International Journal of Academic Research and Development
ISSN: 2455-4197
Impact Factor: RJIF 5.22
www.academicsjournal.com
Volume 2; Issue 5; September 2017; Page No. 270-272

Affect of irradiation of the PEM of 1.531211SMJ29 Jeewanu with clinical mercury lamp and sunlight on blue colour intensity and the pH of the PEM of 1.531211SMJ29 silicon molybdenum Jeewanu

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

Abstract
The Jeewanu has been prepared in the laboratory in a sunlight exposed sterilized aqueous mixture of some inorganic and organic substances by Bahadur and Ranganayaki. In prebiotic atmosphere possibly energy transducing systems similar to Jeewanu existed which had an ability to convert solar energy into useful forms. Gáinti in 2003 discussed that Jeewanu possesses a promising configuration similar to protocell-like model. Jeewanu is capable of spitting water molecule to hydrogen and oxygen in presence of sunlight and the proton set free, is utilized to fix nitrogen and carbon dioxide.
Effect of variation in the concentration of mineral solution, formaldehyde and ammonium molybdate on pH and colour intensity of the PEM of 1.531211 SMJ38 Jeewanu before and after exposure to sunlight was studied by Srivastava, D.

Keywords: autopoetic, eukaryote, Jeewanu, PEM, sunlight, mercury lamp, morphology, 1.531211SMJ29, pH

Introduction
The Jeewanu has been prepared in the laboratory in a sunlight exposed sterilized aqueous mixture of some inorganic and organic substances [1].
In prebiotic atmosphere possibly energy transducing systems similar to Jeewanu existed which had an ability to convert solar energy into useful forms.
The photochemical, formation of protocell-like microstructures "Jeewanu" in a laboratory simulated prebiotic atmosphere capable of showing multiplication by budding, growth from within by actual synthesis of material and various metabolic activities has been reported [1, 2, 3, 4, 5, 7].
Gáinti discussed that Jeewanu possesses a promising configuration similar to protocell-like model [8].
Jeewanu is capable of spitting water molecule to hydrogen and oxygen in presence of sunlight and the proton set free, is utilized to fix nitrogen and carbon dioxide [9].
The photochemical reversible oxidation-reduction reaction takes place in the parental mixtures in which Jeewanu are formed. The colourless parental mixture becomes blue when exposed to sunlight because of the reduction of molybdic form of molybdenum of ammonium molybdate to molybdous form, during the Jeewanu formation. In dark, the (ous) molybdenum is again oxidized to (ic) molybdenum turning the parental mixture colourless again. This process makes the mixture blue on exposure to sunlight and colourless in dark. This phenomenon can be observed in the same mixture when shifted from dark to the sunlight and again from sunlight to dark repeatedly. But for this, the presence of formaldehyde and the contact of the mixture with atmospheric oxygen are essential. This reversible photochemical electron transfer is very interesting in the sense that it resembles the electron transfer of chlorophyll of plants in sunlight during the process of photosynthesis, where organic matter donates the electron.
Jeewanu under certain conditions showed characteristic movements at different periods of exposure. A very characteristic shivering movement, of Jeewanu which were prepared by the mixing of cerous sulphate solution to a mixture of potassium ferrocyanide solution and sucrose along with other constituents, was observed by Verma in 1970 [10].
The movement which is observed in protoplasm is considered to be the movement of locomotion. As this movement of protoplasm is without the aid of external factors, it is considered to be due to some internal causes. Sometimes, certain chemical substances, light and heat act as the external factors inducing the movement of protoplasm. These factors act as stimuli. Light also act as a stimulus as seen in algae which move towards the source of weak light but move away from the source of strong light. Protoplasm also responds to the stimulation of heat. When there are two different temperature areas, protoplasm moves towards the warmer area. However, if the tissue is gently warmed, the protoplasm shows more rapid rotation or circulation motion.
Effect of variation in the concentration of mineral solution, formaldehyde and ammonium molybdate on pH and colour intensity of the PEM of 1.531211 SMJ38 Jeewanu before and after exposure to sunlight was studied by Srivastava, D [11, 12, 13].
In this paper, an attempt is made to investigate the effect of irradiation of 1.531211SMJ29 Silicon Molybdenum Jeewanu PEM with mercury lamp and sunlight on the blue colour intensity and the pH of the PEM.

