SHORT COMMUNICATIONS

Effect of different soil types on plant growth, leaf pigments and sennoside content in Cassia species

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ABSTRACT

Cassia angustifolia (Tinnevelly senna) and *C. acutifolia* (Alexandrian senna) have great medicinal importance because of their sennoside content in leaves and pods, which are used as purgatives. Such properties have not been observed in *C. occidentalis*. The maximum growth of these *Cassia* species was observed in black soil followed by sandy and humus soils. The leaf pigments also increased in black soil. The sennoside content of senna was maximum in sandy soil as compared to other soils. (Pharm. Weekblad Sci. Ed. 2, 65-67)

INTRODUCTION

Soil organic matter plays an important role in controlling plant growth. In most cases plants depend upon soil for their nitrogen. Desert soils are deficient in organic matter and the addition of mineral fertilisers is not beneficial. Cultivation of leguminous plants in such soils is recommended to improve the soil nitrogen.

African senna *Cassia acutifolia Del.* is wild whereas Indian senna *C. angustifolia Vahl.* is a cultivated crop for which India is the largest supplier to the world market. *C. angustifolia* has been reported by GUPTA (1974) as wild in loamy and sandy soils from Kutch. *C. occidentalis Linn.* was also found growing in the Indian desert by BHANDARI (1978). *C. acutifolia* and *C. angustifolia* have great medicinal value due to their purgative properties. The leaves and pods contain sennosides, which are classified as stimulant cathartics. Such compounds have also been reported in *Rheum palmatum* by ZWAVING (1972).

In the present studies an attempt has been made to study the plant growth, leaf pigments and sennoside content of *C. acutifolia, C. angustifolia* and *C. occidentalis* growing in different soil types.

MATERIALS AND METHODS

The seeds were subjected to acid treatment for removal of hard seed coat dormancy as suggested by BHATIA (1976). The seeds after thorough washing under running water were sown in earthen pots (9" diam.) containing humus (manure mixed with garden soil), sandy and black soil. Each set was in triplicate. The pots were watered daily in the evening. The observations were made with regard to growth parameters, leaf pigments and sennoside content at the end of 45 days of the experimental period.

The leaf pigments were estimated according to ARNON (1949) and leaf sennosides as suggested by FAIRBAIRN and MICHAELS (1950), a method which was later modified by the Joint Committee of the Pharmaceutical Society (1965).

RESULTS AND DISCUSSION

The results are tabulated in the Tables I and II. It appears from Table I that plant growth was favoured in black and sandy soil. Maximum growth of shoot and root was observed in plants grown in black soil followed by sandy and humus soil. The fresh and dry weights of shoot and root were also higher in plants growing in black soil as compared to that of sandy and humus soil. JOSHI and KAMBHOJ (1959) reported that growth of *Gisekia pharnaceoides* was more in sandy habitat while in black soil it was very poor. PANDYA and BAGHELA (1973) observed that relative growth rate of plants decreased with increase in days of growth in different soil types viz. silty, gravelly, sandy silty and silty clayey. They recorded maximum dry weight in plants growing in silty clayey soil. In *C. angustifolia* and *C. acutifolia* the percentages of sennoside were 3.72 and 2.30 in sandy soil, while they were 2.29 and 2.13 in black soil, respectively. BHATIA (1976) reported a sennoside content of 3.31 per cent in

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TABLE I. *Effect of different soil types on plant growth and sennoside content in Cassia species*

