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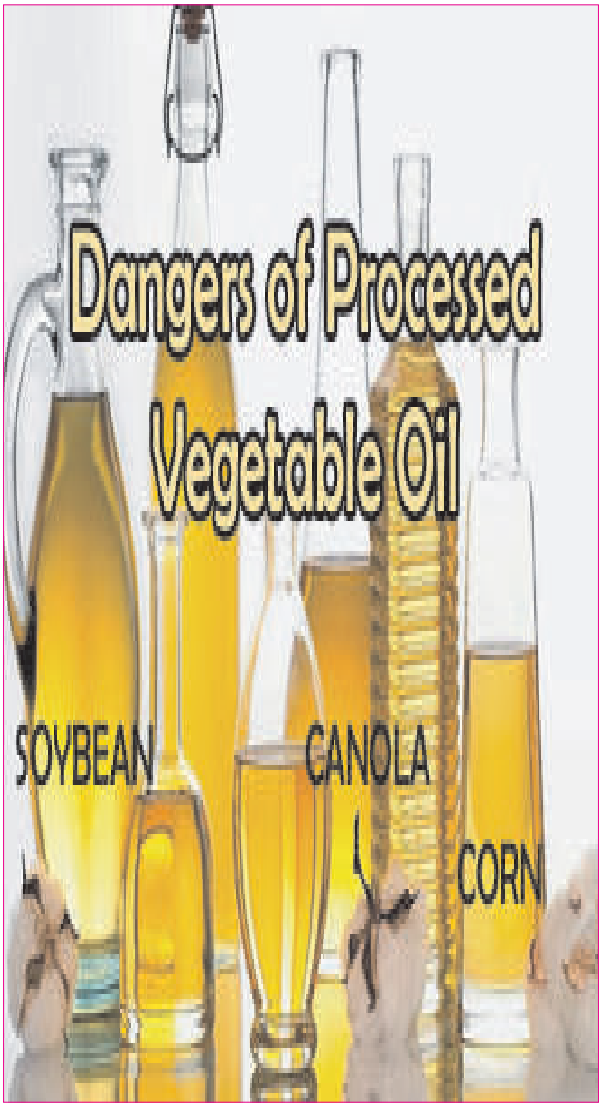
USE OF DIFFERENT VEGETABLE OILS IN BROILER DIET



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ABSTRACT:

The expressions "fat" and "oil" allude to triglycerides of a few profiles of unsaturated fats. Unsaturated fats that are not bound to other natural parts as glycerol are the alleged free unsaturated fats. Lipids constitute the principle fiery hotspot for creatures and they have the most astounding caloric incentive among every one of the supplements. Linoleic corrosive is the main unsaturated fat whose dietetic prerequisite has been illustrated. Other than providing vitality, the expansion of fat to creature diets enhances the assimilation of fat-solvent vitamins, diminishes pulverulence, expands count calories agreeability, and the productivity of use of the devoured vitality. Moreover, it decreases the rate of sustenance entry through the gastrointestinal tract, which permits a superior retention of all supplements display in the eating regimen. The lively estimation of oils and fats rely upon the accompanying: the length of the carbonic chain, the quantity of twofold securities, the nearness or nonappearance of ester securities (triglycerides or free unsaturated fats), the particular courses of action of the immersed and unsaturated fats on the glycerol spine, the organization of the free unsaturated fat, the arrangement of the eating routine, the amount and the sort of the triglycerides supplemented in the eating routine, the intestinal vegetation, the sex and the age of the feathered creatures. In winged creatures, muscle to fat quotients sythesis is like the piece of the fat from the eating regimen. The clear edibility of unsaturated fats is high in the main days of life of flying creatures, though evident absorbability of soaked fats is low. The amount of oils or fats is surveyed by the accompanying techniques: titration, dampness, polluting influences, unsaponifiable, saponification esteem, rate of fat, rate of free unsaturated fats/sharpness and the profile of unsaturated fats. The strategies starting peroxide esteem, dynamic oxygen strategy, osi, iodine esteem, and examination of the thiobarbituric corrosive (TBARS) are particular to assess the oxidative strength. Considering diets with the same nutritive esteems, flying creatures sustained with proportions containing oil exhibit preferred execution over winged creatures encouraged no oil. In addition, the utilization of oil or fat in diets for ovens may change both the piece and the nature of the cadaver.

