

## Abstract

Optimum utilization of the date byproduct requires understanding of the physicochemical and structural characteristics of the date. In the first trial, the metabolizable energy values of two variety of date palm by-products (inedible whole date palm, date pits and pulp) were determined by the Total collection method using 35 adult leghorn cockerels. The chemical composition of these products was also determined. After that, two experiments were carried out to study the feeding value of ground date pits and whole date palm (*Phoenix dactylifera* L.) with and without enzyme supplementation on performance of two strains of laying hens. In the second trial, 144 Lohmann 55-week-old *LSL-Lite* hens were randomly allocated into 6 groups consisting of 4 replicates of 6 birds, Based on a 3×2 factorial arrangement of treatments. Six iso-caloric and iso-nitrogenous experimental diets including I-corn-soybean meal-based control, II-corn-soybean meal-oil-based control, and III- corn- soybean meal-based diet included (180 g/kg DP) were formulated. Each of the diets supplemented with two levels of an enzyme (0.0 and 0.07 g/kg multi-enzyme). In the third trial, a total number of 256 Bovanz 95-week-old hens were randomly allocated into 8 groups consisting of 4 replicates of 8 birds each. Based on a 4×2 factorial arrangement of treatments. Eight iso-caloric and iso-nitrogenous experimental diets including 1-corn-soybean meal-based control, 2- corn-soybean meal-based diet included 70 g/kg ground WDP, 3- corn-soybean meal-based diet included 140 g/kg ground WDP and 4-corn-soybean meal-based diet included 210 g/kg ground WDP were formulated. Each of the diets supplemented with two levels of an enzyme (0.0 and 0.07 g/kg multi-enzyme). Apparent metabolisable energy (AME), and apparent metabolisable energy corrected to zero nitrogen equilibrium (AME<sub>n</sub>) of dry matter of the date pits and whole date palm were 1803.2 (kcal/kg), 1820.4 (kcal/kg), 1924 (kcal/kg) and 1954 (kcal/kg) respectively. According to the findings of

the second trial, There was no significant difference in feed intake, feed conversion ratio, egg production, egg mass, eggshell weight, eggshell thickness, and Haugh unit among the treatments ( $P>0.05$ ). Dietary inclusion of date pits (DP) significantly decreased body weight gain (BWG), egg weight and yolk color score (YCS). According to the findings of the third trial, There was no significant difference in feed intake, feed conversion ratio, egg production, egg mass, eggshell thickness, and Haugh unit among the treatments ( $P>0.05$ ). However, yolk color score significantly decreased as dietary WDP levels increased in the diet. Moreover, there were no significant differences in the relative weight of different organs except for abdominal fat that was decreased ( $P<0.05$ ) as dietary WDP levels increased. In both of trials, the serum cholesterol, LDL, HDL, and triacylglycerols were not significantly affected by DP/WDW and enzyme supplementation ( $P>0.05$ ). Our finding show that WDP up to 210 g/kg and DP up to 180 g/kg are good substitutes for feedstuff in laying hen rations and resulted in the high reduction of dietary cost with little effect on egg yolk color. However, this unfavorable effect can be ameliorated by dietary carotenoids supplementation.

**Keywords:** Metabolizable energy, Chemical composition, Date palm by-products, Performance, Laying hens.



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