

IN THE NAME OF GOD

EFFECT OF SALBUTAMOL ON CARCASS CHARACTERISTICS
AND BLOOD PARAMETERS IN BROILER CHICKENS

BY
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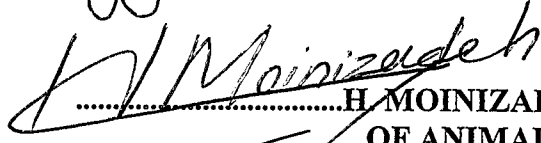
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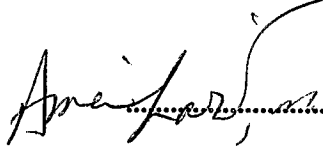
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TO :

My dear father for his patience,

my beloved mother for her kindness

and

to other members of my family

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ABSTRACT

EFFECTS OF *SALBUTAMOL* ON CARCASS CHARACTERISTICS AND BLOOD PARAMETERS IN BROILER CHICKENS

By

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Effects of salbutamol feeding was studied on carcass characteristics and blood parameters in Aryan broiler chickens, from day 30 to day 49 of the rearing period. Salbutamol in solution was fed on 56 chicks per treatment, at the rate of 0 (T₀), 5 (T₁), 10 (T₂) and 15 (T₃) ppm of the diet. Blood samples were collected before the start of salbutamol feeding and again before slaughter. Carcass characteristics were evaluated at slaughter. Breast and drumstick meat crude protein, fat and dry matter, and several blood parameters were determined. Crude protein was determined by the Kjeldahl method, fat by ether extract and dry matter (water content) by oven drying.

Serum parameters (glucose, cholesterol, triglyceride, BUN, CPK and GOT) were determined using commercial kits. Data were analyzed by using the GLM procedure of SAS. The level of significance was set at $P < 0.05$.

Subcutaneous fat weight was significantly reduced in T₁ (23.1% relative to the control group). Head weight was reduced in T₃, feet weight was increased in T₂, and the weight of liver was greater in T₂ and T₃ as compared with the control group. There was a significant increase in cold and hot carcass weight due to salbutamol feeding. Breast and drumstick fat contents (in dry matter) were significantly reduced in T₁, T₂ and T₃ but breast and drumstick protein contents (in dry matter) were significantly increased in T₁, T₂ and T₃. Dry matter content of the breast meat was significantly increased. Level of creatine phosphokinase (CPK) was significantly lowered in T₁, but cholesterol level was significantly increased in T₃. Salbutamol did not significantly affect glucose, BUN, TG and GOT levels in blood. The data indicated that salbutamol affects body composition and metabolism of the broiler chickens, similar to other beta-adrenergic agonists.

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ABBREVIATIONS

BUN; BLOOD UREA NITROGEN

CPK; CREATINE PHOSPHOKINASE

GOT; GLUTAMATE OXALOACETATE TRANSAMINASE

DM; DRY MATTER

CPDM; CRUDE PROTEIN IN DRY MATTER

EEDM; ETHER EXTRACT IN DRY MATTER

SCFAT; SUBCUTANEOUS FAT

ABFAT; ABDOMINAL FAT

REM; REMAINDER OF CARCASS i.e. CARCASS WITHOUT
DRUMSTICKS, BREAST AND PYGOSTYLE.

DMRT; DUNCAN MULTIPLE RANGE TEST

PNMT; PHENYLETHANOLAMINE N-METHYLTRANSFERASE

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CHAPTER 1

INTRODUCTION

Today, the population explosion together with disproportionate distribution of food are among the world's greatest problems. In most of the highly populated and poorly developed countries many children suffer from malnutrition during their early years (69). This may result in a high death rate or may cause an adverse effect on the body that persists throughout the lifetime of the affected individuals. The available food in these overpopulated areas consists mainly of starchy grains, which supply enough energy for life processes, but lacking in the proteins which are necessary for growth and repair of body tissues. Thus, in these areas a severe lack of protein of good quality often results in a disease known as kwashiorkor in young children.

High quality protein is necessary for the proper growth and good health of animals and men. It is the nutrient in shortest supply on a worldwide basis. Plant proteins usually do not provide a good balance of amino acids; animal proteins are superior in this respect. Animal products such as meat, milk, and

eggs still remain a major source of high quality protein for humans throughout the world.

As human protein needs increase with increase in the world's population, there may be more and more competition between human and livestock for the cereal grains. We must try to produce more efficient animals in future (69).

Considerable progress has been made recently in understanding the processes regulating the growth and development of muscle and adipose tissue of livestock species. This has been facilitated by the discovery of several compounds that exert dramatic effects on carcass composition (122).

Excessive deposition of fat is a major problem of the livestock industry today. Utilization of nutrients by the animal for accretion of fat, which is of lesser value than lean tissue, represents a loss both to the grower and to the consumer (7). The United States Livestock industry produces approximately 5 billion pounds (2.270 billion Kg) of excess fat annually. Along with being unacceptable to consumers, the excess fat represents an inefficient use of feedstuffs (85).

Genetic improvement in broilers during the last several decades has reduced the time required to reach market weight by half. This dramatic improvement in growth rate has been accompanied by excessive fat deposition. Overly fat broilers use feed less efficiently than leaner broilers of the same weight and

age, and such fat is considered to be a loss to processor and consumer (26).

Nutritional factors that have been shown to modulate fat deposition in broilers include dietary fat levels, calorie: protein ratios, water: feed ratios, feed restriction, and sodium chloride content of the diet (26). Reducing fat deposition by such methods is, however, usually associated with adverse effects on birds performance (26).

Various chemical treatments have also been used in an effort to reduce carcass fat (26). Daily injections of epinephrine, norepinephrine, or nicotine, which reduce fat accumulation in swine, failed to improve carcass composition in broiler chicks (26). Thyroactive iodinated casein administered in the diet has been reported to be effective in reducing excess fat accumulation in broilers, but this was associated with reduced feed conversion, greater shrinkage, and lower dressing yields (26).

The primary goal of this investigation was to study the effects of daily feeding salbutamol on carcass characteristics and composition, skeletal (drumsticks and breast) muscle proteins and subcutaneous, abdominal and intramuscular fat. Some blood parameters, for studying the effects of this beta-agonist on protein and fat metabolism, were also determined.

CHAPTER 2

REVIEW OF LITERATURE

Among the flesh foods, poultry meat is known for its nutritional and organoleptic qualities. It is low in calories and is a good source of both saturated and unsaturated fatty acids including certain essential fatty acids. Its protein content is higher in comparison with red meat (98).

The structural unit of a muscle tissue is the muscle fiber. The diameter of muscle fibers vary depending on the species, sex, breed, plane of nutrition and age. The muscle fiber consists of a sarcolemmal membrane, sarcoplasmic reticulum, nuclei, mitochondria, golgi bodies, "T" system and the contractile proteins of myofibrils. Fibers are narrow, cylindrical, tapered and multinucleated in nature (98).

2-1. MOISTURE, PROTEIN AND FAT IN POULTRY MEAT

Water forms around 67 to 68 percent of the soft tissues of the avian carcass. The moisture content of meat tissue varies depending on the type of bird from which it is originated. In case of chicken (hen) the edible portion of meat contains on an