Materials and Methods
The following solutions were prepared:
1. 4% (w/v) ammonium molybdate
2. 3 % (w/v) diammonium hydrogen phosphate
3. Mineral solution: It was prepared by mixing various

minerals in appropriate proportions
4. 36% formaldehyde
5. 3% (w/v) sodium chloride
6. 5% (w/v) water soluble sodium silicate

Procedure

Two clean, dry, sterilized corning conical flasks of 10 ml capacity were taken and labeled and B. In each flask 15 ml of 4% ammonium molybdate, 30 ml of 3% diammonium hydrogen phosphate, 10 ml of mineral solution, 20 ml of formaldehyde, 10 ml of sodium chloride and 10 ml of soluble sodium silicate were added. The total volume of each flask was 95 ml separately.

Each flask was cotton plugged and shaken well. Flask A was exposed to sunlight and flask B was exposed to mercury lamp keeping the distance of flask B from mercury lamp 32 cms and the mercury bulb used was of 125 W. Both the flasks were exposed simultaneously for same exposure time each day giving half hour exposure daily for first two days, and then 2 hours exposure daily for fourteen days giving a total exposure of 29 hours. The intensity of the blue colour and the pH were noted both before and after each exposure for each flask A and B. the microscopic observations were also done simultaneously both before and after each exposure.

After total 29 hours of exposure, particles of each flask were filtered, dried in a desiccator and weighed. The yields of both flasks were noted.

Table 1: Effect of irradiation of 1.531211SMJ29 PEM to sunlight and mercury lamp on the pH of the PEM.

Period of exposure in hours	Irradiated to sunlight		Irradiated to mercury lamp	
	Before exposure	After exposure	Before exposure	After exposure
½	3.33	2.72	3.37	2.90
1	2.65	2.60	2.64	2.53
3	2.73	2.70	2.73	2.70
5	2.82	2.80	2.82	2.80
7	2.68	2.60	2.68	2.60
9	2.72	2.60	2.68	2.66
11	2.70	2.65	2.65	2.60
13	2.73	2.62	2.71	2.54
15	2.67	2.61	2.68	2.53
17	2.66	2.62	2.63	2.57
19	2.70	2.65	2.68	2.60
21	2.68	2.65	2.68	2.63
23	2.69	2.59	2.69	2.57
25	2.75	2.70	2.75	2.64
27	2.78	2.66	2.77	2.57
29	2.64	2.63	2.73	2.65

The yields of the two flasks were as follows
Yield of 1.531211SMJ29 in g

a. Flask A exposed to sunlight 0.2984
b. Flask B exposed to mercury lamp 0.2430

Conclusion

The observations indicate that the intensity of the blue colour increased with increase in the exposure time in both the cases i. e. in both the PEM the one exposed to sunlight and the other exposed to the radiation of the clinical mercury lamp light. The difference in the trend of absorbance in both was that the peak of the absorbance in case of the PEM irradiated with clinical mercury lamp light was lower than that of the PEM irradiated with sunlight indicating that some radiations of sunlight other than long ultraviolet is more effective in producing the blue colour in the PEM on exposure. It was further observed that the difference in the blue colour intensity after a night gap and before the next exposure and that after exposure gradually decreased with increase in the exposure time and almost disappeared after 7 hours of exposure. This was found to be true for both the cases of PEM irradiated with sunlight and with clinical mercury lamp light.

In the mixture which was exposed to sunlight the intensity of blue colour was more after the day’s exposure. After the mixture stood in shade and in the darkness of the night the next morning the mixture became light in the blue colour intensity. This started after the exposure of half an hour and was observed till 7 hours of exposure. After that the decrease in the colour intensity in dark was not that pronounced.