Species	Soil types	Percentages of sennoside on dry wt. basis	Root			Shoot		
			Length cm	Fresh wt. g	Dry wt. g	Length cm	Fresh wt. g	Dry wt. g
C. angustifolia	humus	3.15	9.8 ± 1.3	0.201 ± 0.08	0.012 ± 0.01	6.8 ± 0.2	1.075 ± 0.07	0.155 ± 0.25
	sandy	3.72	25.6 ± 2.3	0.316 ± 0.04	0.080 ± 0.01	8.8 ± 1.7	1.300 ± 0.30	0.327 ± 0.07
	black	2.29	29.0 ± 0.8	0.900 ± 0.16	0.170 ± 0.04	17.3 ± 0.5	4.883 ± 1.18	0.975 ± 0.20
C. acutifolia	humus	2.25	8.0 ± 0.1	0.250 ± 0.02	0.024 ± 0.03	4.5 ± 0.5	0.350 ± 0.05	0.082 ± 0.06
	sandy	2.30	23.5 ± 1.5	0.275 ± 0.04	0.057 ± 0.06	9.3 ± 0.7	0.766 ± 0.08	0.128 ± 0.02
	black	2.13	30.0 ± 2.5	0.550 ± 0.05	0.095 ± 0.04	10.8 ± 0.2	2.550 ± 1.20	0.491 ± 0.06
C. occidentalis	humus	–	30.0 ± 3.1	1.200 ± 0.10	0.279 ± 0.03	21.2 ± 1.2	4.750 ± 1.34	1.043 ± 0.60
	sandy	–	36.2 ± 0.8	1.300 ± 0.80	0.352 ± 0.12	21.6 ± 0.3	9.052 ± 3.15	2.260 ± 0.24
	black	–	39.3 ± 3.4	3.250 ± 0.15	0.876 ± 0.15	32.3 ± 0.9	10.850 ± 1.22	3.031 ± 0.44

leaves of *C. angustifolia* which were 45 days old plants, growing in sandy soil. In the present studies it was observed that sennosides were absent in leaves of *C. occidentalis*. GUPTA (1974) reported that the percentage of sennosides in *C. angustifolia* growing in loamy and sandy soils was 3.02 in immature and 2.40 in mature pods.

It is evident from Table II that chlorophyll and carotenoid contents were also at a maximum in plants growing in black soil, while they were minimum in sandy soil.

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TABLE II. *Effect of different soil types on leaf pigments (mg/g) in Cassia species*

Species	Soil types	Chlorophyll *a*	Chlorophyll *b*	Total Chlorophyll *(a+b)*	Carotenoids
C. angustifolia	humus	1.2889	0.5372	1.8261	0.4218
	sandy	1.1182	0.4398	1.5580	0.4022
	black	1.7042	0.6074	2.3116	0.5379
C. acutifolia	humus	1.1524	0.5070	1.6594	0.3821
	sandy	0.8481	0.4852	1.3333	0.3213
	black	1.7467	0.6301	2.3768	0.5778
C. occidentalis	humus	1.8451	0.7781	2.6232	0.5449
	sandy	1.3944	0.5766	1.9710	0.4165
	black	2.3809	1.0177	3.3986	0.6945

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ABSTRACTS OF DUTCH PH.D. THESES

The Editorial Board of the *Pharmaceutisch Weekblad Scientific Edition* has decided to the establishment of a section *Abstracts of Dutch Ph.D. Theses.* The following criteria are put for acceptance of abstracts:

1. this section is open for Ph.D. theses of Dutch universities and for Ph.D. theses of Dutch pharmacists studying at foreign universities;
2. the subject of the dissertation must fall within the scope of the pharmaceutical sciences and its contents need to be of interest for larger spread among our reading public.

Abstracts should be submitted by invitation only. The decision for acceptance of the abstract is reserved to the Editorial Board. An abstract may cover about one page of the journal (about 500 words).

The influence of drugs on intra-ocular pressure, mediated by the central nervous system

H. C. INNEMEE[1], University of Amsterdam, April 25, 1979

Promoter: Prof. Dr. P. A. VAN ZWIETEN (Amsterdam)
Referee: Prof. Dr. R. A. CRONE (Amsterdam)

Although there is some evidence that the intraocular pressure (IOP) is subject to diencephalic control, pharmacological investigations concerning a central regulation of IOP are scarce. A few years ago it was speculated that chlorpromazine and phenobarbital may lower the IOP by a primary central effect. The decrease in IOP due to clonidine and Δ^9-tetrahydrocannabinol (Δ^9-THC) is also considered to be initiated within the central nervous system (CNS), although irrefutable pharmacological experiments for this statement were not available. The fall in blood pressure induced by the latter two drugs is of central origin.

It was the aim of the experiments described in the present thesis to investigate to which degree the lowering of IOP by clonidine and Δ^9-THC may be due to a central mechanism. For

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