

# Integration of vermicompost and vermicompost tea for soil and plant health management in semiarid vineyards

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## Introduction

There is an increasing interest among wine grape growers for use of integrated management practices such as utilization of vermicompost (VC) and vermicompost tea (VCT). Vermicompost can increase wine grape yield, supply nutrients, enhance arbuscular mycorrhizae fungi colonization on roots, and suppress population of parasitic root nematodes. Vermicompost tea enhances grapevine growth and development, and suppresses powdery mildew and botrytis bunch rot pathogens. This study aimed to evaluate the effect of VC and VCT application rate and/or frequency of application on wine grape yield, fruit quality, and vine nitrogen (N) status.

## Materials and Methods

Study was conducted at two irrigated vineyards in south Okanagan Valley, British Columbia, Canada, Thomas Ranch (13-yr old Chardonnay) and Blasted Church (32-yr old Chardonnay), in 2018. Each plot (14.9 m<sup>2</sup>) consisted of 5 vines, and VC and VCT treatments were replicated 6 and 5 times, respectively. Availability of N in VC assumed 10% in the application year. Treatments include in-row soil application of VC at 0 (fertilize control), 7, 14, 28 metric tonnes/ha.row dry weight basis (Fig. 1), and three foliar VCT doses (distilled water (control), 1:12.5 and 1:25 compost/water ratio) and two VCT application frequencies (3 applications at E-L 15, 19, 23 stages and 5 applications at E-L 13, 15, 19, 23, 28, 31 stages). The VC was broadcasted and lightly incorporated late in May. Applications of VCT was foliar at 857 L/ha/app (Fig. 2). Soil properties at the start of experiment, petiole N concentration at veraison, and yield and fruit quality parameters at harvest were determined.



Fig. 1. Vermicompost application at 14 t/ha rate in Thomas Ranch Vineyards, (May 2018)

## Results

Average yield ranged from 15 to 29 tonnes/ha in Thomas Ranch Vineyards and from 6 to 14 tonnes/ha in Blasted Church. Yield and fruit quality parameters were not affected by VC rates; however, petiole N concentration at veraison was linearly increased from 0.65% in control to 1.07% in 28 metric tonnes VC/ha.row (Fig. 3).



