

## Optimal Cauliflower Stage Inflorescence (CSI) Nutrient Concentration Ranges for 'Hass' Avocado in California

**Summary of the optimal nutrient concentration ranges (ONCRs) for the seven nutrients in the cauliflower stage inflorescence (CSI) of the 'Hass' avocado that are predictive of yields greater than 40 kg per tree (> 90 lb/tree).**

CSI nutrient	N	P	K	Mg	S	Zn	Cu
	----- % -----					----- mg·kg <sup>-1</sup> -----	
ONCRs	2.7-3.0	0.40-0.45	1.4-1.7	0.15-2.00	0.25-0.28	40-44	6-10

[Campisi-Pinto et al., 2017. HortScience 52\(12\):1707-1715\).](#)

For leaf nutrient analysis, avocado leaves are at least 6 months old at the time of collection in August to October and it is notoriously difficult to identify the correct leaf on a terminal spring flush vegetative shoot from one that developed on a terminal shoot in a later flush. Collected this late in the crop production cycle, leaf analysis is used to guide replacement fertilization in spring, approximately seven to eight months later. Samples of cauliflower stage inflorescence (CSI) tissue are collected in spring (March) and represent a discrete developmental stage of relatively short duration that is easy to identify and collect. Since CSI can be collected and analyzed 4 to 6 weeks before full bloom, sufficient time is provided to correct nutritional problems before they affect flower retention and fruit set and negatively impact current crop yield, fruit size or quality.

In our research, the cauliflower stage inflorescence was identified (among other tissues tested, full bloom inflorescences and fruit pedicel tissues collected at different stages of fruit development, which represented different stages in the phenology of the 'Hass' avocado tree) as the tissue with the best potential for diagnosing nutritional problems related to yield of 'Hass' avocado trees in commercial orchards in California. Seven nutrients (N, P, K, Mg, S, Zn, and Cu) in CSI tissue had concentrations uniquely associated with yields greater than 40 kg per tree (> 90 lb/tree). Within CSI tissue, we determined the optimal nutrient concentration ranges (ONCRs) that maximized the probability of obtaining a yield greater than 40 kg per tree to assist the California avocado industry in meeting its goal to increase average production to more than 10,000 lb per acre. The ONCRs for these seven nutrients are given in the Table above.

Given how early in the new crop production cycle CSI tissue can be collected, the ease of collecting CSI tissue for nutrient analysis and the utility of this tissue for predicting the potential for trees to yield > 90 lb per tree, further research is warranted for the development of CSI nutrient analysis as a supplemental tool for diagnosing 'Hass' avocado tree nutrient status to increase yield.

#### Literature Cited

Campisi-Pinto, S., Zheng, Y., Rolshausen, P.E., Crowley, D.F., Faber, B., Bender, G., Bianchi, M., Khuong, T., Lovatt, C.J. 2017. Optimal nutrient concentration ranges of 'Hass' avocado cauliflower stage inflorescences – Potential diagnostic tool to optimize tree nutrient status and increase yield. HortScience 52(12):1707-1715.