

# Quinoa: Is organic actually better?

By Jack Carper



## Introduction

- Organic crops typically have less but higher quality protein than conventional crops, but the protein is higher quality (Rambalilowska 2007, Vrčak et al. 2013, Winter and Davis 2006)
- Quinoa can survive in marginal soil, so it can be planted many places that other crops cannot be (Choukr-Allah et al, 2016)
- Study was designed to test protein content and quality in quinoa

## Materials and Methods

- 82 samples from 2018, 21 genotypes
- NIR (near infrared radiation) technology reflects specific light wavelengths off whole quinoa seeds to determine nutritional makeup
- Two NIR tests for each sample



Cleaned samples



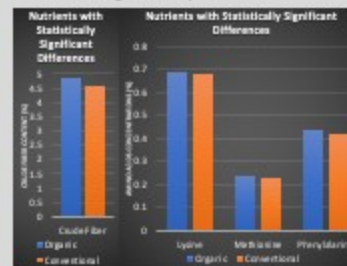
NIR Analysis



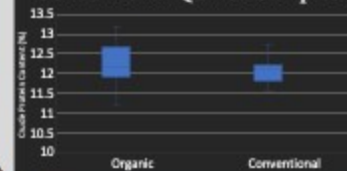
Significance tests on data

## Results

- Organic samples averaged greater amounts of protein, crude fiber, and all essential amino acids for every genotype
- Statistically significant results for crude fiber, lysine, methionine, and phenylalanine in organic samples when compared to the conventional samples
- Protein level differences were not statistically significant
- More variation in the amount of protein for the organic samples



## Protein Content in Organic and Conventional Quinoa Samples



## Conclusion

- No evidence of organic quinoa containing less protein on average (contrary to other similar studies)
- Crude fiber amounts were substantially greater in organic samples than in conventional samples
- Similar to other studies, these results show higher amino acids concentrations in the organic samples
- All nutrients examined were found in greater proportions in the organic samples

By acknowledging the benefits and increased nutritional value of organic quinoa over conventional quinoa, utilization of this highly nutritious alternative grain could prove a vital component in increasing world health and decreasing malnutrition.

### Note:

All data and results on this poster are preliminary results only and not yet confirmed.

### References:

- Ordoñez-Alba, E., Ben, N. K., Frank, A., Mendi, M., Alshakeri, A., Todorok, E., Qi, H., & Ben, K. U. (2017). Quinoa for Marginal Environments: General Food and Nutritional Security in MENA and Central Asia Regions. *Frontiers in Nutrition*, 7, 141. <https://doi.org/10.3389/fnut.2017.00141>
- Rambalilowska, E. (2007). Quality of plant proteins from Organic Agriculture. *Journal of the Science of Food and Agriculture*, 87(15), 2703-2705. <https://doi.org/10.1002/jsfa.3008>
- Vrčak, I. V., Čepin, B. V., Radoš, D., Perović, M., Žemec, I., Radoš, M., Miroškić, G., & Mladkić, B. (2013). Is incorporation of the combined value and food safety of organically and conventionally produced wheat flours. *Food Chemistry*, 143, 102-109. <https://doi.org/10.1016/j.foodchem.2013.04.028>
- Winter, C. K., & Davis, K. L. (2006). Organic Protein. *Journal of Food Science*, 71(9), 117-122. <https://doi.org/10.1111/j.1365-2656.2006.01016.x>

### Acknowledgements

- Dr. David Packer, Head of this project
- Dr. Kevin Murphy, PI of the SSS Laboratory
- Jessica Bricker, Lab manager for the SSS Laboratory
- Dr. Anna Warsaw, Assistant professor
- Kathryn Davis, Teaching assistant