Fig. 2. Vermicompost tea foliar application at Blasted Church Vineyards

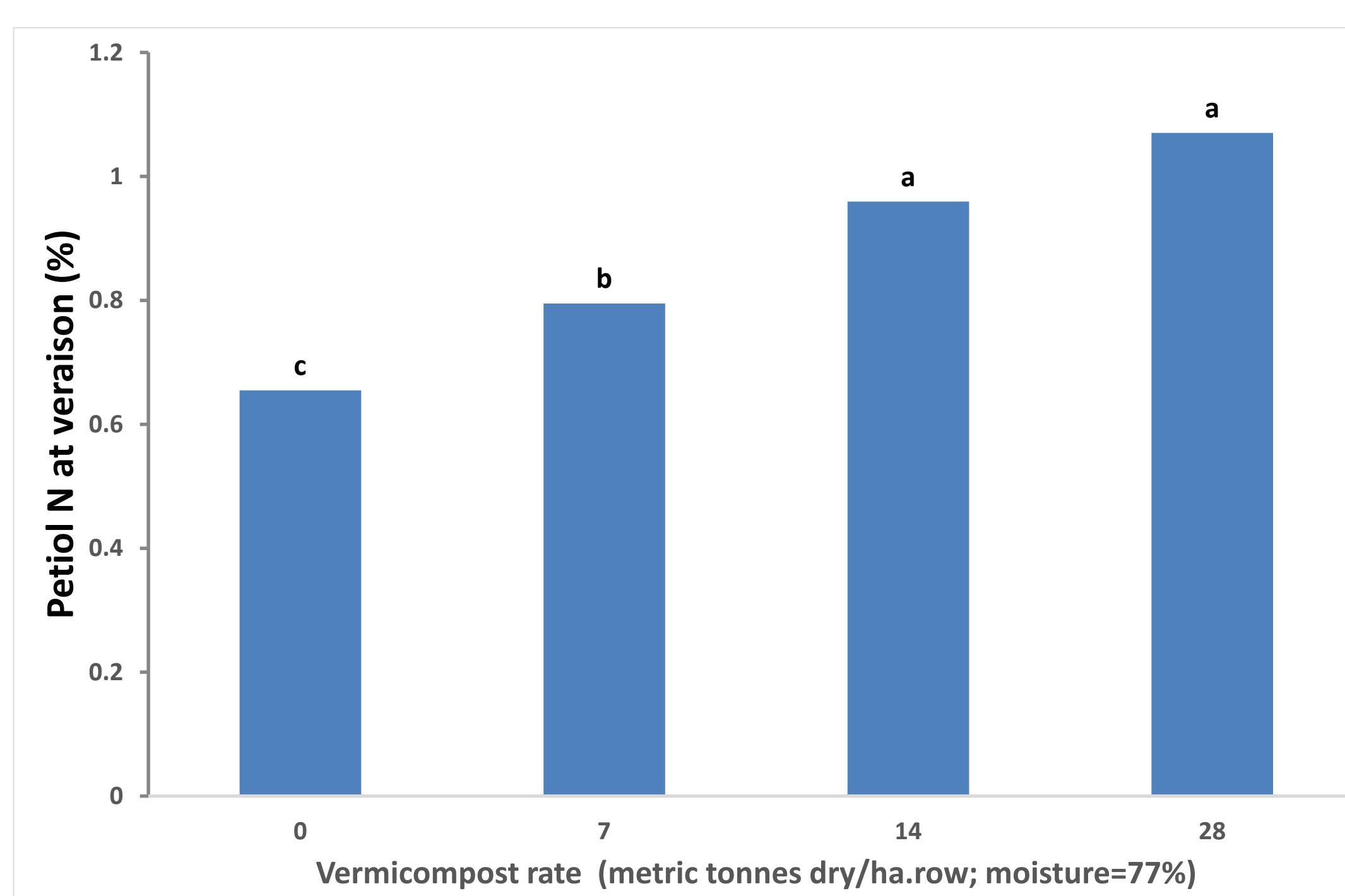


Fig. 3. Effect of vermicompost application rate on petiole N concentration at veraison (Thomas Ranch Vineyards, 2018)

The VCT application did not affect yield and fruit quality parameters except for Brix which was 0.63° lower in 3 applications of 1:25 compost/water ratio compared with control and other treatments (Fig. 4). Petiole N concentration at veraison was significantly increased in 5 applications compared to 3 applications of VCT at 1:12.5 compost/water ratio, but was similar to other treatments (Fig. 5). A positive trend were observed for yield (14%), average numbers of clusters (7.3%) and berry size (2.7%) in 5 applications of VCT at 1:12.5 compost/water ratio compared to control.

