

Dept. of Animal Medicine,  
Faculty of Vet. Med., Assiut University

## RESPONSE OF FOALS TO PROBIOTIC (PRONIFER) SUPPLEMENTATION (With 2 Tables and 4 Figures)

By

**M.N. ABD-EL-SALAM, M.F. RAGHIB and A. SROUR\***

\*: Veterinary Medical Representative for Pronifer Producer Company

(Received at 29/9/1998)

الاستجابة فى الأمهار لاضافة منشط النمو (البرونى فير)

محمد نجيب عبد السلام ، محمد فاروق راغب  
عبد الناصر سرور

أشتملت الدراسة على عدد عشرون مهر عربى أصيل (سلالة مصريه) تتراوح أعمارها ما بين ٧-٨ شهور سليمه أكلينيكياً وموجوده بمزرعة الزهراء بالقاهرة - جمهورية مصر العربية. استغرقت التجربه مدة شهر. تم إضافة منشط النمو (البرونى فير) إلى العليقه المتوازنه بجرعات متفاوتته بمقدار ٥ جم، ١٠ جم، ٥٠ جم لكل كيلو عليقه متوازنه وذلك لثلاث مجاميع من الأمهار تشمل كل مجموعه خمسة أمهار - وذلك لمعرفة تأثير منشط النمو على الصحة العامه لهذه الأمهار - وكذلك على معدل الاستفاده من الغذاء عند مقارنة ذلك بمجموعة ضابطه تشمل أيضاً خمسة أمهار تتناول فقط عليقه متوازنه. أوضحت الدراسة زياده معنويه فى الوزن الحى ومعدل الاستفاده من الغذاء فى الأمهار التى تناولت منشط النمو بمقدار ١٠ جم/ كيلو جرام من العليقه المتوازنه وذلك عند مقارنتها بمثيلتها فى المجموعه الضابطه. كما أظهرت علامات الصحة واضحه على المجموعه التى تناولت منشط النمو بمقدار ١٠ جم/ كيلو جرام عليقه متوازنه وذلك فى صورة أزيداد الشهيه والنشاط الجيد وسلامة صحة الجلد الذى تميز بشده لمعانه ولم تظهر تغيرات جوهرية فى درجات حرارة الجسم ومعدلات النبض والتنفس وكانت عمليات التبول والتبرز طبيعیه.

### SUMMARY

A total number of 20 clinically healthy pure Arabian Egyptian breed foals aging 7-8 months old from El Zahraa farm, Cairo, Egypt constitute the material of this investigation. Different doses of the feed additive pronifer were given to three groups of the experimental animals (5, 10 and 15 g/kg balanced ration respectively) to study the effect of this probiotic on

feed utilization and health performance when compared with control group given only balanced ration. There was significant ( $P < 0.01$ ) increase in the weight gain and improvement in the feed conversion in foals given pronifer at a dose of 10 g/kg ration when compared with control ones. Insignificant ( $P > 0.05$ ) changes were found in rectal temperature, pulse and respiratory rates among all animals whether experimental or control ones. Signs of healthy condition were clearly seen in animals supplemented with pronifer in the form of lustrous and shining coat with normal defecation and urination, good appetite in addition to good activity when compared with control ones.

*Key words: Foals-Probiotics-Pronifer*

## INTRODUCTION

The term probiotic was first introduced by Lilly and Stillwell (1965) to describe growth promoting factors produced by micro-organisms. Parker (1974) used the term probiotic for micro-organisms or substances which contribute to intestinal microbial balance. Later on, Grawford (1979) defined probiotic as a culture of specific living micro-organisms (primarily lactobacillus species). Nahashon *et al.*, (1992) pointed out that the composition of probiotic is a mono or mixed culture of living micro-organisms applied to the animal or man which beneficially affect the host by improving the properties of indigenous microflora.

Pronifer is one of these probiotics which composed mainly of lactobacillus bacterial cocktail acts through improving the balance of intestinal microflora with consequent improvement of animal health performance (Games, 1987 and Sisson, 1988).

