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EFFECT OF TOTAL REPLACEMENT OF RAW AND FERMENTED WHEAT INSTEAD OF THE MAIZE IN LAYING HENS DIETS ON SPECIFIC CHARACTERISTICS OF EGGS AND HISTOLOGICAL CHARACTERISTICS OF SMALL INTESTINE

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ABSTRACT : This study was conducted in the poultry field of the Department of Animal production at the College of Agriculture, University of Baghdad in the old site (Abu Ghraib) for the period from 1 February 2017 to 30 June 2017 for 18 weeks to study the chemical analysis of wheat before and after fermentation, as well as study the effect of total replacement of raw and fermented wheat instead of the maize in Laying hens diets on specific characteristics of egg and histological characteristics of small intestine. Twenty two Laying hens with 22-week-old of Lohmann Brown cultivar distributed randomly in five treatments with four replicates per treatment, each replicate containing 6 hens (24 hens/ treatment). The hens were fed on test diets containing raw and fermented wheat substitutes for maize. The experimental treatment included standard diet (C) 100% maize, (W) 100% raw wheat, (F1) 0.5% fermented wheat with kiwi fruit juice, (F2) 0.3% fermented wheat with probiotic and (F3) 0.1% fermented wheat with Lactobacillus bacteria. The results of the experiment indicated a significant decrease in both raw wheat and fermented wheat with kiwi compared with control treatment when measuring the albumin diameter. Both the raw wheat and the fermented wheat with probiotic showed a highly significant superiority on all the treatments in the shell thickness in addition, a significant decrease occurring in raw wheat and fermented wheat with kiwi compared with control treatment in pH of the duodenum content, whereas there was decrease in a highly significant in all treatments when compared with control treatment in the jejunum and ileum regions and a fermented wheat with kiwi treatment showed significant superiority on all the treatments in the height of villus and depth of the crypt for regions of the duodenum and jejunum as well as the depth of the crypt in the ileum region.

Key words : Fermented wheat, kiwi, probiotic, lactobacillus bacteria.

INTRODUCTION

The importance of fermentation is shown in an increase secretion of enzymes and changes the specific characteristics of food especially poultry. The improvement in food stuff or feed depends on the change resulting from this process which includes the chemical, physical and microbial properties in order to get the most benefit from them, there are several factors required by the process of fermentation such as Added water, temperature and quality of feed used in addition to the amount of time required for this process (Heres *et al*, 2002). It is worth mentioning that fermentation occurs mostly in anaerobic conditions, the reason is that 90% of the useful microorganisms in the gastrointestinal tract belong to the group of anaerobic organisms and are characterized as positive for the Gram×s dye, especially the bacteria that produce the lactic acid. The most common species are *Lactobacilli*, *Bifidobcterium* and *Bactoroides* (Huyghebaert, 2005).

Fermentation helps to extract energy from the oxidation and reduction reactions of food compounds, including carbohydrates (Klein *et al*, 2004). William and Akika (2007) pointed out that fermentation converts complex organic compounds into simple compounds by increasing the secretion of the enzymes that accompany this process, such as the catalase enzyme produced by yeasts and microorganisms.

The quality of the egg can be judged by some qualitative measurements, the shell strength is considered one of the important specific characteristics of produced egg because it controls on arrival of egg to the consumer without being exposed to fracture which plays shell thickness a major role if shell thickness increases, the