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Alfalfa hay replacement with *Kochia scoparia* and its effects on early lactating Brown Swiss dairy cows

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INTRODUCTION

- Alfalfa and corn silage are two major forages used in dairy cattle nutrition.
- Production of these forages is limited in Iran because of drought. Also the cultivable lands are used mostly for human food.
- Saline lands and areas with high water hardness are the only places can be used for forage production nevertheless those are unsuitable for Alfalfa and corn.
- Halophyte native plants such as *Kochia scoparia* can be cultivated in these lands although those contains some anti-nutritional factors.

OBJECTIVES

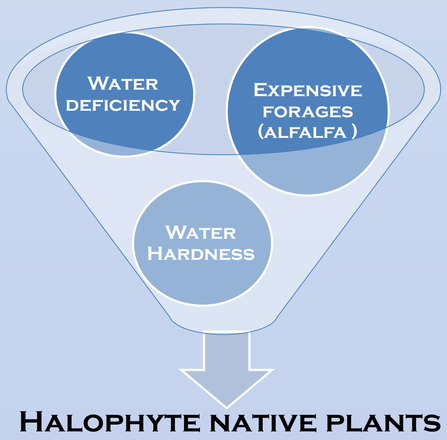
Determining effects of *Kochia scoparia* (Ks) on:

1- Milk yield and composition

2- Rumen pH

3- Feed intake and feed conversion rate (FCR)

PROBLEMS & SOLUTION



Advantages	Disadvantages
• Growth in salt &alkali soils • Low water requirement • Increasing cultivatable lands • Nutritional value similar to Alfalfa when non-bloomed • High biomass production • High protein content	• Oxalate as a primary toxicant in drought-stricken, mature, or overgrazed kochia • Thiamin-destructive Causes: • Photo sensitivity • Polioencephalomalacia

MATERIALS AND METHODS

14 days Adaptation → 7 Days sampling → 14 days Adaptation → 7 Days sampling → 14 days Adaptation → 7 Days sampling

- Ks cultivated in educational farm of higher education center of Jihad agriculture (HECJA) and harvested at 75±10 cm height, Air dried, and chopped to fed cows
- 3 cows (28±0.65 kg milk production; 71.4±6.3 days in milk; Tied at HECJA stalls) were used per treatment in a change over design
- Dry matter intake and milk yield were recorded throughout whole experiment
- Milk samples were taken in last 2 days of sampling phase (3 times per day)
- Rumen samples were taken using stomach tube in the last day of each sampling phase and pH were determined immediately
- Data analyzed using SAS 9.1. Means compared using Duncan test (P<0.05)

Treatments		
0%Ks[1]	15%Ks[2]	30%Ks
- Diet: Corn silage and Alfalfa hay and a concentrate include half grain plus the rest protein and other supplement and byproducts (NRC 2001) **1- No Ks in diet 2- 15% (DM based) of Alfalfa substituted by Ks**		

RESULTS

Items	Treatments			SEM
	0%Ks	15%Ks	30%Ks	
Milk yield (kg)	25.04	25.27	24.30	0.875
FCM4% (kg)	24.49	24.67	23.44	0.966
Fat (%)	3.95	3.88	3.93	0.123
Protein (%)	3.71	3.68	3.67	0.061
Lactose (%)	4.74[a]	4.76[a]	4.58[b]	0.048
Solids non fat (%)	9.14	9.10	8.95	0.068
Total solids (%)	13.09	12.98	13.04	0.161
DMI (kg)	21.39	21.19	20.71	0.628
Rumen pH	6.45[a]	6.64[b]	6.54[ab]	0.040
FCR[1]	0.87	0.85	0.90	0.273

1- Feed conversion rate=DMI Kg / Milk yield Kg

- **No decrease in milk and fat corrected milk 4%**
- **No decrease in milk composition except lactose (%) at 30% Ks replacement**
- **No decrease in dry matter intake in early lactation**
- **Rumen pH increased by 15% Ks replacement**
- **FCR was not affected by Ks**

DISCUSSION

It seems that *Kochia scoparia* can replace Alfalfa hay in dairy cows' diet up to 15% in early lactation without adverse effects on milk yield and composition, FCM 4%, DMI, and feed conversion rate.

In addition, rumen condition improved by increasing of pH.

It is noticeable that 30% replacement just had an adverse effect on milk lactose (%) which may reduce the volume of milk production as can be seen with numerical reduction in milk production.

TAKE HOME MESSAGE

• In early lactation which is really the riskiest part of lactation, *Kochia scoparia* successfully replaced 15 % of Alfalfa in diet without any adverse effect on performance. Even rumen environment was improved in case of pH because of more fibrous content of Ks.

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