While most of the work on probiotics has been done on ruminant animals, and poultry, yet uptill now no available investigations are carried out on equines. In addition, equine industry nowadays became a powerful economic force whether in well or underdeveloped countries (Hintz *et al.*, 1979). Besides, the horse as a nonruminant animal, the bacterial population in the digestive system can not be relied upon to provide substantial amounts of essential nutrients as amino acids and water soluble vitamins. In this respect the routine clinical examination of the animals including internal body temperature, pulse and respiration are of great clinical importance (Radostits, 1994).

The aim of the present study is to throw a light on the performance and health response of foals to pronifer supplementation by recording the clinical features and measuring the feed utilization.

## **MATERIALS and METHODS**

### **Animals:**

A total number of 20 pure Arabian Egyptian breed clinically healthy foals 7-8 months old from Elzahraa farm, Cairo, Egypt constitute the materials of this investigation. The experiment extended for one month (25 January till 26 February 1996). Animals were classified into four groups each five animals. Group 1 was fed balanced ration and kept as control group. Groups 2,3 and 4 were experimental groups supplemented by 5, 10 and 15 grams pronifer per kg ration respectively. The balanced ration was constituted by weight of 3 kg bran, 4kg ground corn, 2kg linseed meal and 3 kg hay. The experimental foals were kept in individual outdoors pens (2.5-7.2 m<sup>2</sup>) throughout the experiment. Fresh water and mineral salts (salt bricks) were available freely

### **Adopted methods:**

#### **Clinical examination:**

This was carried out according to Kelly (1984) for general inspection of visible mucous membranes (color, secretion and lesion), skin (elasticity of the skin and characters of the hair), and measuring of rectal temperature, pulse and respiratory rates. Clinical examination of all animals was carried out daily during the experiment.

#### **Faecal examination:**

Microscopic examination of faecal samples collected from all animals in the experiment was done according to Coles (1989) just before starting the experiment to ensure the healthy condition of the foals and to exclude any factors which may interfere with body gain.

#### **Urine examination:**

Rapid examination of urine samples of all animals in the experiment was done using Reagent Strip (Combi-9, Boehringer Mannheim, Germany) to indicate the healthy condition of the foals before beginning of the experiment.

### **Determination of feed utilization:**

This was carried out by measuring the live body weight in all groups before and after 15 and 30 days from supplementation of pronifer. Feed intake by each animal was recorded daily and feed conversion index (FCI) was calculated after McDonald *et. al.*, (1979) as follow:

$$\text{Feed conversion index (FCI)} = \frac{\text{Feed intake (gm)}}{\text{Weight gain (gm)}}$$

### **Statistical analysis:**

Test of significance ( $P < 0.05$  and  $P < 0.01$ ) between averages and the correlation coefficient between parameters were calculated using Microstat Software Computer Program after Spsswin (1995).

## **RESULTS**

### **Clinical examination:**

The animals were examined clinically and the daily recorded observations declared that those animals supplemented with pronifer specially group 3 (supplemented by 10 gm/kg balanced ration) showed good appetite, good activity, rosy red mucous membranes and elastic skin with shiny lustrous hairs, which arranged in one direction. There was good defecation which declared with faecal matter without undigested food particles. There was also normal urination without any significant changes in other parameters namely body temperature, pulse and respiratory rates (Table 2).

### **Feed utilization**

Live body weight (kg), gain in body weight (g), feed intake (g) and feed conversion are showed in table 1. As it is shown from the table, animals of group 3 fed diet supplemented with 10 g/kg ration recorded the highest values of performance along the whole experiment, where daily gain and live body weight were significantly ( $P < 0.01$  and  $P < 0.01$ ) increased ( $1261 \pm 0.17$  g and  $350.1 \pm 1.09$  kg respectively) at 15 and 30 days of the experiment and finally feed intake was relatively increased ( $3814 \pm 1.96$ ) at 15 days and it was highly increased ( $P < 0.01$ ) ( $4492 \pm 2.31$  g) at 30 days of the experiment. Insignificant ( $P > 0.05$ ) variations were recorded with the other two levels of pronifer supplementation (5 and 15 g/ kg ration).

