AVAILABILITY OF PHOSPHORUS OF RAPESEED MEAL AND RAPESEED MEAL EXPELLER FOR GROWING CHICKENS AND IMPROVEMENT OF PHOSPHORUS AVAILABILITY BY GRADED ENZYME ADDITION.

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ABSTRACT

Semi-synthetic diets for broiler chickens of Avian type in which the main source of phosphorus were either 00 rapeseed meal or expeller were supplemented with phytase enzyme. 160 chickens were used for the experiment during which they were kept in individual cages. Phytase was administered at three levels: 250, 500 and 1000 Phyt. U/kg feed. Balance experiments on chickens were carried out twice: first when chicks were 11-15 days old and second time when they were 26-30 days old. Supplementation of diets with phytase increased phosphorus availability from 37-39% in control groups to 43-54% in experimental groups fed 500-1000 Phyt. U/kg feed.

INTRODUCTION

Meals and expellers obtained during rapeseed

processing belong to the richest sources of phosphorus among plant feeds. Rapeseed meal which is the most common substitute of soybean meal contains 1.17% total P, while expellers contain only 0.65% (NRC 1984).

Unfortunately, 60-73% of P occurs in the form of P phytin which is characterized by low availability for chickens (Jeroch, 1994; Żyła, Koreleski, 1993). Incorporation of phytase enzyme into diets containing such feeds may increase phosphorus availability from these sources. At the same time, it can reduce the demand for inorganic phosphorus introduced into diets in the form of different mineral compounds and cut down its excretion in poultry excreta which, in turn, will contribute significantly to an enivoronmental protection which is seriously threatened by excess phosphorus.

EXPERIMENTAL

Tests with broiler chickens

80 one-day-old chickens (Avian) were used for the experiment. The birds were divided into 8 groups of 10 chicks each and throughout the experiment were kept in individual balance cages. All animals were fed semi-synthetic diets. Birds from the first four groups(1-4) received diets containing rapeseed meal, while those from the remaining four groups(5-8)-rapeseed expeller. Apart from the above mentioned products the diets also contained maize starch, soybean oil, potato protein as well as mineral and vitamin additives. All the diets were isonitrogenous and isoenergetic. The experimental treatments are shown in Table 1.

TABLE 1. The experimental design.

Group	Source of phosphorus	Level of phytase Phyt. U/kg feed
1	Rapeseed meal	0
2	Rapeseed meal	250
3	Rapeseed meal	500
4	Rapeseed meal	1000
5	Rapeseed expeller	0
6	Rapeseed expeller	250
7	Rapeseed expeller	500
8	Rapeseed expeller	1000

Phosphorus balance was performed twice: first between the 11th and 15th day of chicks life and second time between the 26th and 30th. Phosphorus content was determined both in diets and in excreta.

Responses to phytase addition.

Table 2 shows the response of birds to the inclusion of phytase.

TABLE 2. Availability of phosphorus in %.

Group	Level of phytase Phyt. U/kg	First period (11-15 d. of life broiler chicken)	Second period (26-30 d. of life broiler chicken)
1	0	39.4	37.0
2	250	40.2	39.8
3	500	43.8	43.6
4	1000	53.6	43.5
5	0	35.0	31.3
6	250	43.9	33.8
7	500	45.1	40.2
8	1000	53.1	43.9

Supplementation of diets for broiler chickens containing either rapeseed meal or rapeseed expeller with phytase enzyme increased availability of phosphorus from these feeds. The rate of phosphorus availability depended on phytase level and increased with the rise of its level (from 37-39% to 43-53%). Furthermore, the addition of the enzyme to diets was found to have a greater impact on chickens aged 11-15 days than those aged 26-30 days.

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