It has been observed that when 0.2 g of ammonium molybdate in 200 ml distilled water and having 10 ml formaldehyde was exposed to sunlight; the mixture became blue in colour in sunlight. If this mixture was covered with black cloth and kept overnight, the intensity of the blue colour decreased. If the mixture was kept for few days in dark it became completely colourless. When the same mixture was again exposed to sunlight, it turned blue in colour and was bleached on keeping in dark. It has been observed that this process can be repeated again and again for a long time. It has further been observed that it has two limiting factors:

1. There must be oxygen in the overhead space.
2. There must be formaldehyde in the mixture.

In the experiment undertaken above, the reason for not getting significant decrease in the colour intensity of the PEM exposed to sunlight after 7 hours of exposure when kept in dark, might be that all the formaldehyde present in the PEM was used up because the oxygen was always present in the overhead space of the flask in which PEM was kept.

It was interesting to note that the long ultraviolet of clinical

mercury lamp produced much less blue colour in the mixture. This shows that the visible part of the solar radiation is more effective in producing blue coloured Mo4+ ions from colourless Mo6+ ions in presence of chemicals of the PEM.
It has been observed that in shade the pH increased i.e. before exposure after darkness of the night, the pH was more. On exposure the pH decreased in both the cases i.e. in PEM exposed to sunlight and the PEM exposed to radiations of clinical mercury lamp. Another interesting feature observed was that the initial pH was more in both cases and with increase in exposure period, the pH decreased in both the cases.

References

1. Bahadur k, Ranganayaki S, Brit J. Interplanetary Soc. 1970; 23(12):813-829.
2. Bahadur K. Vijanana Parishad Anusandhan Patrika. 1963; 6:94-117.
3. Bahadur K, Agarwal KML, Zbl. Bakt. 1964; 117(2):585-602.
4. Bahadur K. in Synthesis of Jeewanu, the Protocell, m/s Ram Narayan Lal Beni Prasad, Allahabad, India, 1966.
5. Bahadur, K., Zbl. Bakt. 1967; 121(2):291-319.
6. Bahadur K, Ranganayaki. Singh, VP, Kumar, S. ravista do.Institute de. Antibiotics Recife. 1975; 15(1/2):33-36.
7. Bahadur K, Ranganayaki S. Origin of Life, A Functional Approach, M/S R Am Narain Lal And Beni Prasad, Allahabad, India, 1980.
8. Ganti T. The Principles of Life, Oxford University Press, Oxford, U.K, 2003.
9. Bahadur K, Ranganayaki S, Smith A, Folsome C. Natl. Acad. Sci. India Golden Jubilee Commemoration. 1980, 181-198.
10. Verma ML. Studies in Abiogenesis of Molecular Associations, D. Phil. Thesi, Dept. of Chemistry, Univ. of Allahabad, Allahabad, India, 1970.
11. Srivastava D. effect of variation in the concentration of mineral solution on pH and colour intensity of the PEM of 1.531211SMJ3Jeewanu before and after exposure to sunlight, international journal of Innovative research in science, engineering and technology (an iso 3297: 2007 certified organization), (ijirset),Vol.5, issue 5, may 2016, pp 8065 8068. Doi: 10.15680/ijirset. 2016. 0505111, 2016.
12. Srivastava D. Effect of increase of concentration of formaldehyde in the PEM of 1.531211 SMJ8 on the proton release and degree of Mo 6+ reduction to Mo 4+ during the exposure to sunlight" journal of natural Science research (iiste). 2012; 2(7):56-59.
13. Srivastava D. Effect of variation in the concentration of ammonium molybdate in the parental Environmental medium (PEM) on the pH and the photochemical reduction of Mo6+ to Mo 4+ in the PEM of the Silicon Molybdenum Jeewanu 1.531211 SMJ8 both before and after exposure, international journal of Scientific and engineering research (ijser), 2012; 3(6):750-754. Doi**:** 10. 14299/000000.