National Journal of Life Sciences, **Vol. 16(1&2) 2019 : 89-90** ISSN : 0972-995X (Print), 2321-7960 (Online)

COMPARATIVE NUTRITIVE CONTENTS IN THE SPECIES OF *CLEOME* IN THAR DESERT

VINOD KUMARI* and R. K. GEHLOT

Department of Botany, Government Dungar College, Bikaner (Rajasthan)

ABSTRACT : Genus *Cleome* in Thar Desert is represented by four species *viz. C.gracilis*, *C.gynandra*, *C.vahliana* and *C.viscosa*. All the species are ephemeral. The present study deals with estimation of nutritive contents and secondary metabolites in different plant parts. In the present study, Crude protein content was found to be highest in leaves of *C.gynandra* (21.45%). The leaves of *C.gynandra* contained maximum (4.18%) amount of crude fat while maximum amount of total carbohydrate reported from the leaves of *C.viscosa* (74.80%). Alkaloids were reported to be present in leaves and stem of *C.vahliana*. Low concentration of saponin and tannin were observed in stem of *C.viscosa*.

Key words : *Desert, Arid, Nutritive value, Secondary metabolites.*

INTRODUCTION

The Western and North-Western part of Rajasthan forms an important part of Great Indian Desert. It is one of the densely populated as well as plant biodiversity rich desert in the world. The vegetation is xerophytic and widely dispersed leaving large area bare. The plants possess some specific morphological and physiological adaptations which enable the plants to survive in xeric climatic conditions. During rainy season a number of ephemeral plant species come up and complete their life cycle in very short period of time. These plants are rich in nutrients especially proteins and minerals hence they are considered better fodder for grazing animals. The importance of these plants and weeds of agricultural field increase more in case of crop failure due to low rainfall and drought. Study on nutritive composition of plants is not only essential to highlight their fodder value but also to understand about their protection, management and research requirements.

In the present study, all the four species of *Cleome* were selected for comparative study on nutritive composition and secondary metabolites in different parts of plants. Genus *Cleome* comprises over 150 species all over the world in which 14 species have been reported from India (Santapau and Henry,1973). In arid region of Rajasthan four species of this genus were identified which are *C.gracilis* Edgew., *C.gynandra* Linn. var. nana (Blatt. & Hallb.), *C.vahliana* Fresen. and *C.viscosa* Linn. (Bhandari,1990). *C.gynandra* and *C.viscosa* are the most common weeds of desert area particularly in cultivated fields where as *C.vahliana* and *C.gracilis* occur mainly on gravel land and coarse sandy area.

Fresh plant parts of all the species have typical smell. These plant species (except *C.vahliana*) are very much liked by grazing animals and considered better fodder. *Cleome* is suitable plant for the restoration of degraded habitats in dry regions. Raju and Rani (2016) studied the flower phenology, pollinators, seed dispersal and germination of *Cleome viscosa* and *Cleome gynandra*. Very scanty information is available on the nutritive composition of desert plants. So, the present study was designed to assess the protein, fat, carbohydrate and secondary metabolites in different parts of plant.

MATERIAL AND METHODS

Field trips were conducted in different localities of Rajasthan desert to ensure the rarity of selected plant species. Mature and healthy plants were collected and their stem and leaves were detached and dried in an oven. Dried plant parts were powered separately and stored in small polythene containers at room temperature for chemical analysis. Voucher specimens were preserved in the laboratory. Crude proteins, crude fat (ether extract), crude fibers, total carbohydrates were estimated by AOAC (1990). For the testing of alkaloids Amar Singham *et al.* (1964) method was followed while Arthur and Chan (1962) method was adopted for the estimation tannin and saponin.

RESULTS AND DISCUSSION

The result of analysis potentially indicates that the plants studied are well endowed with essential nutrients required for grazing animals. The result showed that amount of crude protein ranged from 6.98-21.45%. The maximum amount of crude protein was observed from the leaves of *C.gynandra* and minimum from the stem of *C.gracilis*. Nutritional value of fodder plants is primarily determined by their protein contents followed by carbohydrate and fat. Mehmood *et al.* (2010) reported very low nitrogen contents (0.041%) and crude protein (0.08%) from *Dipterygium glaucum* indicating that it cannot be utilized as fodder for grazing animals. Similar results have also been reported on *Cressa cretica* (Rashid *et al.*,2002). Choyal *et al.* (2006) estimated 32.28% crude protein, 15.72 crude fibres, 2.02% ether extract from the roots of *Chenopodium murale* and 70.02% nitrogen free extract and 77.46% total carbohydrate in the roots and fruits of *Salsola baryosma*, respectively. Kasera *et al.* (2018) reported highest amount of crude protein content during flow-

*Corresponding author (email : kumari.vinod13@gmail.com) Received 16.10.2019 Accepted 14.11.2019

Table. 1 Nutritive contents in the *Cleome* species on percent dry matter basis.

