EFFECT OF FEED DIETS ON MILK PRODUCTION AND YOGURT QUALITY

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Introduction

Rapid increase in human populations is leading to market expansion for agricultural products in the Middle East. This trend parallels a decline in range productivity due to overgrazing. To target the market opportunities, farmers resort to purchase feeds and intensify their production systems. Thus, feeding costs represent important production constraints. Cost reducing diets (CRD) using unconventional low cost feedstuffs have been proposed by the International Center for Agricultural Research in the Dry Areas in Syria (ICARDA) as means to reduce feeding cost. This study is an integral part of a research to assess the effect of cost reducing diets based on unconventional feedstuffs on milk production, firmness and organoleptic traits in yogurt, a product widely consumed and produced by small producers in Syria.

Methods

Feed Diets

A survey was conducted on sheep farmers in Aleppo province to assess the traditional diet features (control=C).
Six CRD and a C diet were tested each on 8 Awassi milking ewes at ICARDA. CRD options include conventional feeds (barley grain and wheat bran) and unconventional feeds (ammoniated wheat straw, cotton seed cake (CSC), molasses and sugar beet pulp (SBP) (Table 1).
All animals were kept on strip grazing with a feed supplement, and received similar levels of crude protein 229g, except the control 180g, and energy18MJ.

Table 1. Cost reduced diets composition

Feed	Control	CRD 1	CRD 2	CRD 3	CRD 4	CRD 5	CRD 6
Barley	+	+	+	+	+		
SBP			+		+	+	+
Molasses			+		+	+	+
CSC		+	+	+	+	+	
Wheat bran	+	+		+		+	+
Urea treated straw		+	+				
Barley straw	+			+	+	+	+
Rangeland	+	+	+	+	+	+	
Vetch pasture							+

Milk production, Yogurt production and yogurt quality

Milk production was recorded weekly, twice a day. Yogurt was processed using bulk milk, under a given CRD.
Yogurt firmness was determined by a texture analyzer. Yogurt organoleptic traits (texture, smell, taste and appearance) were evaluated with a 1-5 scale (1 = not accepted, 5 = highly accepted).

Results and Discussion

Milk production and costs

Milk production of ewes under five of the six CRD was up to 48% higher than that under C (P<0.01). With 34% molasses in its composition, CRD 6 caused a decrease in milk production in relation to C (P<0.01) (Fig. 1). The feeding costs per day per ewe of all CRD, except the CRD 6, were slightly higher than C. Total income per ewe was higher in all CRD except CRD 6 compared with C. Comparing total net income in tested diets, CRD 6 was the lowest (Fig. 1).

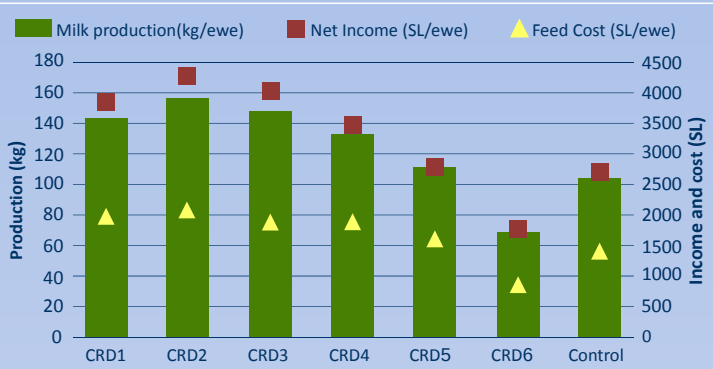

Figure 1. Effect of diets on total milk production, total feed costs and total net income.
SL: Syrian pounds (1US$≈46 SL)

Yogurt firmness

There was a clear effect of the CRD on consistency which reflects on yogurt firmness (P<0.01), important aspect in yogurt pricing in the Middle East. In most CRD, firmness increased (6 to 23%) over C. In the CRD diets that included molasses (diets 5 and 6), the firmness declined (9 to 10% compared with C (Fig. 2).

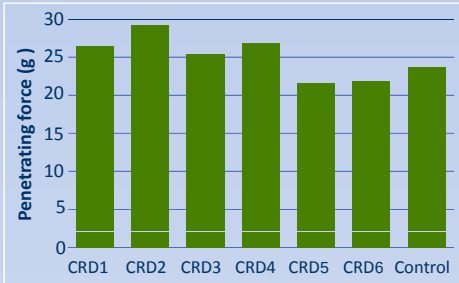

Figure 2. Effect of diets on yogurt firmness

A trend to increasing firmness as the milking period advances was observed in all CRD and C (P<0.05).

Organoleptic properties

Texture, except in CRD 6 (molasses diet), and taste, were positively improved by the CRD over C (P<0.01) (Fig. 3). The effects of diets on smell and appearance were not significant. Yogurt produced under the molasses-diet CRD 6 ranked lower than the other CRD's in relation to all analyzed traits (P<0.01).

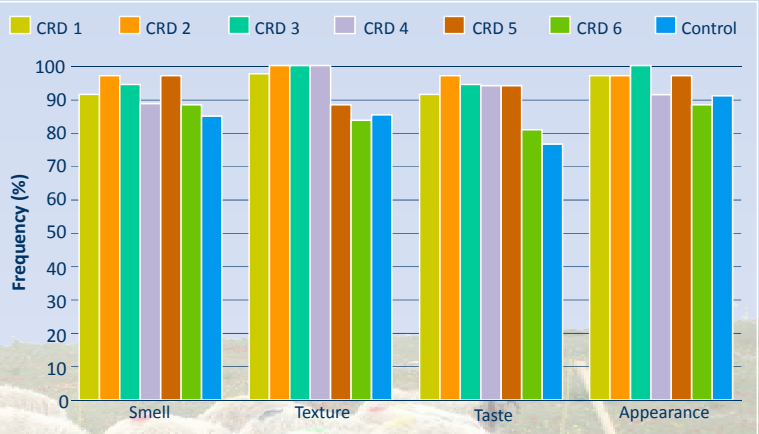

Figure 3. Effect of diets on organoleptic properties (sum of the three highest scores)

Conclusion

The proposed diets using unconventional feeds, decreased the feeding costs, increased productivity and net income of dairy sheep systems without affecting the main quality components of yogurt. Actually the proposed diets enhanced yogurt quality (in 5 out of the 6 CRD) and texture firmness (in 4 out of the 6 CRD)

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