Effect boiled barley and order of consumption of concentrate to forage on proxies related to insulin resistance in adult Arabian mares

Amiri, M.[1]; Kiani, A.[2] and Mohammadzadeh, S.[3]

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Abstract

In this study, effect of boiling of barley grain and order of consumption of concentrate to forage on proxies related to insulin resistance in Arabian mares were studied using minimal model of glucose and insulin dynamics. Six mares age 4-10 years, mean body weight 445±34 kg) were fed during four periods of 14-days in a cross-overs experiment. In two feed sequencing, the concentrate part of ration was offered either 30 min. after (F-C) or 30 min. before forage part (C-F). Barley grain was either crushed (crushed) or boiled for 3h in water (boiled). At the end of each period, blood samples were taken from jugular vein four hours after morning meal. Blood samples were analyzed for insulin and glucose concentrations. Insulin response, insulin sensitivity, response pancreatic beta cells, tissue glucose non-insulin dependent and modified insulin glucose ratio were calculated based on proxy of the dynamic model. The results showed that feed sequencing had no significant effect on insulin response, response of beta cells, and modified insulin to glucose ratio ($P>0.05$). Beta-cell response mIU/(L. min^{-1}) in boiled barley was higher than that in crushed barley (719 vs. 478, $P<0.05$). A positive correlation was found between insulin sensitivity and glucose consumption of non-insulin dependent tissues in crushed but not in boiled barley. The results showed that feeding boiled barley might increase postprandial glucose to insulin ratio which might lead to insulin resistance in adult Arabian mares.

Key words: Insulin resistance, Feed sequencing, Grain boiled, Horse

1- MSc Graduated of Animal Physiology, Faculty of Agricultural Science, Lorestan University, Khoram Abad, Iran

2- Associate Professor, Department of Animal Science, Faculty of Agricultural Science, Lorestan University, Khoram Abad, Iran

Corresponding Author: Kiani, A., E-mail: kiani.a@lu.ac.ir

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