## DISCUSSION

Healthy animals are generally characterized by having well functioning intestinal tract. This is a fundamental for the efficient conversion of feed, for maintenance and for growth production. The most important characteristics of a well functioning intestinal tract is the balance of its bacterial population. Lactic acid bacteria present in the alimentary tract and in some situations are the predominant organisms (Fuller, 1989). This equilibrium within the intestinal tract is upset when the animal is subjected to stressful conditions. Consequently, continuous feeding of probiotics to animals has been found to maintain the beneficial intestinal microflora in two ways, by competitive exclusion and by antagonistic activity towards pathogenic bacteria.

The supplemented pronifer in the present investigation as a probiotic is composed mainly of lactobacillus bacterial cocktail that improved the balance of intestinal microflora, with consequent improvement in the process of digestion reaching the efficient digestion and feed utilization. This could be reflected on the animals in the form of good appearance, good activity and an increase in live body weight, which reflected a good performance especially animals of group 3 fed 10 gm/kg ration. In this respect Nahashon *et al.* (1992) and Jin *et al.* (1997) reported that, the use of probiotic eventually increases feed intake and digestion by stimulating appetite and increasing fat, nitrogen, calcium, phosphorus, copper and manganese retention.

As it was recorded by Sisson (1988), the supplemented pronifer gives a daily protection against any pathogens that may get entrance to the animal gut, which eventually facilitate and improve the process of digestion and absorption of the essential nutrient giving rise to the best feed utilization by the animal. Furthermore the authors pointed out that pronifer improve animal health performance by preventing diarrhea and increasing animal growth rate. In addition lactobacillus bacteria present in the pronifer suppress ammonia production in the intestine (Chateau *et al.*, 1993) enhancing growth and improving animal health.

From the obtained results it is clearly seen that pronifer supplementation at a level of 10 gm/kg ration was the most convenient for the foals at 4 - 8 months age and under the circumstances mentioned in the farm. This is clearly found from the clinical examinations where the performance and growth rate of the foals were better in foals supplemented with pronifer especially group 3 (10 g pronifer per each kg

balanced ration) which again emphasized the beneficial effect of supplementation of this probiotic.

Finally it could be concluded from the present investigation that the use of probiotic pronifer leads to improvement of health performance and feed utilization especially when this probiotic was supplemented as 10g/kg balanced ration for Arab breed foals.

## REFERENCES

- Chateau, N. Castellanos, I. and Deschamps, A.M. (1993):* Distribution of pathogen inhibition in the bacillus isolates of a commercial probiotic consortium. *J. of Applied Bact.* 74: 36- 40.
- Coles, E.H. (1989):* "Veterinary Clinical Pathology." 5<sup>th</sup> Ed. Saunders Comp. Philadelphia, London, Toronto.
- Fuller, R. (1989):* Probiotics in man and animals. *J. of Applied Bact.* 66: 636 - 642.
- Games, R.G. (1987):* Animal nutrition and feeding. 1<sup>st</sup> Ed., Text Book Demar Publisher INC USA.
- Growford, L.M. (1979):* Probiotics and feed additive. Aspect and Action On Intestinal Microflora. Cited by Jin *et al.* (1997).
- Hintz, H.F.; Hintz, R.L. and Van Vleek, L.D. (1979):* Growth rate of through bred. Effect of age of dam, Year and month of birth and sex of foal. *J. Anim. Sci.* 48: 480.
- Jin, L.Z. ; Ho, Y.W. ; Abdullah, N. and Jalaudin, S. (1997):* Probiotic in Poultry, modes of action, *World's Poultry Sci. J.*, 53: N4, 352.
- Kelly, W.R. (1984):* Veterinary Clinical diagnosis. Textbook 3<sup>rd</sup> Ed. Bailliere, Tendal London.
- Lilly, D.M. and Stillwel, R.H. (1965):* Probiotics, growth promoting factors produced by microorganisms. *Sci.* 147:747-748.
- McDonald, P.; Edward, R.A. and Greenhalgh, J. (1979):* Animal Nutrition Textbook 3<sup>rd</sup> Ed. Longman, INC, New York.
- Nahashon, S.N.; Nakaue, H.S. and Mirosh, L.W. (1992):* Effect of direct fed microbials on nutrient retention and production parameters of laying pullets. *Poultry Science*, 71, 1, 111-116.
- Parker, R.B. (1974):* Probiotic, the other half of antibiotic story. *Animal Nutrition and Health*, 29, 4 - 8.

