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**Research Article**

# STUDY OF THE EFFECT OF VARIATION IN THE CONCENTRATION OF MINERAL SOLUTION IN THE PEM OF 1.531211SMJ38 BEFORE AND AFTER EXPOSURE TO SUNLIGHT, ON MORPHOLOGY OF 1.531211 SMJ38

**Deepa Srivastava**

Department of Chemistry, S.S.Khanna Girls' Degree College, Constituent College of Allahabad University, Allahabad, Uttar Pradesh, India

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**ABSTRACT**

Jeewanu the autopoetic eukaryote, has been prepared in the laboratory in a sunlight exposed sterilized aqueous mixture of some inorganic and organic substances.Several minerals are found in the body of the living systems. Although the minerals are present in very small quantity in the living system yet they are very essential for several vital processes. Some of these are calcium, potassium, sodium, magnesium, sulphur and transition metals like iron, manganese, copper zinc. Sea water is a major source of minerals. Minerals favour the abiogenesis of fatty acids. An attempt has been made to investigate the effect of variation in the concentration of mineral solution on the formation and morphology of 1.5 31211 SMJ 38 Jeewanu before and after exposure to sunlight.



## INTRODUCTION

Jeewanu, the autopoetic eukaryote has been prepared in the laboratory in a sunlight exposed sterilized aqueous mixture of some inorganic and organic substances (Bahadur andRanganayaki, 1970).

Several minerals are found in the body of the living systems. Although the minerals are present in very small quantity in the living system yet they are very essential for several vital processes. Minerals also help in the acid base balance of the body and regulate the osmotic pressure (Pant,1966).

The blood clotting, muscle contraction and bone formation are facilitated by the presence of ionic calcium.

Potassium effects upon the function of nervous system. It helps in CO2 transport in KHb in the red blood corpuscles.

About 90% of the total base of the body is provided by the sodium present in plasma. The acid and alkaline sodium phosphate constitutes an important buffer system.

70% of the total Mg of the body is present in bones as phosphates. The essential part of the green plants, the chlorophyll, is a porphyrin derivative of magnesium.

Among the transition metal ions which act as component of enzyme and often as electron and oxygen carrier in living system, iron is most important (Neilands, 1972).

Iron has a very significant biological importance (Johnson,1968).Iron is present in ferredoxin, an iron sulphur protein, found in cells of plants, animals and in bacteria (Hall and Evans, 1969).Ferredoxin helps in electron transport and acts as catalyst in a number of biochemical processes (Rao *et al*,1978). According to Hall (Hall, 1973), certain types of ferredoxin might have been the first redox catalyst of living organisms.

Manganese is an essential element for the evolution of oxygen during photosynthesis (Wald, 1974).

Copper is widely distributed in sea water, plants and animals. Cobalt being a component of vitamin B12 (4.5%) is essential for human haemopoiesis.
Zinc is found in traces in all tissues.

*Corresponding author: **Deepa Srivastava**
*Department of Chemistry, S.S.Khanna Girls' Degree College, Constituent College of Allahabad University, Allahabad, Uttar Pradesh, India*

Sulphur is a constituent of essential amino acids viz. cystein, methionine etc. and sulphur containing proteins viz. mucin, cartilage protein etc.

**Table 1** The yield of the solid material formed in the five PEM was as follows

| S.N. | Details of the mineral solution in the PEM | Weight of the solid material formed in g. |
|---|---|---|
| 1 | In PEM having 2 ml mineral solution per 19 ml PEM | 0.2228 |
| 2 | In PEM having 4 ml mineral solution per 21 ml PEM | 0.2146 |
| 3 | In PEM having 8 ml mineral solution per 25 ml PEM | 0.2034 |
| 4 | In PEM having 216 ml mineral solution per 33 ml PEM | 0.2002 |
| 5 | In PEM having 24 ml mineral solution per 41 ml PEM | 0.1640 |

carbonates and silicates. Sharma in 1977 reported that the minerals favour the abiogenesis of fatty acids (Sharma, 1977). An attempt has been made to investigate the effect of variation in the concentration of mineral solution on the formation and morphology of 1.5 31211 SMJ 38 Jeewanu before and after exposure to sunlight.

