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ON THE IRRITATIVE ODOR EMITTED BY *DILSEA EDULIS*

By

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Introduction

Sea air is a mixture of odors, pleasant and unpleasant. The unpleasant odor is produced by various matter, eminently by sea-weed decaying on the beach. The pleasant odor is believed to be emitted by fresh sea-weed lying exposed to the air in shallow water.

As far as the authors of this paper are aware, P. Haas (1) is the only person to have studied the chemical nature of the volatile principle in sea-weed; and, according to him, the odor emitted by *Polysiphonia fastigiata* and *P. nigrescens* is due by dimethylsulphide.

This short paper reports the results of analytical studies conducted by the writers on the irritative odor emitted by *Dilsea edulis* in Onagawa Bay, Miyagi Prefecture, Japan.

Methods and Results

As the odor emitted by this species at low tide was suggestive of a halogen compound, the specimen was immediately analyzed for iodine and bromine. The results obtained are shown in Table I.

Table I
Percentage of iodine and bromine in *Dilsea edulis*:

I ₂	Br ₂
0.086	0.509

From the above, it can be seen that *Dilsea edulis* contains a great deal more bromine than iodine. Therefore, in order to determine whether bromine is included in the odor emitted, a 1 liter flask was filled with 100 grams of fresh *Dilsea edulis* and fitted with a stopper through which two tubes, a short delivery tube and a long tube reaching to the bottom of the vessel, were passed. By means of a suction pump, a current of air conveying

the gas emitted by the specimen was then transmitted from the flask described to the other two flasks containing 25 cc. of 1% sodium carbonate and 25 cc. of distilled water respectively. The air and gas mixture was passed through these two solutions for a period of three hours at room temperature. Both solutions were then analyzed for chlorine, iodine and bromine and the results obtained are shown in Table II.

Table II
Quantity of chlorine, iodine and bromine detected in gas emitted by 100 grams of *Dilsea edulis* :

Cl ₂	I ₂	Br ₂
negative	3.806 mg	negative

This shows that the odoriferous principle is iodine, not bromine as had been anticipated. Thus, iodine was found to be a new element of the odor of sea air.

In order to find the mechanism of emission of iodine, following experiment was carried. 100 grams of *Dilsea edulis* were immersed in 200 cc of diluted sea-water (4 parts sea-water ; 1 part distilled water) for a period of three hours; subsequent tests of this solution revealed that it contained almost the same quantity of iodine as the solution in experiment No. II. (Table III).

Table III
Quantity of iodine and bromine extracted by diluted sea-water :

Principles extracted by diluted sea-water	Soaking time in hours.			
	2	3	24	36
I ₂ (mg.)	2.29	3.69	49.05	51.61
Br ₂ (mg.)	negative	negative	trace	

It can therefore be suggested that the production of the odor, or the liberation of iodine, might in some way be attributable to an interruption in the normal metabolism of the sea-weed. In other words, the odor may be the result of some change in the plant, associated either with the drying process during low-tide, or with osmotic action resulting from dilution by fresh water as occurs following precipitation. Moreover, Kylin's works (2, 3, 4) on the iodine metabolism of sea-weed, particularly of *Laminariae*, emphasize this phenomenon. He showed that iodine was split off from iodide by the action of both iodide-oxidase and oxygen. An investigation to ascertain whether the liberation of iodine from *Dilsea edulis* occurs under the same conditions is reserved for future study.

Summary

1. Iodine is the odoriferous principle emitted by *Dilsea edulis*. 3.806 milligrams of iodine were given off by 100 grams of fresh sea-weed during three hours of aeration.

2. Iodine has, therefore, been found to be a new element of the odor of sea-air as given off by fresh sea-weed lying on beaches.

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References

1. Haas P. 1935. *Bioch. J.*, 29, 1297-1299.
2. Kylin H. 1930. *Z. physiol. Chem.*, 186, 50-84.
3. Kylin H. 1931. *ibid.*, 191, 200-210.
4. Kylin H. 1931. *ibid.*, 203, 58-65.