

Effect of Metal Ions on the Growth of *Sargassum swartzii* (Turn.) C.Ag. Germlings

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Zinc, cobalt, manganese and molybdenum at concentrations ($\mu\text{g/l}$) 20-80, 1-4, 10-40 and 20-60 respectively stimulate while higher concentrations of the same inhibit growth of alga. Copper and iron at 5-10 and 10-50 $\mu\text{g/l}$ respectively show no effect on the growth of the germlings but higher concentrations of these are toxic.

In the present study an attempt has been made to determine the effect of the 6 important micronutrients at different concentrations on the growth of germlings of *Sargassum swartzii* (Turn.) C.Ag. under culture conditions.

Thirty days old germlings of *S. swartzii* were used. The experiments were conducted in a culture room (temp., $20 \pm 2^\circ\text{C}$; light intensity, 1500 lux; and photoperiod, 16-8 hr). Stock solutions of Fe, Cu, Co, Zn, Mo and Mn were prepared in double distilled water using $\text{FeCl}_3 \cdot 6\text{H}_2\text{O}$, $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$, $\text{CoCl}_2 \cdot 6\text{H}_2\text{O}$, ZnCl_2 , $(\text{NH}_4)_6\text{Mo}_7\text{O}_{24} \cdot 4\text{H}_2\text{O}$ and MnCl_2 respectively. Further dilutions of stock solutions were made with sterile seawater. Increase in length of pseudophyll of germlings was measured at the end of 30 days incubation period. Loss of pigmentation of pseudophylls was considered as a measure of toxic level of the metal.

Table 1 shows concentrations of the 6 metallic ions present in seawater along with their stimulatory and inhibitory levels on the germlings of *Sargassum*. Effect of these metals on growth is shown in Fig. 1.

Marked increase in growth is observed with Mo up to a concentration of 20 $\mu\text{g/l}$, beyond which the growth is reduced. Co is beneficial at concentrations of 1-3 $\mu\text{g/l}$. Nasr and Bakheet¹ have shown that Mn has not increased growth, estimated in terms of dry weight, in marine algae. However, in the present experiments Mn accelerates growth of *Sargassum* at certain concentrations.

Clendenning *et al.*² have reported that Cu and Zn are toxic to the growth of young plants of *Macrocystis pyrifera* at concentrations 0.1 and 5 mg/l respectively. In the present study the growth of the germlings is normal as is in control at lower concentrations. Fe slightly increased the growth at 10 $\mu\text{g/l}$ and further increase, decreased the growth.

Table 1—Effect of Metallic Ions on Germlings of *Sargassum swartzii* at Different Concentrations

Metallic ion	Seawater*	[Concentrations are in $\mu\text{g/l}$]	
		Stimulatory levels	Inhibitory levels
Cobalt	0.1	1-4	7-10
Copper	3	5-10	100-1000
Iron	10	10-20	1000-2000
Manganese	0.5	10-30	1000-2000
Molybdenum	10	20-60	1000-5000
Zinc	10	20-60	1000-10000

*Goldberg³

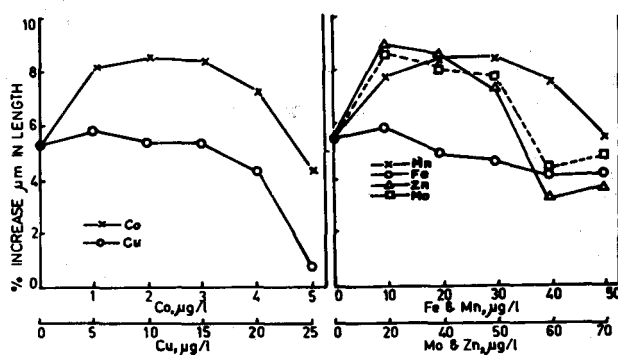


Fig. 1—Effect of different metal ions on the growth of the germlings

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References

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- 3 Goldberg E D, in *Chemical Oceanography* edited by J P Riley and G Skirrow (Academic Press, New York) 1965, 163.