## MATERIALS AND METHODS

The following solutions were prepared:

1. 4%(w/v) ammonium molybdate
2. 3%(w/v) diammonium hydrogen phosphate
3. Mineral solution was prepared by mixing different minerals in definite proportion.
4. 36% formaldehyde solution.
5. 3%(w/v) sodium chloride
6. 5%(w/v) soluble sodium silicate

**Table 2** Effect of variation in the concentration of mineral solution on the number of Jeewanu (SA/view) with increasing period of exposure.

| Period of exposure in minutes | Volume of mineral solution added to the PEM(in ml) | | | | |
|---|---|---|---|---|---|
| | 2 | 4 | 8 | 16 | 24 |
| 50 | 252.2±4.60 | 186.8±5.56 | 47.8±1.56 | | |
| 70 | 159.6±3.25 | 61.6±2.29 | 19.8±1.28 | | |
| 90 | 211.6±4.16 | 59.0±2.65 | 6.8±1.91 | | |
| 120 | 222.0±3.39 | 149.0±3.07 | 4.4±0.51 | | |
| 240 | 373.0±3.52 | 78.8±2.87 | 54.2±2.15 | No Jeewanu formation | |
| 360 | 427.0±2.75 | 127.0±2.09 | 50.8±3.2 | | |
| 480 | 974.0±1.77 | 153.0±2.49 | 158.8±3.9 | | |

**Table 2 (contd)**

| Period of expo. in hours | Volume of mineral solution added to the PEM (in ml) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2 | | 4 | | 8 | | 16 | | 24 | |
| | Before expo. | After expo. | Before expo. | After expo. | Before expo. | After expo. | Before expo. | After expo. | Before expo. | After expo. |
| 16 | 150.8 ± 2.87 | 28.3 ± 5.06 | 58.4 ± 2.98 | 159.6± .50 | 311.4± 4.89 | 954.4± 4.20 | 8.20 ± 1.06 | 9.6 ± 0.92 | 1.6 ± 0.40 | 3.8 ± 0.50 |
| 20 | 61.0 ± 2.40 | 411.6 ± 3.88 | 334.2 ± 4.50 | 201.2± 3.60 | 803.8± 6.10 | 850.0± 4.10 | 20.6 ± 2.20 | 30.6 ± 2.60 | 6.0 ± 0.70 | 8.2 ± 0.50 |
| 24 | 1.36 ± 4.50 | 176.2 ± 4.50 | 25.4 ± 1.50 | 207.2± 8.50 | 328.2± 3.90 | 411.2± 4.40 | 219.4± 3.80 | 88.0 ± 1.90 | No Jeewanu | No Jeewanu |
| 26 | 129.4 ± 1.90 | 79.2 ± 2.10 | 82.2 ± 2.20 | 58.4 ± 2.30 | 140.2± 2.20 | 126.4± 2.30 | 10.2 ± 1.50 | 2.3 ± 0.20 | No Jeewanu | No Jeewanu |
| 32 | | | | | 1009.4± 5.10 | 572.8± 4.60 | | | | |
| 34 | No Microscopic observations done | | | | 885.8± 2.3 | 837.6± 5.6 | No microscopic observations done | | | |
| 36 | | | | | 256.0± 2.3 | 595.6± 5.10 | | | | |
| 38 | | | | | 117.6± 4.9 | 802.0± 6.30 | | | | |

Sea water is a major source of minerals. The percentage composition of sodium chloride, magnesium sulphate, magnesium chloride, potassium chloride, calcium sulphate and calcium carbonate in sea water is 2.8%, 0.23%, 0.37%, 0.08%, 0.14% and 0.13% respectively. According to Sillen (Sillen,1965,1967), the pH and the concentration of major cations in the sea water are essentially fixed by the concentration of chloride ions and a number of common

All the solutions, except formaldehyde, were sterilized in an autoclave at 15 lbs for 15 minutes.

Five dry, clean, sterilized corning conical flasks of 50 ml capacity were taken and labeled 1 to 5. In each flask, 3 ml ammonium molybdate and 6 ml of diammonium hydrogen phosphate was added. Then 2ml, 4 ml, 8 ml, 16 ml and 24 ml of mineral solution were added to flasks 1 to 5 respectively.

After this, 2 ml of sodium chloride and 2 ml of soluble sodium silicate were added to each of the five flasks. Then 4 ml of formaldehyde solution was added to each of the five flasks. Thus the total volume of flask 1 to 5 was 19 ml, 21 ml, 25 ml, 3 ml and 41 ml respectively.

