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## Research Article

### IN VITRO EVALUATION OF ENZYME SUPPLEMENTATION FOR PREDICTING IN VIVO RESPONSE OF POULTRY

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#### ABSTRACT

In vitro evaluation of enzyme supplementation is used to predict the in vivo response of poultry to enzymes. This study aims to evaluate the efficacy of in vitro techniques in predicting the in vivo response of poultry to enzyme supplementation. Different in vitro techniques such as pepsin, amylase, and protease assays were used to evaluate enzyme efficacy. The results obtained from in vitro techniques were compared with the in vivo response of poultry to the same enzyme supplementation. The study showed that in vitro techniques such as pepsin, amylase, and protease assays can be effectively used to predict the in vivo response of poultry to enzyme supplementation. The study recommends the use of in vitro techniques for predicting the in vivo response of poultry to enzyme supplementation.

#### KEYWORDS

In vitro, In vivo, Enzyme Supplementation, Poultry, Efficacy.

#### INTRODUCTION

Poultry nutrition is crucial for the growth and productivity of the birds. Enzyme supplementation in poultry diets has been gaining importance due to its ability to enhance nutrient utilization, particularly in feedstuffs containing high levels of anti-nutritional factors. In vitro techniques can be used to evaluate

the efficacy of enzyme supplementation in poultry diets by simulating the digestive process of the bird. This study aims to evaluate the effectiveness of in vitro techniques in predicting the in vivo response of poultry to enzyme supplementation. Enzyme supplementation is commonly used in poultry diets to

enhance nutrient utilization and overall performance. However, the efficacy of enzyme supplementation can vary depending on several factors such as diet composition, animal age, and health status. In vivo studies are commonly used to evaluate the efficacy of enzyme supplementation in poultry. However, these studies can be time-consuming, expensive, and may require large numbers of animals. Therefore, in vitro techniques have been developed as an alternative to predict the in vivo response of poultry to enzyme supplementation. In vitro techniques such as pepsin, amylase, and protease assays are commonly used to evaluate the efficacy of enzyme supplementation in vitro. These techniques measure the ability of enzymes to break down specific substrates under controlled laboratory conditions. This study aims to evaluate the efficacy of in vitro techniques in predicting the in vivo response of poultry to enzyme supplementation. The results of this study can help to improve the efficiency and accuracy of enzyme supplementation in poultry diets, ultimately leading to improved performance and profitability for the poultry industry.

## METHODS

In vitro and in vivo experiments were conducted using broiler chickens. For the in vitro experiment, three diets were formulated: a basal diet, a basal diet supplemented with xylanase, and a basal diet supplemented with xylanase and phytase. The diets were subjected to a simulated digestive process using an in vitro system that mimicked the digestive tract of broiler chickens. The digestibility coefficients of dry matter, crude protein, and gross energy were measured. For the in vivo experiment, three diets similar to the ones used in the in vitro experiment were fed to broiler chickens for 35 days. The

performance parameters and carcass characteristics were measured.

## Sample preparation:

In this study, samples of broiler feed were collected from a commercial feed mill. The feed was ground into powder form and mixed thoroughly. The feed was divided into different groups, with each group receiving a different enzyme treatment.

## In vitro enzyme evaluation:

For each enzyme treatment group, 100 mg of the feed was mixed with a buffer solution and incubated with the specific enzyme. The mixture was then incubated at 40°C for 1 hour. After the incubation period, the enzyme activity was determined using appropriate assays.

## In vivo trial:

For the in vivo trial, a total of 200 broiler chickens were randomly divided into five groups with four replicates of 10 birds each. The birds were fed with the same feed as used in the in vitro trial. The control group was fed the feed without enzyme supplementation, while the other four groups were fed with feed supplemented with different enzymes. The feeding trial lasted for 42 days.

## Data collection and analysis:

At the end of the feeding trial, the birds were slaughtered, and their weights were recorded. The weights of the liver, heart, spleen, and bursa of Fabricius were also recorded. Blood samples were collected for the analysis of serum biochemical parameters. The data collected were analyzed using appropriate statistical methods.

## RESULTS

In the in vitro experiment, the addition of xylanase and phytase to the basal diet significantly increased the digestibility coefficients of dry matter, crude protein, and gross energy. In the in vivo experiment, broiler chickens fed with the xylanase and phytase-supplemented diet showed significantly better performance parameters and carcass characteristics than the other two groups.

## DISCUSSION

The results suggest that in vitro techniques can effectively predict the in vivo response of poultry to enzyme supplementation. The improvement in digestibility coefficients observed in the in vitro experiment was reflected in the better performance parameters and carcass characteristics in the in vivo experiment. In vitro techniques can be used to evaluate the efficacy of enzyme supplementation in different feedstuffs and under different conditions, thus providing valuable insights into the design of cost-effective and nutritionally balanced poultry diets.

## CONCLUSION

In vitro evaluation of enzyme supplementation can be a useful tool in predicting the in vivo response of poultry. The findings of this study demonstrate the potential of in vitro techniques in designing effective and efficient poultry diets. Further research is needed to explore the applicability of in vitro techniques to different feedstuffs and poultry species.

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