KEYWORDS: *Broiler nutrition, fat, lipids, oil.*

INTRODUCTION :

Oils have generally been utilized as vitality source in the eating regimens for grills. Focal points of using oils in poultry count calories incorporate diminishing of food tidy, increment in ingestion and processing of lipoproteins, importance measure of fundamental unsaturated fats and their lower warm toward sugars and proteins. Likewise they help vitamin A, vitamin E and Ca assimilation (Leeson and Atteh, 1995). A few worries that ought to be noted with oils usage include: utilization of more elevated amounts of oils may discredit the impacts of pelleting, estimation of Metabolizable Energy (ME) substance can be troublesome, there is the potential for rancidity (Chen and Chiang, 2005). Furthermore, unsaturated vegetable oils have higher vitality levels than of immersed creature fats (Carew et al., 1961). Various diverse oil sources are accessible for poultry from the vegetable sources. Basic oil sources in oven nourishment are sunflower oil, canola oil and soybean oil. Female grills sustained weight control plans containing two distinct types of canola oil indicated better development rate when contrasted with females nourished eating methodologies containing fat and acidulated soybean oil soapstock.

EXPERIMENTAL OILS AND DIETS:

Fresh sunflower oil (FO) and recovered frying sunflower oil (RO) were obtained from local restaurants. The two oil samples were subjected to analysis for their fatty acids profile, peroxide value and acidity. Oils analyses were all done according to the Official Method 996.06 (AOAC)7 . Four experimental diets were formulated according to the nutritional requirements of the chicks in the different stages of age. In each experimental phase one diet contained fresh oil (control) while the other contained recovered frying oil (treatment). The ingredients and chemical compositions of the diets are shown in table-1.

GROWTH PERFORMANCE EXPERIMENT:

A total number of 72 (one day old) Ross chicks (36 per experimental diet), were housed under controlled environmental conditions. The chickens had free access to their respective experimental diets and live weight gain; feed intake and feed efficiency were recorded from 1 to 14 days, 15 to 28 days, 29 to 42 days and cumulatively.

CARCASS CHARACTERISTICS AND MEAT QUALITY:

At the end of the experiment, 12 birds from each treatment group were slaughtered for evaluation of carcass characteristics. Carcasses were cleaned thoroughly, feathers, feet and visceral organs were removed. The dressed and edible organs (heart, empty gizzard and liver) weights were then individually recorded. All weights were expressed as percentage of live body weight.

RESULTS AND DISCUSSION

Characterization of the experimental oils: Quality of fat has a great contribution to get better poultry growth and feed efficiency which depends upon chemical nature of the constituent fatty acids10. The fatty acids profile, peroxide and acid values of fresh and recovered frying oil are shown in table- 2. The results indicated that the frying process of fresh oil resulted in increasing its peroxide and acid values. The average peroxide value (meq O2/kg) of fresh oil was 3.30 and it increased to 6.55 upon using it in the frying process. Peroxide value is one of the most widely used tests for the measurement of oxidative rancidity and or deterioration of oils and fats11 . And according to Gan et al.12 good quality oil should have a peroxide value less than 10 units. On the other hand, the acid value (mg KOH/g) was 0.20 for fresh oil and 1.00 for recovered frying oil which is attributed to the hydrolytic alteration that usually occurs when food products containing a certain amount of water (e.g. potatoes) are fried5 . In agreement with our results, similar results were obtained by Anjum et al.13 for soyebean oil and Blas et al.14 for vegetal oil (sunflower oil + olive oil).

