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## Feasibility of using spectral profiles for modeling water activity in five varieties of white quinoa grains

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### Abstract

1 In this paper, the feasibility of using spectral profiles for modeling water activity  
2  $a_w$  in white quinoa grains (*Chenopodium quinoa* Willd.) is studied. For this  
3 purpose, five hundred samples of five white varieties were stabilized at different  
4  $a_w$  values using the isopiestic method. Next, hyperspectral images (HSIs) of ten  
5 grains for each combination (variety,  $a_w$  value), covering the range of 400-1000  
6 nm were acquired, and mean spectral for each grain extracted. Then, due to a  
7 linear relationship that the spectral profiles are shown, the modeling was per-  
8 formed with  $a_w$  values over 0.741 using partial least square regression (PLSR).  
9 From total spectra, three hundred spectrum were selected and randomly divided  
10 into training and validation sets. The results shown coefficient of determination  
11 from 0.59 to 0.834 concluding than for  $a_w$  over 0.741, HSI+PLSR show potential  
12 for  $a_w$  prediction in white quinoa grains.

*Keywords:* Quinoa grains, Water activity, HSI, PLSR

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### 1. Introduction

14 Quinoa is an important food crop for people living in Andean rural regions  
15 (Carrizo et al., 2016). However, there are few studies related to the main pa-

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