

EFFECT OF AQUEOUS SEA WEED EXTRACT ON *ZIZYPHUS MAURATIANA* LAMK

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Aqueous extract from *Sargassum wightii* (Ag.) when applied as foliar spray on cultivated race of *Zizyphus mauratiana* plants, before harvest of fruits showed considerable increase in yield and quality of fruits. An increase of 11.23%, 9.2% and 25.36% in length, breadth and weight of fruits respectively was obtained over control. The quality of fruits was better in treated fruits than in the control. The technical feasibility of the process and the commercial viability of the product were also discussed.

Key words: *Zizyphus mauratiana*, *Sargassum wightii* seaweed fertilizer, foliar spray, seaweed extract.

Brown seaweeds such as *Ascophyllum nodosum* are good source of manure for crops in the European countries. In India the brown seaweeds are represented mainly by *Sargassum* spp which are found to be a good source of fertilizer because of the mineral and growth hormone content and as such can be used as compost, FYM, SLF etc. (Thivy, 1961; Metha *et al.*, 1967, Bokil *et al.*, 1976, Dhargalkar and Untawale, 1983). In spite of these studies, lacunae existed in the process of extraction, nature of its chemical constituents and application technology. The present investigation was aimed at developing and standardizing LSF extraction process and its application technology for the benefit of marginal farmers.

MATERIALS AND METHODS

Sargassum wightii, was used as the test plant for technique standardization and process evaluation. The extraction was optimised at 1.06 kg/cm² for 2 h with 1:10 ratio of *S. wightii* and water. The chemical characterization of the LSF is being done to arrive at most important chemical factors that influence growth of the crops when it is used as "foliar spray". LSF application technology as "Foliar Spray" based on European method was tried under field conditions to test its efficacy on *Zizyphus mauratiana* fruits in the "Energy plantation" field at Surendrabagh (Blavnavar). Six feet tall *Z. mauratiana* plants were selected each in treatment and control plots by random sampling method and 1.0% aqueous solution of LSF was applied as foliar spray using agriculture spray pump. The spray was done at the time of preharvesting and in the early hours of day, preferably before sunrise in order to facilitate maximum absorption of LSF through

stomatal opening and in the control pure water was sprayed each time.

The growth and yield data of *Z. mauratiana* are given in Table 1-3 after subjecting the data to 't' test, and all the observed values were found significant.

RESULTS

Table 1: Effect of liquid seaweed extract on the yield of *Zizyphus mauritiana*

S. No.	CONTROL			TREATMENT		
	Length (mm) of fruits	Breadth (mm) of fruits	Weight (g) of fruits	Length (mm) of fruits	Breadth (mm) of fruits	Weight (g) of fruits
1.	39.16	26.52	940	43.04	33.00	1,480
2.	40.31	32.40	1,600	42.42	31.60	1,150
3.	41.36	24.32	790	43.24	33.52	1,500
4.	38.08	27.91	790	49.92	30.64	1,600
5.	39.48	30.64	940	42.96	31.64	1,220
6.	39.32	32.02	1,090	42.80	31.80	1,200
Mean	39.61	29.30	1,025	44.06	32.02	1,285
t-value	-	-	-	3.7	2.2	19.7

The seaweed extract obtained by the above described method produced 16% yield on dry basis of the raw-material and 80% volume/volume basis. The chemical study indicated the presence of IAA, IBA, Gibberellines A and B, the presence of cytokinis, the principal growth promoting substances is being investigated.

Table 2: Effect of L.S.F. on the growth and yield of fruits in *Zizyphus mauratiana*.

Growth Character of fruits	Control	L.S.F.	Increase	% Increase Over control
Length (mm)	39.61	44.06	4.45	11.23
Breadth (mm)	29.30	32.02	2.72	9.20
Weight (g)	1,285	1,285	260	25.36

In the field trials conducted at Surendrabagh on the efficacy of LSF as foliar spray during pre-harvest time, it enhanced the over all growth of fruits in terms of length, breadth and weight by 11.23%, 9.20%, 35.36% respectively over the control (Table 1 and 2). And also the texture, taste and odour of the fruits from treated plants were far better as compared to the control fruits. Although the shelf life was not studied in detail, the over all shelf life of the treated fruits was comparatively more than in the control. In addition, the foliage and the green canopy appearance was more healthier in the treated plants.

Table 3. Effect of seaweed dry powder and liquid formulations on tomato pusa ruby at R.A.R.S., Bangalore. (Fresh weight, Stem length, number of leaves and fruits/per plant).

Treatments	Replications					Total	Mean	Per cent Increase over control
	1	2	3	4	5			
T1 Dry powder 0.1 gm	300	190	185	150	200	1,025	205	33.1
T2 Dry powder 2.0 g	165	175	140	130	270	880	176	14.3
T3 Liquid 0.5 ml	60	110	95	145	95	505	101	-
T3 Liquid 0.5 ml	195	1110	9245	1145	210	905	101	17.5
T5 Control	135	135	100	215	185	770	154	-

Inference: It appears that dry powder and liquid formulations of seaweed have some effect in increasing fresh weight of the tomato plants. Dry power is effective at lower doses and liquid is effective at higher dose.

DISCUSSION

Booth (1966) has carried out extensive investigations on the seaweed extracts and their commercial utilization as seaweed manure. Milton (1964) advocated that the seaweed extracts employed as foliar spray positively enhanced growth and yield of hard fruits of many of vegetables and flowers producing plants. Thivy (1964) demonstrated for the first time in India that seaweed composted with FYM (Farm Yard Manure) and added to vegetables like "Bhendi" influenced growth and yield. Bokil *et al.* (1974) and Mehta *et al.* (1967) indicated the use of seaweed manure, when composted with Farm Yard

Manure and supplemented with NPK. The indisputable efficiency of seaweed extract as fertilizer was shown by Blunden (1972, 1977 a,b), Blunden and Wildgoose (1977) and Blunden *et al.* (1979). The preliminary investigation indicated their utility as fertilizer when supplemented to NPK (Bhosle *et al.*, 1975, Bhukari & Untawale 1978 and Dhargalkar and Untawale, 1983) and as a source of trace elements and growth hormones. Albertz and Young (1983) have decisively shown that cytokinins are the major growth inducing factors in liquid seawater extracts while Kingman and Moore (1982) isolated and quantified cytokinins from the brown seaweed *Ascophyllum nodosum*. The author has developed process for extraction of a aqueous seaweed extract from *Sargassum wightii* and its efficacy was confirmed under field trails as "Foliar spray" at Surendrabagh on fruits and on tomatoes, pusa ruby plants at R.A. R.S. Bangalore (Table 3). the presence of IAA, IBA, and GA in the liquid seaweed extract was established and the data is in conformity with the earlier results.

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