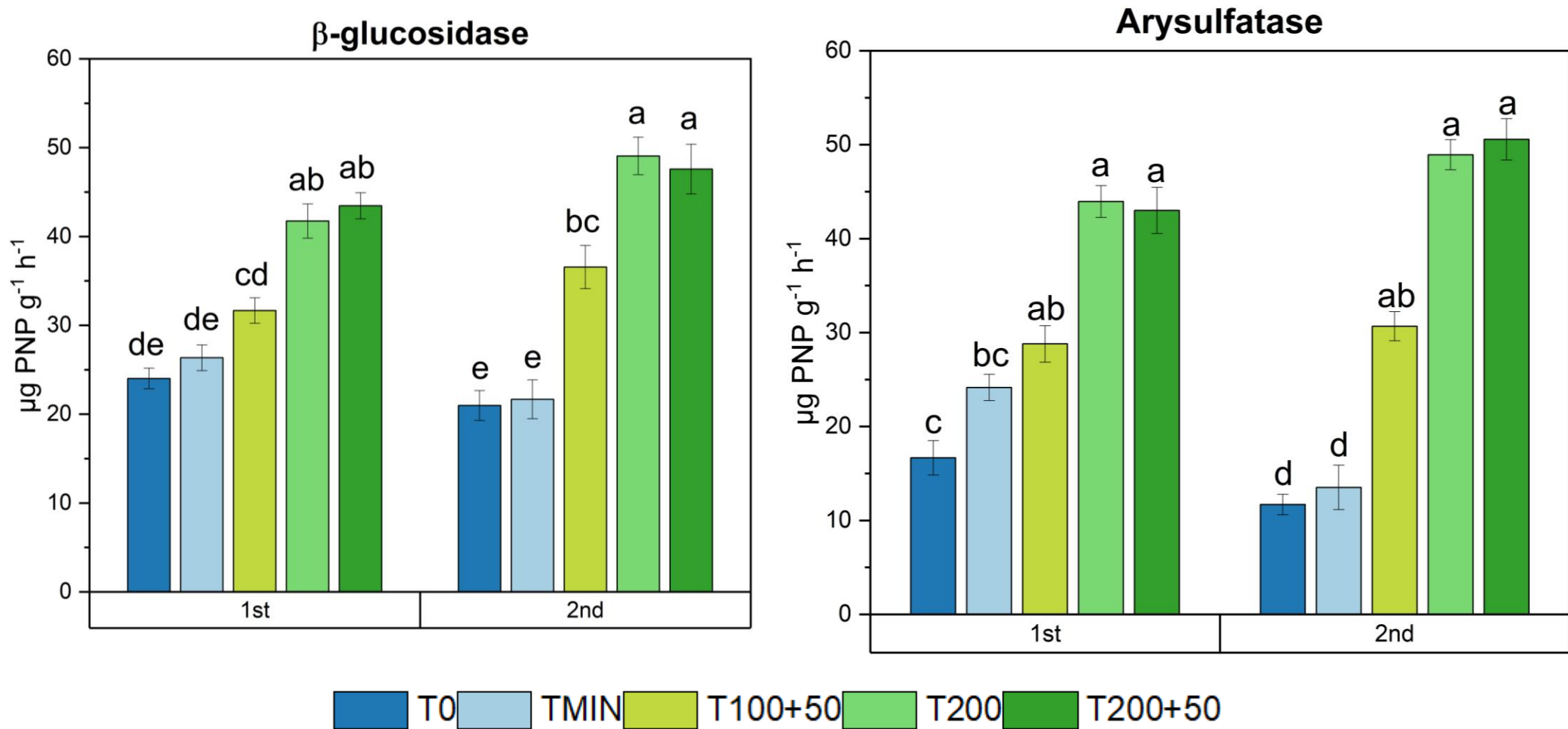
Soil N, P, K

Enzymatic activities:

