Effect of Different Animal Manure on Flower Yield and Qualitative and Quantitative Characteristics of Forage Production of Saffron (*Crocus sativus*) in Mashhad Conditions

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**Abstract**

In order to understand the effects of different organic and chemical fertilizer on stigma yield and leaf dry matter yield, *in vitro* dry matter digestibility, organic matter digestibility and Digestible-value of *Crocus sativus* leaves, an experiment was conducted at Experimental station, College of Agriculture, Ferdowsi University of Mashhad, Iran in years 2005-2006. Four different fertilizer including cow manure (20, 40, 60 t/ha), sheep manure (20, 30, 40 t/ha), hen manure (5, 10, 15 t/ha) and chemical fertilizer (50-250 Kg/ha N-P$_2$O$_5$, 100-250 Kg/ha N-P$_2$O$_5$, 300-250 Kg/ha N-P$_2$O$_5$) were compared in a Randomized Complete Block Design with three replications. The results showed that there were significant differences between different fertilizer treatments in terms of fresh flower yield and fresh and dry stigma yield. Dry and fresh stigma yield, fresh flower yield were higher at lower amount of fertilizer in each treatment except in cow manure. Fresh and dry leaf yield were significantly influenced by different fertilizer treatments. There were no significant differences between different fertilizer treatment in terms of *In vitro* dry matter digestibility, organic matter digestibility and D-value. Different fertilizer treatments had a significant effect on dry matter digestible yield.

**INTRODUCTION**

Saffron (*Crocus sativus* L.) is the world's most expensive spice and 95% of the production is coming from Iran. It has been used as food additive, culinary proposes, medicinal and coloring agents. The novel use of saffron in recent years has been associated in cancer cure. This delicate spice has been utilized for thousands of years for different parts of world particularly Iran, China, Spain, Italy, India, Turkey and Greece.

Traditionally in Iran, the leaves of saffron are used as forage for animal feeding. It was stated that saffron produce about 150 g leaf dry matter per squire meter. Saffron cultivated area in Iran is about 47000 ha. Therefore, annually considerable amount of leaf dry matter can be produced from saffron fields. Information about the feeding value of saffron leaves is scarce. Valizadeh (1989) demonstrated that the nutritive value of saffron leaves was intermediate. His result showed that digestibility of saffron forage compared with alfalfa due to high fibrous tissues and low protein and mineral content was fairly low.

Housini (1998) stated that saffron is a low nutrient demands plants and requires a modest amounts of nutrients and high application of fertilizers and in
particular nitrogen fertilizer promotes vegetative growth and lowers the yield. Shahandeh (1991) suggested that soil organic matter, available phosphorus, mineral nitrogen and exchangeable potassium are important to saffron production. In Iran based on the type of the soil and farmers habit, 20 to 80 t/ha cow manure or 100 kg nitrogen are applied to saffron farms. It has been suggested that using 25 t/ha cow manure in low organic matter soils produced better saffron stigma dry yield than chemical fertilizer (Sadeghi et al., 1989).

The present work generates special data on different organic and chemical fertilizer on stigma yield and leaf dry matter yield, in vitro dry matter digestibility, organic matter digestibility and Digestible-value of *Crocus sativus* leaves which cultivated in dry and semi dry area of Iran.

**MATERIALS AND METHODS**

Corms of saffron were obtained from a field in Mashhad (Iran). The experimental treatments were four different fertilizer including cow manure (20, 40, 60 t/ha), sheep manure (20, 30, 40 t/ha), hen manure (5, 10, 15 t/ha) and chemical fertilizer (50-250 Kg/ha N-P₂O₅, 100-250 Kg/ha N-P₂O₅, 300-250 Kg/ha N-P₂O₅). A randomized complete block design was carried out at the Experimental station, College of Agriculture, Ferdowsi University of Mashhad, with three replications, in years 2004-2006. Planting was done by hand, at 20 cm row distance and 15 cm corm distance in the lines. The weight of corms was about 8-10 g. Plot size was 5 m² (2 X 2.5 m). Different fertilizer treatments were used at one month before planting date. Weeds were controlled by hand, when needed. Harvesting of the flowers and leaves were done by hand at 28 Oct. 2005 and 17 April 2006, respectively. After mechanical separation of tepals, the stigmas were hand separated from carpels and dried. Flower and leaf yield were determined in 2.8 m² in each plot. Dry matter digestibility, organic matter digestibility and digestible value (D-value) were determined based on Jones and Hayward (1973) methods. Collected data were analyzed by using Excel and means were compared by Least Standard Deviation Methods (LSD 5 %).

**RESULTS AND DISCUSSION**

In the first year plants did not produce any flower. The results of leaves which collected in the end of first year did not included here. The results of flowers and leaves which are presented here collected at the second year after planting saffron. Results showed that there were significant differences between different fertilizer treatments in terms of fresh flower yield and fresh and dry stigma yield. The highest and the lowest fresh flower yield and dry and fresh stigma yield were obtained at 40 t/ha cow manure and 15 t/ha hen manure, respectively (Figs.1-3). Generally fresh flower yield and dry and fresh stigma yield was higher in cow manure and chemical fertilizer treatments compare with hen manure and ship manure treatments.

Fresh and dry matter leaf yield were significantly influenced by different fertilizer treatments. The highest and the lowest dry matter leaf yield were obtained at 20 t/ha cow manure and 15 t/ha hen manure, respectively (Fig. 4). Hen manure treatments produced less dry matter leaf yield than other treatments.

There were no significant differences between different fertilizer treatments in terms of In vitro dry matter digestibility, organic matter digestibility and D-value. Different fertilizer treatments had a significant effect on dry matter digestible yield. The highest and the lowest dry matter digestible yield were shown at 20 t/ha cow manure and 15 t/ha hen manures (Fig. 5).
Literature Cited


Sabzevari, 1996. Saffron, the red gold of desert. Agricultural Bank, No. 46.


Fig. 1. Effect of different animal manures and chemical fertilizers on fresh flower yield of saffron.

Fig. 2. Effect of different animal manure and chemical fertilizer on fresh stigma yield of saffron.
Fig. 3. Effect of different animal manure and chemical fertilizer on dry stigma yield of saffron

Fig. 4. Effect of different animal manure and chemical fertilizer on dry matter leaf yield of saffron
Fig. 5. Effect of different animal manure and chemical fertilizer on dry matter digestible yield of saffron leaf.