



The Determination of Metabolizable Protein of Grap pomace and Raising Vitis leaves



Moghaddam. M¹, A. Taghizadeh², & A. Ahmadi³

^{1&3}Dep. of Animal Science, Faculty of Agriculture, Azad University of Maragheh, Maragheh, Iran

Azad University of Maragheh

²Dep. of Animal Science, Faculty of Agriculture, University of Tabriz, Tabriz, Iran

Introduction

- There is little information available on the nutritive value of grape pomace and raising vitis leaves. Although grape pomace and raising vitis leaves contain tannin and phenol but this feedstuff have high Metabolizable protein.
- The potential use of these wastes in ruminant rations will participate in reducing the shortage of feedstuffs and subsequently increase milk and meat production.
- The aim of this study was to determination of MP, ERDP and ED of dried GP and RVL using in sacco degradation trial.

Material and methods

- The chemical composition of dried GP and RVL was determined using the methods recommended by AOAC (1999).
- Total phenolics (TP) were measured using the Folin Ciocalteu method (Makkar, 2000).
- Rumen degradation characteristics of feeds (Ørskov et al, 1980) were calculated after the incubation of 5 g sample of GP or RVL (ground at 2 mm) in nylon bags.
- The bag size was 12 cm × 6 cm with a pore size of 50 μm. Bags were incubated in the rumen of 3 cannulated sheep for 0, 2, 4, 6, 8, 12, 16, 24, 36, 48, 72, and 96 h.
- The percentage of degradability (Y) of DM and N at time (t) was obtained from an exponential curve of the type: $Y = a + b(1 - e^{-ct})$, which was fitted to the experimental data by iterative regression analysis (Ørskov and McDonald, 1979).
- The effective degradability content calculated using equation ED (g/kg DM) = $a + bc/(c + k)$, where k refers to the fractional outflow rate of small particles from the rumen.

Results

- The chemical composition of dried GP and RVL are presented in Table 1.
- The parameters estimated from the metabolizable protein of dried GP and RVL are shown in Table 2.
- The CP digestibility of treatments decreased with increasing GP and RVL in diets. It may be because of tannin effects on feeds protein and rumen microorganisms. Tannins bind to protein and decrease accessibility of proteins to rumen microorganisms.
- The GP had high MP compared to RVL. The amount of total tannin and total phenol in RVL (3.54 and 4.59%) that was more than GP (1.98 and 2.71%) resulted low MP in RVL compared to GP. Protein-binding proteins with tannins and availability for rumen microorganisms to reduce.
- RVL due to higher levels of ADF protein degradation much less than that of GP. CP digestibility in treatments with dried grape pomace in the diet decreases may be this is due to the effects of tannin on protein feed and rumen microorganisms.
- Grape pomace and raising vitis leaves contain tannin and phenol but this feedstuff have high metabolizable protein.
- These results showed that GP and RVL can be used in ruminant nutrition.
- **Acknowledgement** This study was carried out at Azad University of Maragheh, Maragheh, Iran.

Table 1 The chemical composition of dried grape pomace and raising vitis leaves (g/kg DM)

| Feed | DM | CP | NDF | ADF | ADIN | OM | CF | HC | Total phenols | Total tannins |
|------|--------------------|--------------------|--------------------|--------------------|-------------------|--------------------|-------------------|-------------------|--------------------|--------------------|
| GP | 96.73 ^a | 16.59 ^a | 22.2 ^b | 20.38 ^a | 0.08 ^a | 86.75 ^a | 7.13 ^a | 1.82 ^b | 2.715 ^b | 1.98 ^b |
| RVL | 96 ^b | 14.34 ^b | 32.02 ^a | 24.33 ^b | 0.14 ^b | 85.45 ^a | 6.23 ^b | 7.69 ^a | 4.599 ^a | 3.548 ^a |
| SEM | 0.0965 | 0.3010 | 0.3162 | 0.398 | 0.00198 | 0.6467 | 0.1458 | 0.9128 | 0.23 | 0.2074 |

^{a,b} Within a column, means without a common superscript letter differ ($P < 0.05$).

Table 2 The parameters estimated from the metabolizable protein and coefficients of crude protein degradation of dried grape pomace and raising vitis leaves

| Feed | a | b | c | ED | SDP | QDP | ERDP | DUP | MP |
|------|--------------------|---------------------|---------------------|---------------------|--------------------|---------------------|---------------------|-----------------------|----------------------|
| GP | 6.48 ^a | 15.903 ^b | 0.0081 ^a | 14.133 ^a | 10.75 ^b | 18.484 ^a | 25.537 ^b | 133.662 ^b | 150.005 ^b |
| RVL | 5.347 ^a | 32.873 ^a | 0.0273 ^a | 15.33 ^b | 7.677 ^a | 16.231 ^a | 20.662 ^a | 113.4032 ^a | 126.626 ^a |
| SEM | 0.3495 | 1.7492 | 0.005521 | 0.113 | 0.567 | 0.71 | 0.293 | 5.455 | 5.624 |

a: Gas production potential of the solution, b: Gas production potential of the insoluble, c: Constant rate of gas production (per h).

^{a,b,c} Within a column, means without a common superscript letter differ ($P < 0.05$).