

Crown Nut Company & Sandu Brothers Field Trial Summary Factsheet - WSARE WS20-912

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Research Objective: evaluate almond hull/shell materials as a potential source of plant-available potassium (K) when surface-applied as an organic matter amendment. Can these materials supply K for plant uptake?



Experimental Design: randomized complete block design. Treatments applied to entire rows.

Treatments:

- (1) Control
- (2) Hulls at 4 tons/ac
- (3) Mix of hulls & shells at 4 tons/ac
- (4) Shells at 7 tons/ac
- (5) K₂SO₄ fertilizer

} +27 lb/ac K fertilizer in all treatments

} +125 lb/ac K from amendments

Reponses	Methods	Results
Hull/shell amendments	Nutrients, Decomposition	<ul style="list-style-type: none"> • All hull/shell materials released K rapidly as water was applied. • Hulls decomposed more than the mix and shells.
Soil	Exchangeable K (XK), Fertility (pH, CEC, SOM, etc.)	<ul style="list-style-type: none"> • Soil XK increased under all materials in the upper 0-10 cm soil and occasionally deeper depths. • Hull/shells occasionally displaced sodium & calcium but did not affect other soil fertility components.
Tree	July leaf nutrient status, Yield & Trunk Circumferences	<ul style="list-style-type: none"> • In 2022, trees amended with mix & shells had higher leaf K, all amended trees had lower leaf magnesium (Mg) than the control, and no differences in leaf N, P, Ca, S, B, Zn, Mn, Fe, Cu, Na. • No effects on yield or trunk circumferences.

Conclusions & Practical Applications:

Hull/shell amendments increased K supply by releasing K rapidly under water application, increasing soil XK in the first 2 months, and increasing tree K status in the third year after 2 applications. This practice did not influence yield at this site where K was already sufficient. Almond hulls/shells can be recycled as a convenient K-rich organic matter amendment. This practice improves orchard K cycling and can help reduce reliance on K fertilizer. Application rates can be chosen to increase K status in K-deficient orchards, or to replace K removed in fruit at harvest to maintain sufficient K while avoiding Mg competition. Growers can monitor soil XK and July leaf K levels to understand orchard effects in different soil types and management approaches.

Pictures



Almond kernel, shell, and hull.



Hulls & shells.



Piles of hulls and shells at the almond processor, Crown Nut Company.



Loading hulls & shells into applicator.



Applying hulls and shells in the orchard.



Hulls & shells in early and late February.



Hull/shell layer after 5 months.