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were kept in temperature-controlled rooms. The temperature of the room was maintained at 33 ± 1°C for the first 3 day, after which the temperature was gradually reduced by 3°C a week until reaching 24°C. The temperature of the room was then maintained at 24°C for the remainder of the experiment. Artificial light was provided 24 h/day by the use of fluorescent lights. The experiment was conducted in 3 phases consisting of a starter phase from day 1 to 16, a middle phase from day 17 to 25 and a finisher phase from day 26 to 38.

Initial live body weight was recorded and then at weekly intervals thereafter. Weighed quantity of feed was offered daily and refusal was recorded to determine the feed consumption. Feed conversion ratio (FCR) was calculated from the body weight gain and feed consumption. All the chicks were vaccinated against Newcastle disease, Infectious Bursal disease and Hydropericardium Syndrome, as per recommended schedule.

At the end of experiment, all chickens were slaughtered at a local abattoir (Chahia, Tunisia) to collect data on carcass characteristics. Hot carcass weight of birds was obtained by removing the skin, head, feathers, lungs, toes with feet and gastrointestinal tract. Internal organs, i.e., liver, heart and gizzard were weighed immediately after slaughtering. Chicken meat from thigh and abdominal muscles were collected, vacuum packed and frozen at -20°C until further analyses were completed.

The experiment was undertaken on 250 day-old broilers for a period of five weeks to study the effect of different vegetable oils on their performance. The day-old chicks were randomly divided into five groups, viz. A to E receiving isocaloric and isonitrogenous diets containing groundnut oil, soybean oil, mustard oil, sunflower oil and palm oil, respectively. The birds from group E recorded significantly higher live weights than birds from all other groups except group B. The live weights of birds from group B were comparable with groups A and D. However, the birds from group B recorded significantly better live weights than group C. The differences in the live weights of birds from groups A, B and D were statistically non-significant. The birds from group E recorded marginally higher gain in weight followed by birds from groups B, D, A and C. The feed consumption of birds from group A was numerically higher followed by birds from group D, E, C and B. The birds from group E recorded significantly better feed conversion ratio than birds from all other groups, except group B. The differences in feed conversion ratio of birds from group D were statistically non-significant as compared to all groups except group E. Similarly, the difference in feed conversion ratio of the birds receiving A, B and D were also statistically non-significant. The birds from group E gained higher net profit followed by group B, D, A and C. The nitrogen retention of birds from group B was highest followed by group E, D, A and C. Similarly, ether extract digestibility coefficient for group B was highest followed by groups E, D, A and C. The non-significant differences among various groups indicated that the different oils had no significant effect on edible carcass yield, liver, gizzard, heart and abdominal fat pad percentages. Thus, it is concluded that use of palm oil and soybean oil in broiler diets is beneficial in overall improvement in performance of the birds as compared to the use of groundnut oil, mustard oil and sunflower oil.

IMPORTANCE OF DIETARY FAT TO POULTRY

Scott et al., have concluded that the net amount of energy obtained by chicks is 60% of the metabolizable energy of proteins, 75% of the metabolizable energy of carbohydrates,, and 90% of the metabolizable energy of fats (Scott, et al., 1982), underscoring the high efficiency of metabolizable energy contributed by fat. Baião and Lara observed that the inclusion of oil in the starter diet increased the fat digestibility in broiler chicks during the first week of life and resulted in better performance through 21 days of age, compared to the chicks received rations without oil (Baião and Lara, 2005). Furthermore, chicks utilized metabolizable energy more efficiently for growth if part of the carbohydrate portion of the diet was replaced isocalorically with corn oil (Carew and Hill, 1964) or acidulated soybean soap stock (Lipstein and Bornstein, 1975). For growing chicks, the net availability of metabolizable energy from corn oil was about 10% higher than that of carbohydrate-rich feed ingredients; yellow corn and milo, (De Groóte, 1968). Also, chicks fed diets devoid of supplemental fat had higher levels of lipogenesis and increased adipose fat deposition (Dvorin, et al., 1998).

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