- Radostits, O.M., Blood, D.C., Gay C.C. (1994): Vet. Medicine. A text book of the diseases of cattle, sheep, pigs, goats and horses. 8th Ed. Bailliere Tindall London Philadelphia Sydney Tokyo Toronto.*
- Sisson, J.W. (1988): Potential of probiotic organisms to prevent diarrhea and promote digestion in farm animals. J. Food and Agric. Scie., 49, 1-13.*
- Spsswin (1995): Computer software statistical analysis program. Under Window Co., USA, 1995.*

**Table 1:** Live body weight and feed utilization of clinically healthy foals fed ration with and without pronifer

Items	Groups	Nu.of animals	Before giving pronifer	Mean data	
				After 15 days	after 30 days
Live body weight (Kg)	1	5	310.6 ± 1.08	325.3 ± 1.03	341.1 ± 1.30
	2	5	311.8 ± 1.99	326.1 ± 1.13	342.1 ± 1.49
	3	5	311.6 ± 1.07	331.9 ± 1.09**	350.1 ± 1.09**
	4	5	312.1 ± 1.17	327.1 ± 1.13	343.4 ± 1.32
Gain in body weight (g)	1	5	-	1014 ± 0.11	1061 ± 0.16
	2	5	-	1018 ± 0.01	1088 ± 0.08
	3	5	-	1081 ± 0.06**	1261 ± 0.17**
	4	5	-	1001 ± 0.03	1084 ± 0.23
Daily feed intake per animal (g)	1	5	3780 ± 1.00	3981 ± 2.10	4462 ± 2.01
	2	5	3708 ± 1.03	3901 ± 2.03	4401 ± 1.96
	3	5	3692 ± 1.11	3814 ± 1.96	4492 ± 2.31**
	4	5	3804 ± 1.06	3910 ± 1.89	4411 ± 1.70
Feed conversion index	1	5	-	3.93 ± 0.11	3.30 ± 0.13
	2	5	-	3.83 ± 0.06	4.05 ± 0.10
	3	5	-	3.98 ± 0.10	3.60 ± 0.09**
	4	5	-	3.90 ± 0.09	4.08 ± 0.10