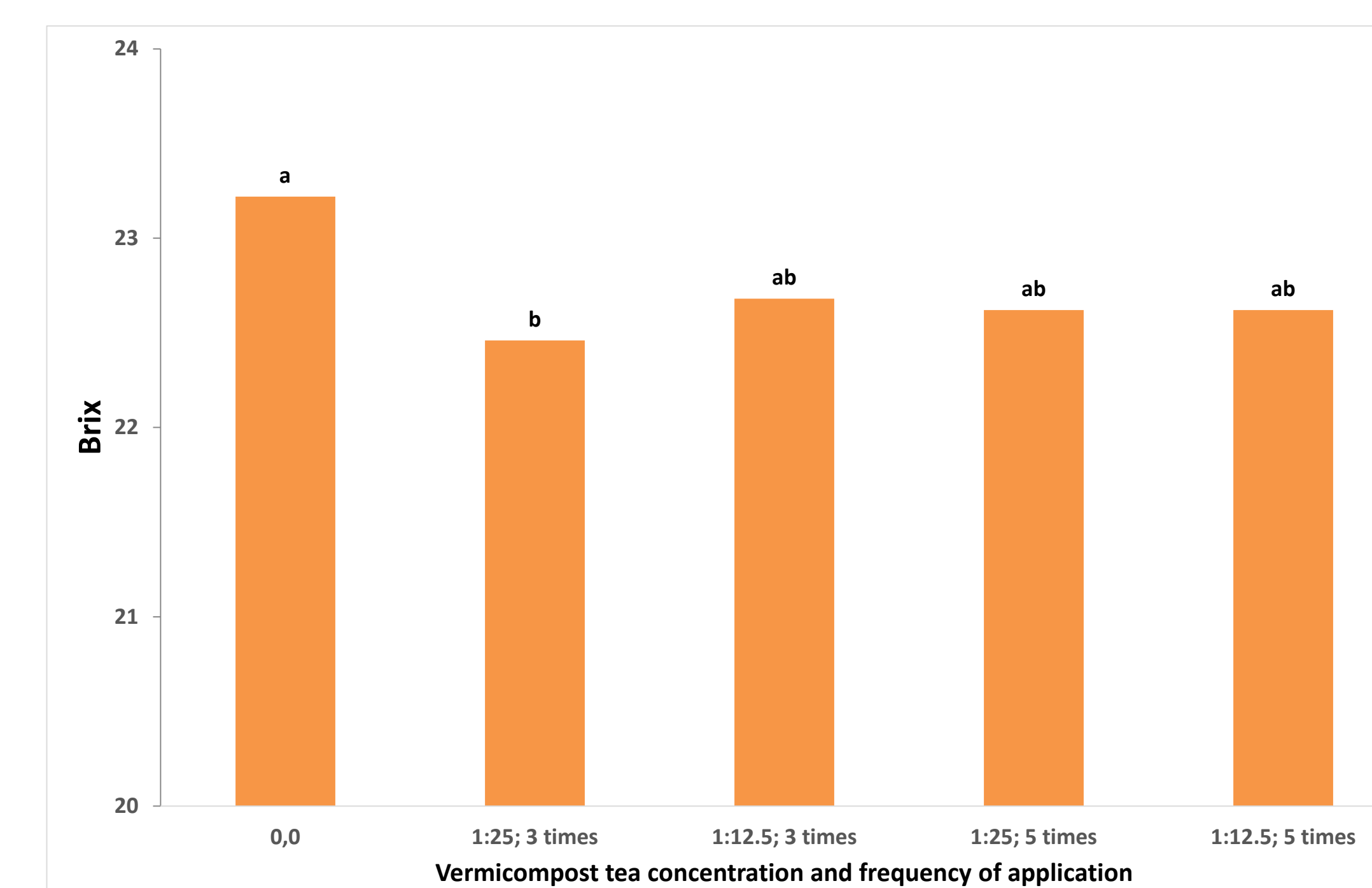


Fig. 4. Effect of vermicompost tea application dilution and frequency on Brix (Blasted Church Vineyards, 2018)

