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Determination of the Phytase Activity and Phytate P of Quinoa (*Chenopodium quinoa* Willd.) using Spectrophotometric and Isotachophoretic Methods

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Abstract

The quinoa (*Chenopodium quinoa* Willd.), is a pseudocereal that has been cultivated in the Andean region in Nariño, Colombia and have great opportunity in the improving food and feed mainly on its use as feedstuff. The aims of this work was to analyse the P contents, phytate phosphorus contents and phytase activity of Quinoa Nariño (QC); Quinoa Anapqui's (QBA); Quinoa -IICA 020 Oruro (QB); Quinoa Huancavelica (QP) and wheat (control) were also analysed at physiological temperature (39°C) and 37°C adopted for additives regulations. Phytic acid was determined by capillary isotachophoretic method and the phytase activity was estimated by a spectrophotometric method. Phosphorus in this study found in major level in QP-Huancavelica variety (508 mg g⁻¹). The phytic acid P proportion in the total P was significantly ($P < 0.05$) low in QC (19.64%), QBA (26.95%), QB (33.6%) and QP (32.17%) varieties analysed in comparison with wheat (60.22%) evaluated.

The phytic acid P proportion in the total P was low in QC (19,64%), QBA (26.95%), QB (33.6%) and QP (32.17%) varieties analysed in comparison with the other cereals evaluated. The phytase activity was evaluated at physiological (39°C) temperature and at standard (37°C), the phytase activity was effected by the temperature in QC (1153 FTU kg⁻¹, 1152 FTU kg⁻¹), QBA (847 and 593 FTU kg⁻¹), QB (896 and 613 FTU kg⁻¹), QP (909 and 561 FTU kg⁻¹) and wheat control (1137 and 1046 FTU kg⁻¹) under 39 and 37°C, respectively. The Bolivian varieties did not present any significant differences. Presented negative correlation (-0.89 at 37°C and -0.79 at 39°C) was established between the phytase activity and the amount of phytic acid P among the four samples. To conclude, the results showed a great potential of the quinoa grains due to the low level of phytic acid P and high phytase activity.

Keywords: Antinutritional factors, endogenous enzyme activity, phytic acid, quinoa