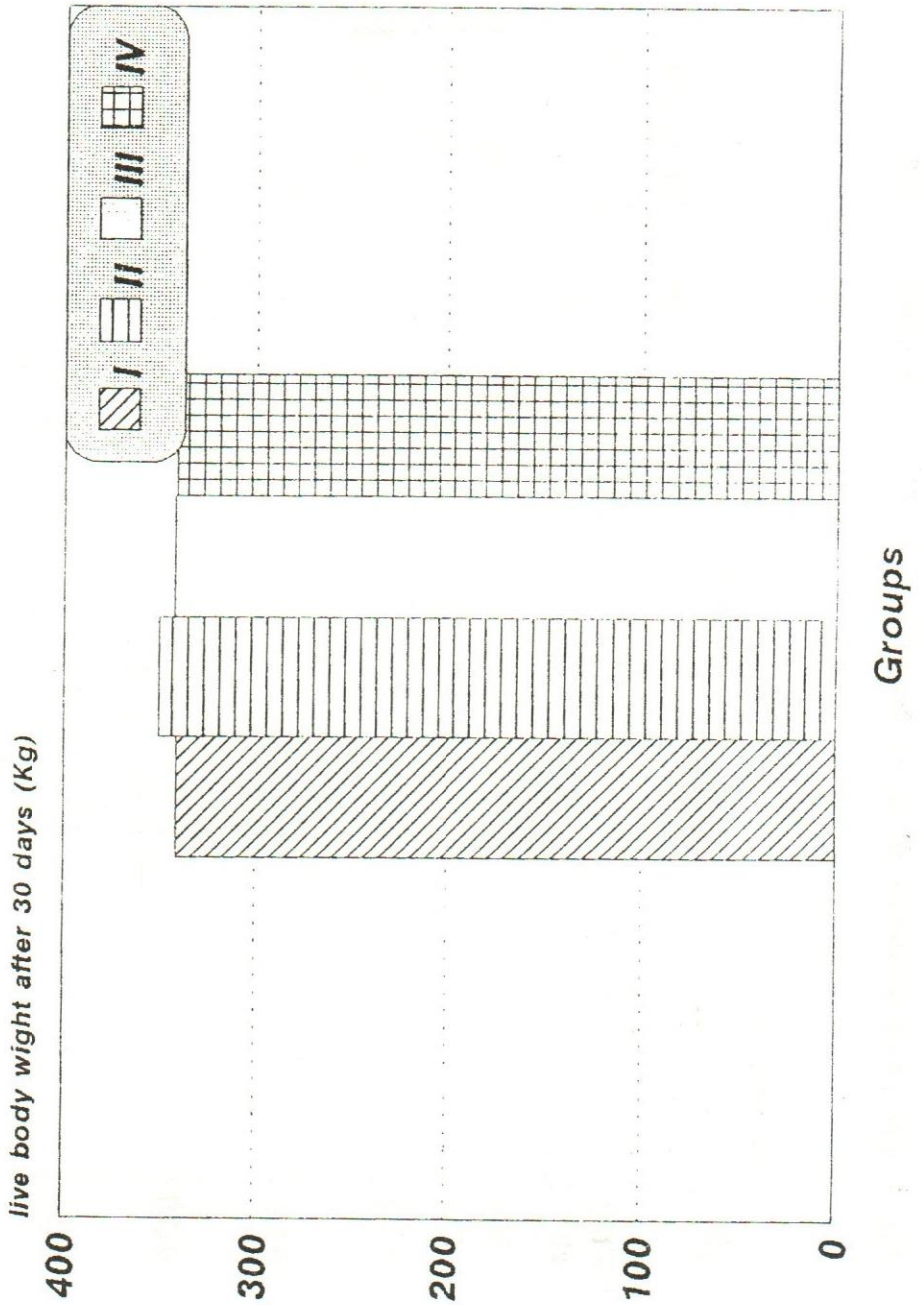
\*\* = Highly significant P < 0.01

**Table 2:** Body temperature, pulse and respiratory rates of clinically healthy foals fed balanced ration with and without pronifer