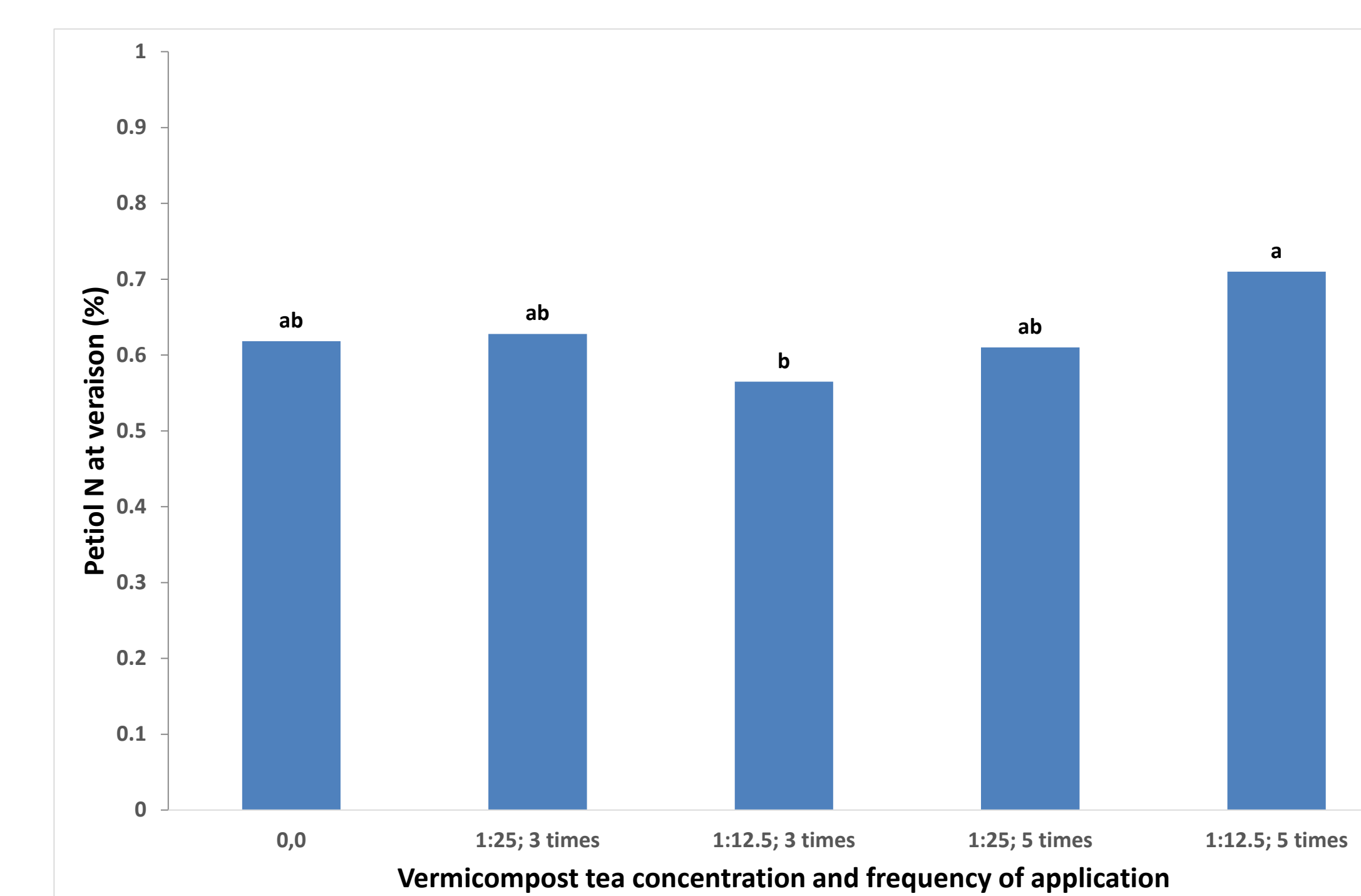


Fig. 5. Effect of vermicompost tea application dilution and frequency on petiole N concentration at veraison (Blasted Church Vineyards, 2018)

## Conclusions

- Vermicompost and vermicompost tea supplied N to grapevine during the growing season; however, did not affect the yield or fruit quality.
- Vermicompost N availability in the year of application was likely >10% and was slowly released. Application of 28 tonnes VC/ha.row resulted in petiole N concentrations of >1% (optimum range).
- Five applications of vermicompost tea at 1:12.5 compost/water ratio improved N status in the grapevine.

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