Plant parts	*Cleome gracilis*		*Cleome gynandra*		*Cleome vahliana*		*Cleome viscosa*	
	Leaves	Stem	Leaves	Stem	Leaves	Stem	Leaves	Stem
Crude protein	18.36	6.98	21.45	7.45	19.20	8.32	16.25	7.44
Crude Fat	2.66	2.30	4.18	2.63	4.12	2.10	3.78	2.45
Crude Fibre	1.50	2.87	1.20	2.56	1.85	3.14	1.04	2.25
Organic matter	91.45	61.32	89.69	68.47	92.74	68.23	92.14	61.44
Total carbohydrate	70.12	47.32	72.65	54.33	65.45	52.12	74.80	52.34

Table. 2 Estimation of Alkaloid, Tannin and Saponin in the *Cleome* species.

Plant studied	Plant part	Alkaloid	Tannin	Saponin
Cleome gracilis	Leaves	-	-	-
	Stem	-	-	-
Cleome gynandra	Leaves	-	-	-
	Stem	-	-	-
Cleome vahliana	Leaves	+	-	-
	Stem	+	-	-
Cleome viscosa	Leaves	-	-	-
	Stem	-	+	+

+Present; - Not observed

ering stage and lowest during vegetative phase in *Corbichonia decumbens*. Therefore, all the plant species of *Cleome* provide the requirements. Ether extract (crude fat) was found to be highest in leaves of *C.gynandra* (4.18%) and lowest in stem of *C.vahliana* (2.10%). The amount of crude fibres showed much variation in different plant parts. The highest amount of crude fibres was observed in the stem of *C.vahliana* (3.14%) and lowest in leaves of *C.viscosa* (1.04%). The amount of Total carbohydrate varied from 47.32 -74.80% with minimum in stem of *C.gracilis* and maximum in leaves of *C.viscosa*.

Alkaloids were present in very low concentration in leaves and stem of only *C.vahliana*. Tannins and saponin were reported from the stem of *C.viscosa*. *Calligonum polygonoides*, a desert plant contain high concentration of tannins, flavonoids and phenolic compound and can be used as a strong antioxidant (Samejo *et al.*,2011). The present study shows that all the species of *Cleome* are either devoid of these metabolites or has a very low concentration.

The comparative biochemical analysis of all the four species of *Cleome* clearly indicates that they have a very high nutritional potential particularly of crude protein and are considered better fodder for cattle. Low concentration of alkaloids makes them safe fodder plant species.

REFERENCES

AOAC (1990). *Methods of Chemical Analysis*. Association of Official Agricultural Chemists, Virginia, USA.

Amar Singham, R. D.; Bisset, N. G.; Millard, A. M. and Woods, M. C. (1964). A phytochemical survey of Malaya, Part III alkaloids and saponins. *Econ. Bot.*, **18(3)** : 270-280.

Arthur, H. R. and Chan, R. P. K. (1962). A survey of Hongkong plants testing for alkaloids, essential oil and saponins. *China Trop. Sci.*, **4** : 147-158.

Bhandari, M. M. (1990). *Flora of the Indian Desert.* MPS Repros, Jodhpur, p. 435.

Choyal, R.; Godara, S. K.; Watts, R. and Sudesh (2006). Nutritive contents of some halophytes of IGNP. Phase-I Command Area, Loonkaransar, Bikaner, Western Rajasthan. *J. Phytol. Res.*, **19(1)** : 151-152.

Kasera, P. K.; Soni, A.; Daiya, K. and Sagar, A. (2018). Evaluation of phytochemical variations in medicinal plants of Rajasthan. *International Journal of Phytocosmetics and Natural Ingredients*, **5** :12.

Mehmood, K.; Mehmood, S.; Ramzan, M.; Arshad, M. and Yasmeen, F. (2010). Biochemical and phytochemical analysis of *Dipterygium glaucum* collected from Cholistan desert. *J. Sci. Res.*, **42** : 13-18.

Raju, A. J. S. and Rani, D. S. (2016). Reproductive ecology of *Cleome gynandra* and *Cleome viscosa*. *Phytologia Balcanica*, **22(1)** :15-28.

Rashid, S.; Mahmood, K.; Ashraf, M. and Arshad, M. (2002). Proximate analysis and antibacterial activity of *Cressa cretica*. *Hamdrad Medicus*, **XLIII** : 32-35.

Samejo, M. Q.; Memon, S.; Bhanger, M. I. and Khan, K. M. (2011). Preliminary phytochemicals screening of *Calligonum polygonoides* Linn. *Journal of Pharmacy Research*, **4(12)** : 4402-4403.

Santapau, H. and Henry, A. N. (1973). *A Dictionary of the Flowering Plants in India.* CSIR, New Delhi, p.198.