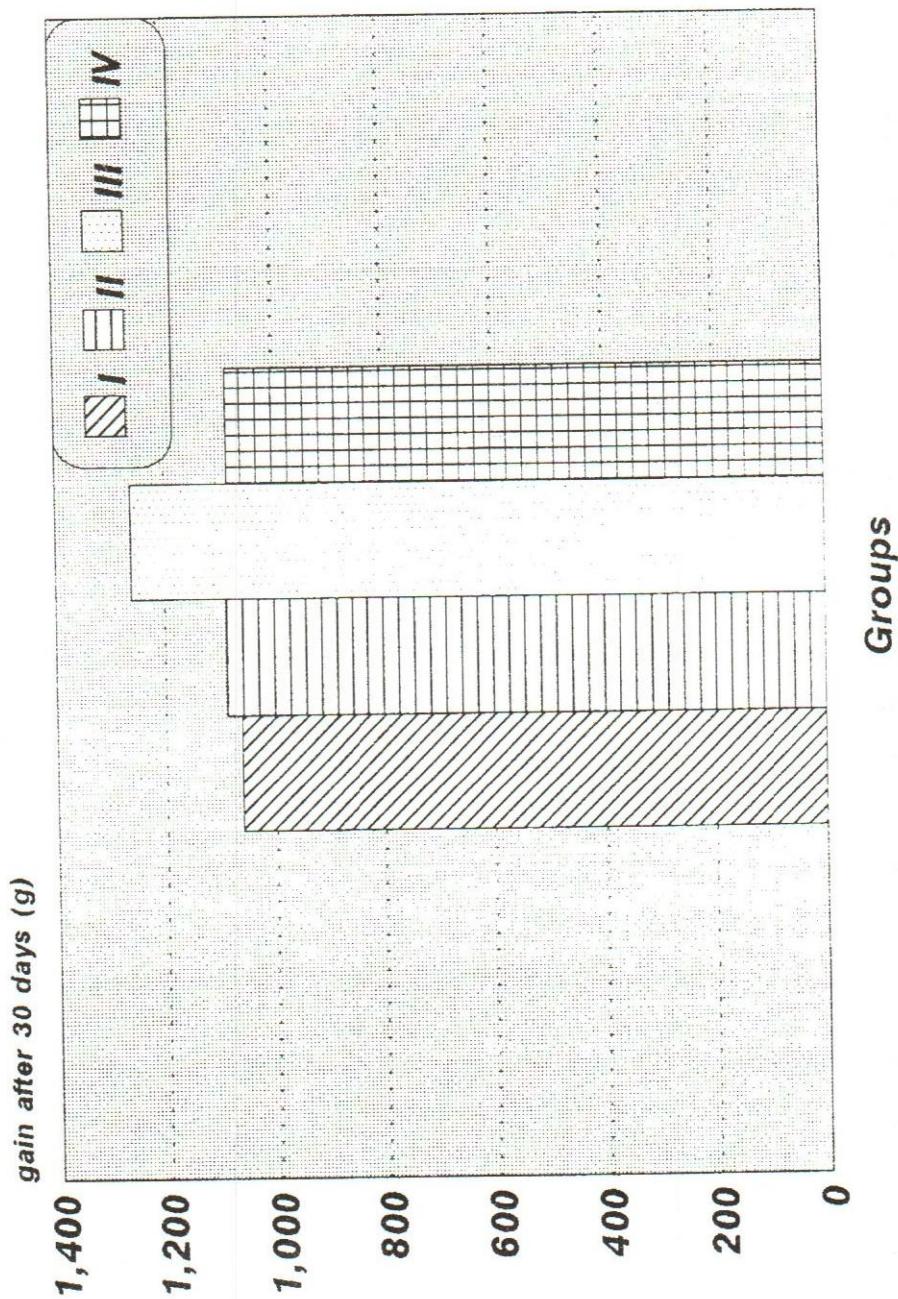
Items	Groups	Nu. of animals	Mean data		
			Before giving pronifer	After 15 days	after 30 days
Internal body temperature (°C)	1	5	38.1 ± 1.01	38.1 ± 1.31	38.1 ± 1.02
	2	5	38.3 ± 0.99	38.2 ± 1.02	38.2 ± 1.60
	3	5	38.2 ± 1.02	38.2 ± 0.93	38.0 ± 1.39
	4	5	38.1 ± 0.89	38.0 ± 1.03	38.1 ± 1.01
Pulse rate / min.	1	5	71.9 ± 2.01	73.8 ± 2.13	70.8 ± 2.13
	2	5	72.9 ± 2.11	71.6 ± 2.06	70.3 ± 2.02
	3	5	70.0 ± 2.60	72.6 ± 2.01	68.4 ± 2.13
	4	5	70.1 ± 2.13	71.9 ± 1.98	70.0 ± 3.10
Respiratory rate / min.	1	5	15.8 ± 1.01	14.6 ± 1.03	14.6 ± 1.02
	2	5	14.0 ± 0.88	15.6 ± 0.95	16.7 ± 1.03
	3	5	15.1 ± 0.78	16.2 ± 0.89	15.1 ± 0.76
	4	5	14.9 ± 0.91	15.8 ± 0.92	16.8 ± 0.89



