

NOTIZEN

99.26 per cent Water Content in the Fresh-water Medusa

Craspedacusta sowerbii

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(Z. Naturforsch. 32 c, 1011–1012 [1977]; received August 22, 1977)

Craspedacusta, Hydrozoa, Water Content, Cation Contents

The fresh-water medusa *Craspedacusta sowerbii* (Hydrozoa: Limnomedusae) contains 99.26% water, 0.67% organic matter, and 0.07% inorganic materials. Its cation concentrations are compared to those of *Aurelia aurita*, sea-water, and habitat water.

Medusae are generally considered to be the animals with the highest water content. Despite fantastic figures of up to 99.9% found in some textbooks, marine medusae, being isotonic with the surrounding sea-water¹, can contain at the most 94–96.5% of water^{2,3}. Higher contents are found in medusae living in brackish water, as they are poikilosmotic in different salinities². Thus, a water content of more than 98% was recorded⁴ for *Aurelia aurita* (Scyphozoa: Semaestomeae) from the Baltic Sea near Greifswald (0.7% salinity), whereas the same medusa has only 95.56%⁵ in normal sea-water of 3.5% salinity. Further, higher water contents are to be expected in hydromedusae rather than in scyphomedusae, because the mesogloea of the former is free of cells. From these facts it may be concluded that the water content of the (hydrozoan) fresh-water medusae must be very high. This assumption was confirmed for *Craspedacusta sowerbii* (Hydrozoa: Limnomedusae) with a water con-

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tent of 99.01–99.31%⁶ and 97.5–98.6%⁷ respectively. In the closely related *Limnocnida tanganica* a water content of slightly more than 99% was found⁸. Since there is a marked difference in the figures given for *Craspedacusta*, which may result from insufficient methods or from different salt concentrations in the habitat water, it seemed worthwhile to reinvestigate the problem and to compare the results with the ionic contents of the water, when a mass occurrence of *Craspedacusta sowerbii* was found in a pond near Heidelberg.

The medusae (only sexually mature females were found) had a mean diameter of 20 mm and a mean fresh weight of 0.52 g. There were no visible food particles in the gastrovascular cavity, but all medusae were heavily infested by *Trichodina pediculus* (Ciliata: Peritricha).

The fresh weight was determined from freshly collected intact medusae that had been dried by gentle squeezing between layers of filtering paper covered with gauze, thus removing very carefully all external water. The dry weight was obtained by two different methods: A) by drying at 105 °C for 12 hours, B) by freeze-drying. The ash weight was found after complete combustion of the dried medusae. Each method was repeated with a second sample (Table I).

Since the results of the samples in both methods are very similar, we can state that in *Craspedacusta sowerbii* the mean water content is 99.26%; the remaining 0.74% of dry matter are composed of 0.07% inorganic and 0.67% organic materials.

In order to obtain the corresponding figures of the habitat water, two samples of water [C) 1 and C) 2] were filtered, then dried at 105 °C for 12 hours and finally combusted (Table II).

From these figures it can be seen that *Craspedacusta* is not isotonic to its habitat water as it is the

Tab. I. *Craspedacusta sowerbii*.

| Test | No. of medusae | Fresh weight [g] | Dry weight [g] | Water content [g] | Ash weight [g] | % Water | % Ash |
|---------|----------------|------------------|----------------|-------------------|----------------|---------|--------|
| A) 1 | 10 | 4.9527 | 0.0364 | 4.9163 | 0.0036 | 99.265 | 0.0727 |
| A) 2 | 10 | 5.5438 | 0.0404 | 5.5034 | 0.0040 | 99.271 | 0.0722 |
| A) 1+2 | 20 | 10.4965 | 0.0768 | 10.4197 | 0.0076 | 99.268 | 0.0724 |
| B) 1 | 25 | 13.0874 | 0.0948 | 12.9926 | 0.0093 | 99.276 | 0.0711 |
| B) 2 | 25 | 13.0029 | 0.0998 | 12.9031 | 0.0099 | 99.232 | 0.0761 |
| B) 1+2 | 50 | 26.0903 | 0.1946 | 25.8957 | 0.0192 | 99.254 | 0.0736 |
| A) + B) | 70 | 36.5868 | 0.2714 | 36.3154 | 0.0268 | 99.258 | 0.0733 |



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Tab. II. Habitat water.

| Test | Weight of filtered water [g] | Dry weight [g] | Ash weight [g] | % Dry matter | % Ash |
|--------|------------------------------|----------------|----------------|--------------|--------|
| C) 1 | 26.0988 | 0.0078 | 0.0055 | 0.030 | 0.0211 |
| C) 2 | 30.9905 | 0.0102 | 0.0062 | 0.033 | 0.0200 |
| C) 1+2 | 57.0893 | 0.0180 | 0.0117 | 0.032 | 0.0205 |

case with marine medusae, its inorganic contents being 3.6 times higher than those of the water.

The concentrations of the dominant cations in *Craspedacusta* and its habitat water were analysed

by means of atomic absorption spectrometry. A comparison of the results with the known data for *Aurelia aurita*¹ and for sea-water¹ (Table III) reveals that the concentrations of cations in *Craspedacusta* compared to its habitat water show marked differences, while the absolute as well as the percentage data for *Aurelia* and its habitat, the sea-water, are nearly identical. Further, it is obvious that the percentage cation concentrations of *Craspedacusta* are more similar to sea-water than to its fresh-water habitat.

I am very grateful to Mr. M. Gastner for performing the atomic absorption spectrometry analyses.

Tab. III. Comparison of cation concentrations.

| Cation | <i>Aurelia aurita</i> | | Sea-water | | <i>Craspedacusta sowerbii</i> | | Habitat water | |
|------------------|-----------------------|--------|-----------|--------|-------------------------------|--------|---------------|--------|
| | [g/kg] | [%] | [g/kg] | [%] | [g/kg] | [%] | [g/kg] | [%] |
| Na ⁺ | 10.2 | 83.40 | 10.6 | 83.80 | 0.198 | 62.21 | 0.012 | 11.89 |
| K ⁺ | 0.41 | 3.35 | 0.38 | 3.00 | 0.0255 | 8.01 | 0.0022 | 2.18 |
| Ca ²⁺ | 0.39 | 3.19 | 0.40 | 3.16 | 0.074 | 23.25 | 0.078 | 77.31 |
| Mg ²⁺ | 1.23 | 10.06 | 1.27 | 10.04 | 0.0208 | 6.53 | 0.0087 | 8.62 |
| | 12.23 | 100.00 | 12.65 | 100.00 | 0.3183 | 100.00 | 0.1009 | 100.00 |

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