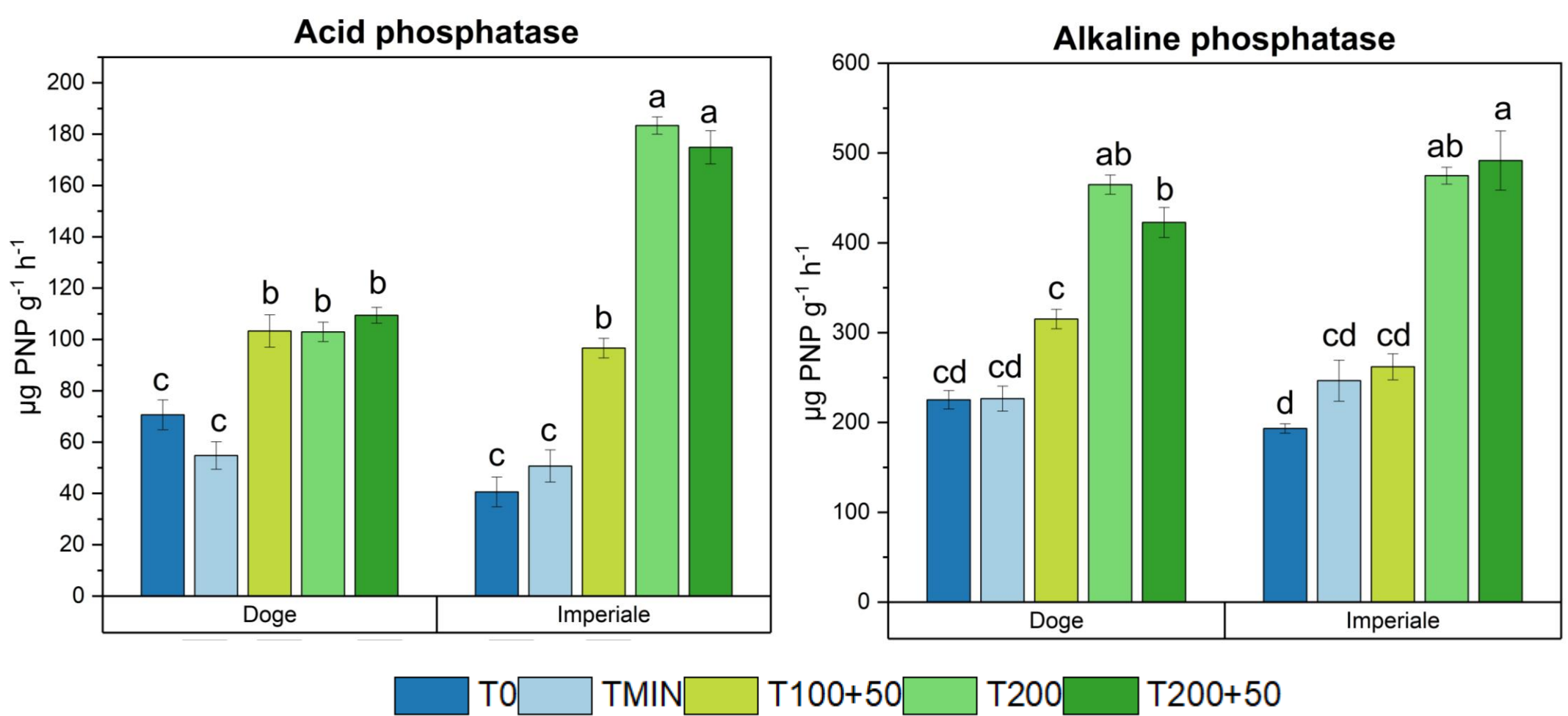
- β-glucosidase
- Arylsulfatase
- Acid Phosphatase
- Alkaline Phosphatase

RESULTS & DISCUSSION

Fertilization treatments with SPS in different amounts enhanced all enzymatic activities in both crop cycles.



The enzymatic activities AcP was higher in Imperiale in T200 and T200+50 compared to Doge.



T100+ 50 obtained the highest yield among SPS treatments. Doge and Imperiale have a different absorption of nitrates, P and K among fertilizations under studies.

Variety	Fertilization Treatments	Nitrates	Phosphates	Potassium
		Δ% from T0	mg kg ⁻¹ DW	
Doge	T0	17559 c	7883 d	40842 d
	TMIN	+8% c	7611 d	41326 d
	T100+50	+49% abc	8011 d	52522 bcd
	T200	+80% ab	7942 d	55338 bc
	T200+50	+82% ab	8263 bcd	55831 ab
Imperiale	T0	24211 abc	8244 cd	47687 cd
	TMIN	+54% a	9447 a	60449 a
	T100+50	+9% abc	9312 ab	57610 ab
	T200	+3% bc	8343 bcd	58591 ab
	T200+50	-4% bc	9096 abc	58508 ab

CONCLUSIONS

The effect of SPS on enzymatic activities was observed after the first crop cycles. The lettuce varieties played an important role in enzymatic activities and N,P, K content in the plant. Further studies will focus on the prolonged effect of SPS fertilization on soil enzymatic activities and on the microbial community in baby leaf crop's system.