**Fig.1: Effect of pronifer supplementation on live body weight after 30 days.**



**Fig.2: Effect of pronifer supplementation on body gain after 30 days. x**



**Fig.3: Effect of pronifer supplementation on feed intake after 30 days.**

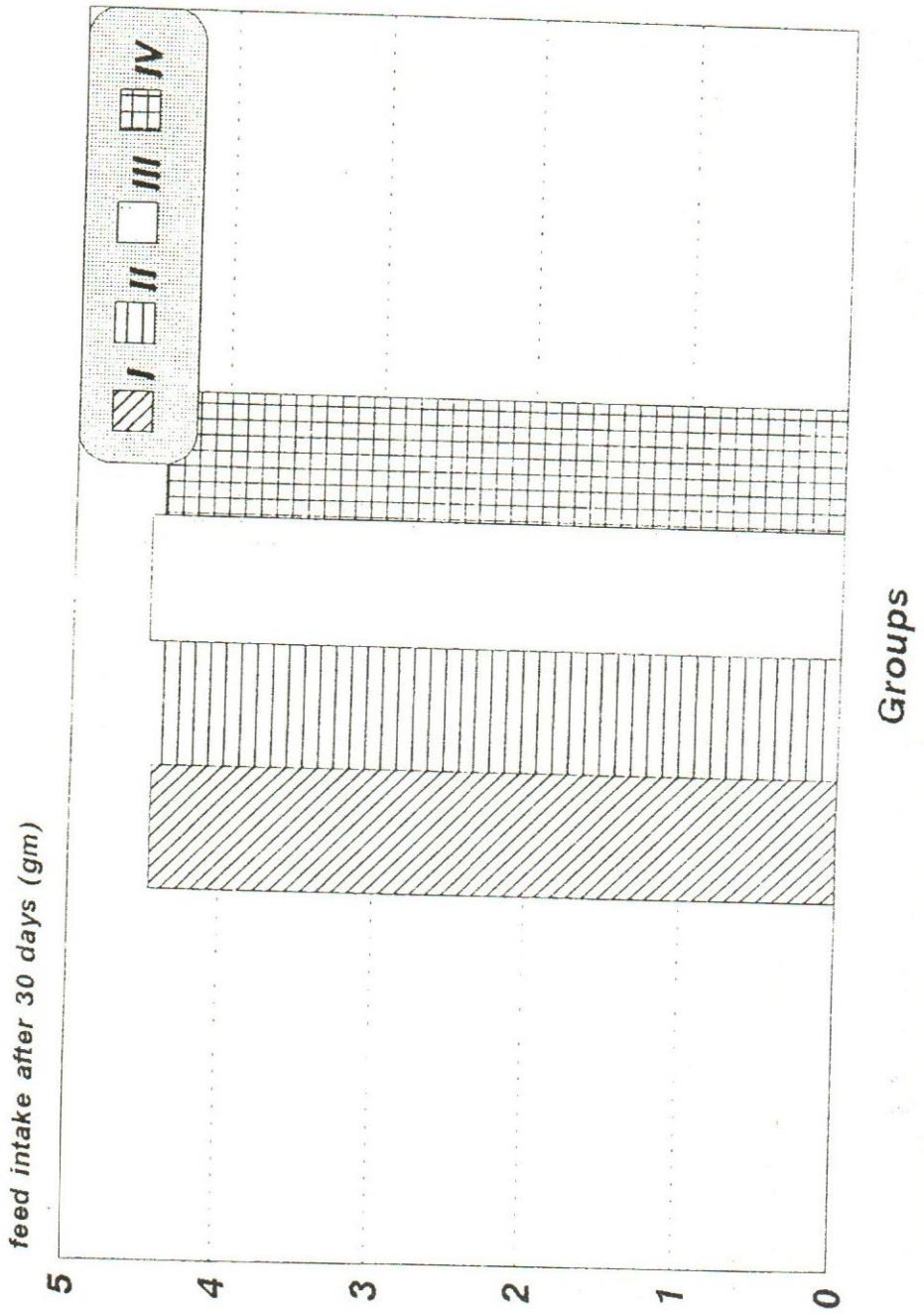


Fig.4: Effect of pronifer supplementation on feed conversion index after 30 days.

