

**EFFECT OF FLUORIDE ON *WITHANIA SOMNIFERA*****J.R.RAVAL****DEPARTMENT OF BOTANY, SHETH M.N. SCIENCE COLLEGE,
PATAN – 384 265.****ABSTRACT:**

The present paper deals with species of flowering plant *Withania somnifera* (L.) Dunal in DC. (Ashwagandha) belong to family Solanaceae. It is a medicinal plant and regularly used plant in Ayurveda and Unani medicine. Root is the medicinally useful. Fluorosis caused by fluoride is an important public health problem in India and some other countries of the world. Fluorosis occurs in human population of North Gujarat, India (Barot, 1998). From the soil, it is transmitted through root hair into stem and finally reaches the leaves. We have studied the effect of salinity on this plant.

KEY WORD: *Ashwagandha, NaCl, Salinity.*

INTRODUCTION:

Ashwagandha is a highly reputed medicinal plant in traditional Indian Medicine and is the one of the most regularly used plant in Ayurvedic and Unani medicine. *Withania somnifera* is an undershrubs. Leaves ovate, appressed-hairy. Flowering and Fruiting time is throughout the year. Flowers greenish-yellow, sessile, and axillary. Berries smooth, red when ripe. Seeds flat, oblong, rarely sub reniform, smooth. Root is the popular medicine for sedative, hypnotic, antiseptic etc. and leaves. The tuberous roots are useful in leucoderma, tissue-building and nervous breakdown. Also useful in ulcer and painful swellings. effect of Salinity particularly on the root length.

MATERIALS AND METHOD:

As a source of fluoride NaF is used. Seeds were sown in earthen pots containing 0.0 NaF (control), 200 mg NaF/kg soil, 400 mg NaF/kg soil, 600 mg NaF/kg soil. Plants were cultivated using normal practice, effects of application of NaF on Ashwagandha plants were studied as follows. 10 plants at random from each treatment i.e. control,

200, 400, and 600 NaF were selected for growth study. The study was carried out at fortnightly intervals and the study period was 105 days. Plants were carefully uprooted

brought to the laboratory and washed under slow running tap water. The root length and stem height of each plant were measured and expressed as cm/plant. The leaf number was noted and expressed as no/plant. The fresh weight and dry weight of root stem, and leaf was recorded. All were expressed as g/plant. Reproductive growth was studied in terms of number of flower and fruit (no/plant), fresh weight and dry weight of flower and fruit (g/plant).

RESULTS AND DISCUSSIONS:

TABLE:-1 EFFECT OF NaF ON ROOT ELONGATION, STEM HEIGHT AND LEAF NUMBER OF ASHWAGANDHA

CHARACTER	NaF Conc. (ppm)	Growth Period (Days)				
		30	45	60	75	90
Root Elongation (cm/plant)	Control	03.95	08.04	45.00	11.20	12.04
	200	03.30	05.50	07.00	08.32	08.40
	400	02.55	04.78	05.96	06.05	08.00.
	600	01.25	03.72	04.20	04.65	06.67
STEM HEIGHT (cm/plant)	Control	03.60	8.64	10.72	17.10	20.50
	200	02.01	5.28	07.78	12.58	15.60
	400	02.00	5.22	06.16	07.04	14.07
	600	01.75	4.58	05.58	06.63	08.28
Leaf Number (no/plant)	Control	09.00	10.00	13.00	23.00	23.00
	200	06.00	08.00	11.00	17.00	19.00
	400	06.00	07.00	09.00	15.00	17.00
	600	05.00	06.00	08.00	09.00	10.00

The adverse effect was visible in 30 days old plants. The rate was slow in fluoride treated plants. Graded concentration of NaF lowered the elongation of root, stem and leaf number. The NaF effect was more on root than on stem of 30 days old plants. The present data suggest that NaF 400 ppm caused 50% reduction in root length of adult plant.

TABLE:-2 EFFECT OF NaF ON FRESH WEIGHT OF ROOT, STEM AND LEAF OF ASHWAGANDHA

CHARACTER	NaF Conc	Growth Period (Days)				
	(ppm)	30	45	60	75	90
Root Fresh Weight (gm/plant)	Control	0.017	0.18	0.28	1.25	1.34
	200	0.009	0.05	0.22	0.84	1.00
	400	0.004	0.045	0.12	0.25	0.65
	600	0.004	0.037	0.06	0.21	0.26
Stem fresh weight (gm/plant)	Control	0.097	0.44	0.52	0.130	1.53
	200	0.035	0.149	0.38	0.800	0.875
	400	0.034	0.133	0.22	0.24	0.65
	600	0.017	0.017	0.14	0.216	0.30
Leaf fresh weight (gm/plant)	Control	0.379	1.14	1.54	2.67	3.76
	200	0.123	0.39	1.30	2.27	2.60
	400	0.115	0.318	0.55	0.84	1.900
	600	0.071	0.215	0.44	0.56	0.74

Data shows that the fresh weight of root, stem and leaf was slowly increasing up to 75 days then increase was lower in NaF treated plant than that in control. The decrease in fresh weight may be due to reduction in water uptake by the root of plants grown on fluoride contaminated soil.

TABLE:-3 EFFECT OF NaF ON DRY WEIGHT OF ROOT, STEM, AND LEAF OF ASHWAGANDHA

CHARACTER	NaF Conc.	Growth Period (Days)				
	(ppm)	30	45	60	75	90
Root dry weight (g/plant)	Control	0.002	0.027	0.064	0.240	0.302
	200	0.001	0.024	0.039	0.150	0.267
	400	0.001	0.021	0.029	0.078	0.158
	600	0.0005	0.013	0.018	0.039	0.064
Stem dry weight (g/plant)	Control	0.01	0.052	0.09	0.020	0.315

	200	0.003	0.018	0.057	0.12	0.189
	400	0.003	0.016	0.031	0.056	0.134
	600	0.002	0.011	0.023	0.033	0.058
Leaf dry weight (g/plant)	Control	0.014	0.17	0.26	0.449	0.50
	200	0.015	0.062	0.199	0.36	0.372
	400	0.013	0.05	0.09	0.100	0.273
	600	0.008	0.033	0.069	0.076	0.098

Data shows that the NaF decreased the dry weight of root, stem and leaf, and the adverse effect was increasing with increasing concentration of NaF. The adverse effect was visible even in 30 days old plant.

Table:-4 EFFECT OF FLUORIDE AS SOIL POLLUTION ON REPRODUCTIVE GROWTH OF ASHWAGANDHA

Dry weight		Fresh weight		Number of		Treatment
Fruit (no/plant)	Flower (no/plant)	Fruit (no/plant)	Flower (no/plant)	Fruit (no/plant)	Flower (no/plant)	
0.668	0.09	2.26	0.49	27	40	Control
0.439	0.05	2.1	0.36	21	37	200
0.31	0.043	1.16	0.23	19	28	400
0.229	0.033	0.933	0.19	17	26	600

The number of flower, fruit, their fresh weight and dry weight was lower in fluoride treated plant than that in control; the lowering was correlated with concentration. Fruiting was remarkably reduced by 600 ppm NaF. The data suggests that not only vegetation growth but reproductive growth of Ashwagandha was also reduced by fluoride.

Above results shows that Ashwagandha is very sensitive to fluoride. Fluoride toxicity may be predicated better by studying the root shoot elongation of young plant. It is also suggested that before using the herbal drug from Ashwagandha root, drug must be analyzed for occurrence of fluoride.

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