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Annals of Biological Research, 2012, 3 (5):2104-2107  
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## Determination rate of safflower whole seeds organic matter degradability in sheep

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### ABSTRACT

The objective of this project was to determination of Safflower whole seed Organic matter (OM) degradability by nylon bags technique .Three male sheep's of Iranian Ghezel rams were used to incubating Bags . Diets containing alfalfa (60%), concentrates (40 %) and safflower whole seeds were fed twice daily during four weeks periods . Seeds were coarsely crashed and incubated for 0, 2, 4, 8, 16, 24 and 48 hours in small Dacron bags . The dates obtained from Degradability parameters of OM for water soluble fraction (a), slowly degradability fraction (b), potential degradability (a+b) and constant rate (c) were 8.3, 39.6, 0.216, 47.83 respectively. Effective degradability (r) 0.02 for OM was calculated . According to results, Safflower whole seed could use as a good source of dietary nutrient in ruminant.

**Keywords:** Safflower, *In situ*, Iranian Gezel Rams, Dietary nutrient.

### INTRODUCTION

The nylon bags technique has been used for many years to provide estimates of the rate and extent of disappearance of feed constituents from the rumen [1, 5, 8, and 9]. Under certain dietary and production Conditions, ruminant diets must be supplemented with forms of rumen non-degraded dietary protein (by pass protein) to increase the efficiency of nutrient utilization and hence production [1 and 7]. Thus there is a need for a technique to quantities the potential degradability in the rumen of commercially available supplements. Although accuracy of the technique is influenced by certain factors, it provides a relatively simple means of grading supplements in terms of potential degradability. The technique involves suspending 4-6 nylon bags each containing a known weight (5g) of sample, on nylon string in the rumen of sheep or cattle fitted with appropriate rumen cannula. Bags are removed from the rumen at known intervals over the following 24 to 72h, depending on the nature of the sample, and then washed under tap water. Bags are oven dried (55°C for 48h) and degradability is normally assessed from disappearance of organic matter (OM) from the bag with time Comparison of results from different experiments is complicated to some extent by differences in bag size, porosity of bag material, preparation of test sample and time of incubation in the rumen. The major source of variation however is associated with the composition of the basal diet and level at which it is fed to the animals. Pore size of the material used for the manufacture of nylon bags apparently has no significant effect on OM disappearance from bags during 72h incubation. Furthermore, there was no detectable effect of particle size of the test material (dried lucerne) on OM disappearance [1 and 9].

In studies in this laboratory, the rate of degradation of lucerne chaff when either chopped (0.5-1cm length) or ground (40 mm sieve) was not significantly different (13h half time for OM disappearance for both samples), with grains however, cracking the glumes increases degradability and with protein meals, degradability increases with reduction in particle size [1 and 9].

The standard procedure is to wash the bag under tap water until the water is clear, which takes approximately 5 minutes per sample, although the method and time of washing apparently has no appreciable influence on coefficient of variation of DM disappearance [1 and 5].

Objective this study was to estimate of the Safflower whole seeds of organic matter degradability rate on the Iranian Gezel rams.

## MATERIALS AND METHODS

### *Animal and diet*

90 male Fifty five kilogram ruminally canulated Gezel rams were used to determine *In situ* degradation characteristics. Rams were housed in individual tie stalls bedded with sawdust. Rams fed ground alfalfa hay containing 14 % CP and 45 %NDF were used for incubation of samples in Dacron bags in this study. In this producers were the same as those described previously, Dacron bags (8×16 cm, 250 mm pore size) were filled with samples of dried ground forage. Suspension of bags in the rumen was accomplished by tying of bags, into tygon tubing with nylon string. Sample in Dacron bags wear placed in the rumen of rams and incubated for the periods of 0, 2, 4, 8, 16, 24, 48 h, after the removal of bags from the rumen, bags were washed in cold water until rinse were clear and dried at 55°C for 48h remaining residues were analyzed for Organic matter [1].

OM was dividing into three fractions as follows :

- 1) The soluble OM (fraction a), OM during the washing process.
- 2) The potentially digestible OM, (fraction b) determined as the different between initial OM, after washing and the amount of OM recovered after 48h incubation.
- 3) The indigestible (fraction c) determined as the amount of OM residue recovered after 48h incubation. Rumen degradation kinetics for OM, were calculated using the non-liner model proposed by Ørskov [10].

$$P = a + b(1 - e^{-ct})$$

Where :

P : percentage of degradability for response variables at t

T : time relative to incubation (h)

a : highly soluble and readily degradable fraction

b : insoluble and slowly degradable fraction

c : constant rate for degradation

e : 2.7182 (natural logarithm base)

### *Chemical analysis*

Organic matter (OM) was determined by drying the samples at 105 °C overnight and ash by igniting the samples in muffle furnace at 525 °C for 8h and Nitrogen (N) content was measured by the Kjeldahl method AOAC, [1 and 9]. Crude protein (CP) was calculated as  $N \times 6.25$  Van Soest et al, [1 and 9].

### *Statistical Analyses*

All of the data were analyzed by using software of Excell and Neway [1].

## RESULT AND DISCUSSION

Organic matter of the whole seed safflower is presented in table1 [1].

**TABLE 1. Chemical composition of the whole seed Safflower on Organic matter basis (%)**

Organic matter (OM)	97.87
Ash	2.13

**Organic matter Degradability**

The organic matter degradability of the whole seed Safflower in different hours of ruminal incubation is presented in table 2 [1]. The OM degradability of the whole seed Safflower was in time 0, 8.55 % and with increasing time, at 8, 16 and 24 hours were; 41.81, 42.83 and 43.94 percentage, respectively. Also, in 48 hour was 50.30%, that due to increasing bacteria colonization in times 2-8, as then this time, reduced available substrate for bacteria, and finally reduced development rate of bacteria in Sacco.

Amount a, b and c organic matter of Safflower seed were; 8.3, 39.6 % and 0.216 parts in hour respectively in table 3. In table 4, organic matter degradability percentage of the Safflower for different rate of rumen showed that increasing material rate of rumen, reduced dry matter degradability percentage. The effective OM degradability of the whole seed Safflower was 43.4 percentages. The degradability rate of Safflower was lower than sunflower meal; because of high soluble material of sunflower meal about 66 % of the dry matter was degraded in 24h.

OM degradability curve of nylon bags, were sigmoid (S form), and involve stage three. One stage contain microbes connection and colonization on feed particle, two stage show, enzyme digestion that increasing curve and in three stages, curve is liner that show finished substrate for microbes [1 and 4].

**TABLE 2: Percentage composition of experimental diets in four periods**

Degradability (%)	Time (hours)
8.55	0
18.82	2
29.99	4
41.81	8
42.83	16
43.94	24
50.30	48

**TABLE 3: parameters Organic matter degradability of the whole seed Safflower**

Safflower seed	Degradability fractions				UD
	A	b	a+b	c	
	7.8	39.1	46.90	0.204	52.17

*a* :highly soluble and readily degradable fraction(%)

*b* :insoluble and slowly degradable fraction (%)

*a+b* :degradability potential (%)

*c* :constant rate for degradation(part in hour)

*UD* :organic matter undegradability (%)

**TABLE 4 : percentage Organic matter degradability of the whole Safflower seed for different rate (r)**

Safflower seed	Rate (part in hour)		
	r=0.02	r=0.05	r=0.08
	43.4	39.2	35.9

**Acknowledgment**

I was appreciating my parents because they are helping me always.

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