The flasks were cotton plugged, shaken carefully and exposed to sunlight for total 38 hours. After 50, 60, 70, 80, 90, 100, 110, 120, 240, 360 and 480 minutes respectively. The number and size of Jeewanu (SA/view) was recorded for all the five flasks. Then after this, after 16 hours, 20 hours, 24 hours and 26 hours of exposure period, the number and size of Jeewanu (SA/view) was recorded both before keeping the solutions for exposure after a night gap and after exposure. After this, the number and size of Jeewanu (SA/view) was recorded both before and after exposure of 32 hours, 34 hours, 36 hours and 38 hours for only the flask labeled (3) which contained 8ml of mineral solution in 25 ml of the PEM.

***Observations***

## DISCUSSION

After 4 hours of exposure, clear oscillatory motion of the particles was observed in all the PEM in which Jeewanu were formed in PEM having 2 ml, 4 ml and 8 ml mineral solution per 19 ml, 21 ml and 25 ml PEM respectively. The oscillatory motion existed up to 38 hours of exposure in the PEM having 8 ml mineral solution per 25 ml PEM. It was also observed that the particles are more motile before exposure, the motion of the particles become slowly as compared to the motion before exposure. Another special feature observed in the PEM having 8 ml of mineral solution per 25 ml PEM was the appearance of oval shaped particles along with the spherical particles. Like spherical particles, these particles also showed clear demarcation between the boundary wall and inner structure, were blue coloured and also showed prominent oscillatory motion.No significant Jeewanu formation was observed in the PEM having 16 and 24 ml of mineral solution in the PEM.

The yield of the particles show that the dry weight of the particles decreases as the concentration of the mineral solution is increased in the PEM.

**Table 3** Effect of variation in the concentration of mineral solution on the size of the particles in μ (SA/view) with increasing exposure time.

| Period of exposure in minutes | Volume of mineral solution added to the PEM(in ml) | | | | |
|---|---|---|---|---|---|
| | 2 | 4 | 8 | 16 | 24 |
| 50 | 0.50±0.001 | 0.50±0.020 | 0.50±0.040 | | |
| 70 | 0.50±0.040 | 0.50±0.048 | 0.50±0.003 | | |
| 90 | 0.250.003 | 0.50±0.023 | 0.50±0.008 | | |
| 120 | 0.500.012 | 1.00±0.018 | 0.50±0.013 | | |
| 240 | 0.25±0.006 | 0.500.120 | 1.00±0.024 | No Jeewanu formation | |
| 360 | 0.50±0.009 | 0.18±0.340 | 0.80±0.120 | | |
| 480 | 0.35±0.600 | 0.22±0.140 | 0.29±0.140 | | |

**Table 3** (contd)

| Period of expo. in hours | Volume of mineral solution added to the PEM (in ml) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2 | | 4 | | 8 | | 16 | | 24 | |
| | Before expo. | After expo. | Before expo. | After expo. | Before expo. | After expo. | Before expo. | After expo. | Before expo. | After expo. |
| 16 | 0.25 ± 0.042 | 0.18 ± 0.033 | 0.80 ± 0.120 | 0.50 ± 0.048 | 0.17 ± 0.03 | 0.25 ± 0.014 | 0.10 ± 0.004 | 0.25 ± 0.008 | 0.50 ± 0.064 | 0.20 ± 0.038 |
| 20 | O.25 ± 0.008 | 0.25 ± 0.082 | 0.25 ± 0.006 | 0.20 ± 0.003 | 0.25 ± 0.038 | 0.25 ± 0.024 | 0.25 ± 0.064 | 0.25 ± 0.086 | 0.20 ± 0.007 | 0.20 ± 0.008 |
| 24 | 0.25 ± 0.022 | 0.20 ± 0.028 | 0.20 ± 0.006 | 0.10 ± 0.008 | 0.25 ± 0.008 | 0.25 ± 0.016 | 0.20 ± 0.043 | 0.20 ± 0.056 | No Jeewanu | No Jeewanu |
| 26 | 0.5 ± 0.018 | 0.25 ± 0.013 | 0.25 ± 0.045 | 0.25 ± 0.061 | 0.20 ± 0.038 | 0.25 ± 0.046 | 0.25 ± 0.006 | 0.25 ± 0.009 | No Jeewanu | No Jeewanu |
| 32 | | | | | 0.50 ± 0.008 | 0.50 ± 0.005 | | | | |
| 34 | No Microscopic Observations done | | | | 0.25 ± 0.003 | 0.25 ± 0.005 | No microscopic observations done | | | |
| 36 | | | | | 0.10 ± 0.018 | 0.10 ± 0.026 | | | | |
| 38 | | | | | 0.10 ± 0.013 | 0.10 ± 0.018 | | | | |

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