THE EFFECT OF DIFFERENT LEVELS OF SINGLE CELL PROTEIN AND UREA IN THE RATION ON THE PERFORMANCE AND CARCASS TRAIT OF CALVES

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INTRODUCTION

The use of unconventional protein supplements such as SCP and non protein nitrogen like urea for ruminant animals would supply a cheaper sources than conventional sources. Ruminant animals are able to convert protein and non protein nitrogen into microbial protein, and digest them successfully. The world protein supply is short. The shortage of world protein will increase from a current 10 million tons to about 22 million tons by the year 2000(Malick et al 1976; Alwash and Ishak 1988). The use of SCP and urea as a source of nitrogen for ruminant animals is the most promissing solution for the world shortage. Using SCP and urea instead of conventional protein in animal feed will release a vast amount of grains and legumes now fed to animals for direct human use. Urea is considered as a useful source of nitrogen for ruminant animals.

Urea is most effective when given as a supplement to rations of low protein content. The rations should also contain a source of readily available energy so that microbial protein synthesis is enhanced and westage reduced.
From considerations of price, convenience and palatibility urea has been the most widely used and investigated non protein nitrogen compound in farm animal feed.

The objective of this experiment was to study the effect of different levels of SCP and urea in the ration on the performance and carcass trait of calves.

MATERIAL AND METHODS

Nine friesian calves (12-18 months old, average weight 387 Kg)were divided into three groups, each group contained three animal. The animals were held into individual pens in an expermental animal house at Ameria,College of Agriculture, University of Baghdad.The animals were fattened on individual basis for 86 days.The fattening rations consisted of concentrate mixture and roughage. The concentrate was adjusted during the fattening period at about 2.5% of average live body weight, while green alfalfa was offered ad libitum. Feed refusals were recorded every morning. The components of concentrate mixture are shown in table 1.

Table 1:Components of the concentrate mixture (%).

Item	Ration 1	R.2	R.3
Barley	50	50	50
Wheat bran	20	20	20
Mollass	8	8	8
Corn extract	10	14	18
Ethanol yeast	10	5	0
Urea	0	1	2
Limestone	1	1	1
Common salt	1	1	1

Feed samples were analysed using the method of AOAC (1976). The chemical composition of the experimental rations are shown in table 2.

Table 2: Chemical composition of experimental rations (% on dry matter basis)

Item	Crude protein	Ether extract	Crude fiber
Ration 1	15	2	8
Ration 2	15	2	9
Ration 3	16	2	9
Barley	11	1	7
Wheat bran	15	4	11
Molass	2	0	0
Corn extract	7	5	16
Ethanol yeast	53	7	1
Alfalfa	11	2	28

At the end of the fattening trial (86 days) all animals in each group were slaughtered. The animals were fasted for 24 hrs prior to slaughter. Slaughter weight, empty body weight and the weight of different organs and offals were recorded after slaughtering and dressing. Empty body weight was obtained by subtracting the weight of digestive tract contents from the live body weight according to the method of Everitt and Jury (1966).
The carcasses were placed in a cold room for 24 hrs at 5 C and subsequently dissected into whole sale cuts using the method of Kempester and Jones (1977). Carcass measurements were made according to the method of Orts (1962). Longissimus dorsi muscle area and fat thickness were measured in cross section between the 12th and 13th ribs (Henderson et al 1966). The physical component of the 9-10-11 rib cut was also determined.

The data were analysed using least square analysis of variance procedures (Harvey, 1968).

RESULTS AND DISCUSSION

Animal performance in term of dry matter intake, finishing weight, total gain and daily gain were not significantly affected by the dietary levels of SCP and urea (table 3).

Table 3: Feed intake, daily gain and efficiency of feed conversion for calves in different groups.

Item	Group 1	G.2	G.3
Initial wt, Kg	388	387	386
Final wt. Kg	475	495	485
Total gain, Kg	86	108	98
D.M intake Kg/day			
Concentrate	9	8	8
Alfalfa	2	2	1
Total	11	10	10
DM intake, Kg/Kg gain	11	8	9
DM intake, Kg/100 Kg body wt.	2.5	2.5	2.5

Daily gain was higher in animals fed urea and SCP or urea alone in their diets (groups 2 and 3) than animals fed SCP alone in their diet (group 1), but differences were not significant (table 3). Efficiency of feed conversion was significantly better (p 0.05) in animals fed SCP and urea as a source of nitrogen in their diets (group 2) than animals fed SCP alone in their diets (group 1). Efficiency of feed conversion in group 3 was also better than in group 1 but differences were not significant, this may be due to the high content of crude protein and soluable carbohydrate in rations 2 and 3 (table 1). Alwash et al (1989) reported higher daily gain and better efficiency of feed conversion in calves fed SCP and urea than those animals fed SCP alone as a source of protein in their rations but differences were not significant.

Hot and chilled carcass weight, dressing percentage and the percentage of whole sale cuts were not affected by treatments except that for the fore rib and rump cuts (table 4).

Table4:Carcass traits of calves fattened on experimental rations

Item	Group 1	G.2	G.3
Slaughter wt.Kg	475	495	485
Empty body wt.Kg	452	446	453
Hot carcass wt	260	273	253
Chilled carcass wt.Kg	256	268	250
Dressing %			
of live body wt.	53	54	51
of empty body wt.	56	60	55

Similar results were obtained by Alwash (1985); Alwash and Al-Dafaee (1985) and Alwash and Al-Mashhadany (1985)when Friesian calves were fattened by rations contained different levels or sources of SCP. Similar results were also obseved for carcass weight, dressing percetage and whole sale cuts of Friesian calves fed different sources of protein supplements in their rations(Alwash 1988).

Physical composition of the 9-10-11 rib cut, rib eye area, fat thickness and the weight of different organs and offals were not affected significantly by the dietary level of SCP and urea (tables 5 and 6).

Table 5:Physical composition of the 9-10-11 rib cut,rib eye muscle area and fat thickness over L.dorsi muscle.

Item	G.1	G.2	G.3
Lean%	56	58	57
Fat%	20	21	18
Bone%	23	20	23
Rib eye area Cm^2	84	87	91
Fat thickness mm	5	4	4

Table 6: Weight of certain boy parts,organs and offals as a percentage of empty body weight.

Item	Group 1	G.2	G.3
Head	4	5	5
Feets	2	2	2
Spleen	0.2	0.2	0.2
Liver	1	1	1
Lung	1	1	1
Skin	7	7	7
Testes	0.1	0.1	0.1
Kidneys	0.2	0.2	0.2
Heart	0.4	0.4	0.4
Digestive tract	5	5	5

Similar results were reported by Alwash and Ishak (1988) for calves fed different levels of torula yeat,this could be due to the fact that all animals were slaughtered almost at the same live body weight.

Carcass measurements were similar in all groups except that of the chuck width (table 7).

Table 7: Carcass measurement for calves in different groups. (cm).

Item	G.1	G.2	G.3
Body length	129	131	130
Thorasic cavity depth	38	37	37
6th lumber vertebra Length	35	35	36
Round width	110	112	106
Chuck width	152	158	150

The chuck width was higher in group 2 than in other groups. In general animals fed SCP and urea as a source of nitrogen grew better than animals fed SCP alone or urea alone in the ration.

It is concluded from this study that urea could replace SCP in the ration of fattening calves at the levels used in this experiment.

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