

Prof. Dr. Rajeshwar Sharan



North-Eastern Hill University

Molecular Biology, Cancer Research, Biotechnology

M. Sc. (Life Sciences), Ph. D.



Research Experience

Oct 2000–Jan 2001	Invited Professor Osaka University, Division of Radiation Biology and Medical Genetics, Prof. Taisei Nomura; Japan, Ōsaka-shi
Sep 1987–Aug 2002	Visiting Professor Forschungszentrum Jülich, Institute of Neurosciences and Medicine (INM)
Aug 1984–present	Lecturer, Reader and Professor North Eastern Hill University, Department of Biochemistry; India, Shillong

Education

B.Sc.	Patna University, Patna, India
M.Sc.	Jawaharlal Nehru University, New Delhi, India
Ph.D	Jawaharlal Nehru University, New Delhi, India

Member

2002-2004	President, Indian Society for Radiation Biology
1990-1993	Member, National Youth Council, Govt. of India
	Associate Editor - <i>Journal of Radiation Research</i>

Choice of latest publications

UVC based advanced oxidation for decolourization and mineralization of calconcarboxylic acid in aqueous solution: Eco-toxicological effect of post treated solutions and its remedy

Mihir K. Sahoo, Bhauk Sinha, Rajesh. N. Sharan

ABSTRACT: The present study reports two important aspects of wastewater treatment by UVC light ($\lambda = 254$ nm) in the presence of hydrogen peroxide (HP) and ammonium persulphate (APS) taking Calconcarboxylic acid (CCA) as a model pollutant. The first part deals with the effect of various operational parameters on the decolourization and mineralization of CCA. Most importantly, the eco-toxicological effect of the treated solutions was examined on the basis of *E. coli* growth inhibition bioassay and the remedy for the same has been suggested in the second part. Although both oxidants show higher mineralization at pH 1, APS is preferred over HP for having higher mineralization, biodegradation, and electrical energy efficiency. The presence of $-\text{COOH}$ group in CCA has detrimental effect on its mineralization and biodegradation, as well as on the electrical energy efficiency. Although a rise in mineralization at all pH is observed by the removal of the $-\text{COOH}$ group, it is significant in alkaline media. Since treatment at pH 1 is not ideal for real scale applications, it is advisable to remove the $-\text{COOH}$ group before treatment, so as to make treatment possible in alkaline media. Removal of $-\text{COOH}$ group also leads to higher biodegradation in a shorter treatment period.

The Canadian Journal of Chemical Engineering 10/2014; 92(10). DOI:10.1002/cjce.22040 · 1.31 Impact Factor

Evaluation of endogenous control gene(s) for gene expression studies in human blood exposed to ^{60}Co -rays ex vivo

S Thangminlal Vaiphei, Joshua Keppen, Saibadaiahun Nongrum, R C Chaubey, L Kma, R N Sharan

ABSTRACT: In gene expression studies, it is critical to normalize data using a stably expressed endogenous control gene in order to obtain accurate and reliable results. However, we currently do not have a universally applied endogenous control gene for normalization of data for gene expression studies, particularly those involving ^{60}Co γ -ray-exposed human blood samples. In this study, a comparative assessment of the gene expression of six widely used housekeeping endogenous control genes, namely 18S, ACTB, B2M, GAPDH, MT-ATP6 and CDKN1A, was undertaken for a range of ^{60}Co γ -ray doses (0.5, 1.0, 2.0 and 4.0 Gy) at 8.4 Gy min^{-1} at 0 and 24 h post-irradiation time intervals. Using the NormFinder algorithm, real-time PCR data obtained from six individuals (three males and three females) were analyzed with respect to the threshold cycle (Ct) value and abundance, ΔCt pair-wise comparison, intra- and inter-group variability assessments, etc. GAPDH, either alone or in combination with 18S, was found to be the most suitable endogenous control gene and should be used in gene expression studies, especially those involving qPCR of γ -ray-exposed human blood samples.

Journal of Radiation Research 09/2014; 56(1). DOI:10.1093/jrr/rru074 · 1.69 Impact Factor

Dimethylnitrosamine-Induced Reduction in the Level of Poly-ADP-Ribosylation of Histone Proteins of Blood Lymphocytes - a Sensitive and Reliable Biomarker for Early Detection of Cancer

Lakhan Kma, Rajeshwar Nath Sharan

ABSTRACT: Poly-ADP-ribosylation (PAR) is a post-translational modification of mainly chromosomal proteins. It is known to be strongly involved in several molecular events, including nucleosome-remodelling and carcinogenesis. In this investigation, it was attempted to evaluate PAR level as a reliable biomarker for early detection of cancer in blood lymphocyte histones. PAR of isolated histone proteins was monitored in normal and dimethylnitrosamine (DMN)-exposed mice tissues using a novel ELISA-based immuno-probe assay developed in our laboratory. An inverse relationship was found between the level of PAR and period of DMN exposure in various histone proteins of blood lymphocytes and spleen cells. With the increase in the DMN exposure period, there was reduction in the PAR level of individual histones in both cases. It was also observed that the decrease in the level of PAR of histones resulted in progressive relaxation of genomic DNA, perhaps triggering activation of genes that are involved in initiation of transformation. The observed effect of carcinogen on the PAR of blood lymphocyte histones provided us with a handy tool for monitoring biochemical or physiological status of individuals exposed to carcinogens without obtaining biopsies of cancerous tissues, which involves several medical and ethical issues. Obtaining blood from any patient and separating blood lymphocytes are routine medical practices involving virtually no medical intervention, post-procedure medical care or trauma to a patient. Moreover, the immuno-probe assay is very simple, sensitive, reliable and cost-effective. Therefore, combined with the ease of preparation of blood lymphocytes and the simplicity of the technique, immuno-probe assay of PAR has the potential to be applied for mass screening of cancer. It appears to be a promising step in the ultimate goal of making cancer detection simple, sensitive and reliable in the near future.

Asian Pacific journal of cancer prevention: APJCP 08/2014; 15(15):6429-36. DOI:10.7314/APJCP.2014.15.15.6429 · 2.51
Impact Factor

Fenton and Fenton-like processes for the mineralization of Ponceau S in aqueous solution: Assessment of eco-toxicological effect of post treated solutions

M.K. Sahoo, M. Marbaniang, B. Sinha, R.N. Sharan

ABSTRACT: This study reports the influence of various operational parameters on the decolorization and mineralization of Ponceau S (PS) by HO and SO₄⁻ radicals, generated by the activation of oxidants like H₂O₂ (HP) and (NH₄)₂S₂O₈ (APS) by three transition metal ion catalysts viz. Fe²⁺, Ag⁺ and Co²⁺ in the so called Fenton and Fenton-like processes. The most effective catalyst for the activation of both the oxidants is found to be Fe²⁺, although its effect is more for HP than APS. Further, Co²⁺ inhibits mineralization completely when used with HP. The ideal systems for mineralization are Fe²⁺/HP operating at pHs 3 and 6.6, and Fe²⁺/APS operating at pH 3. The most significant result of this study is that Fe²⁺/APS system is applicable at all pH, which is important for real scale applications. As the treated solutions have to be released into the water bodies, the eco-toxicological effect of these solutions on a model microorganism, Escherichia coli were examined based on their metabolic inhibition assay. The treated solutions were found to be more biotoxic than the pure dye

solution, the magnitude being more in Fe²⁺/HP system than in Fe²⁺/APS system. Thus, metal ion assisted treatment processes are not environmentally benign.

Separation and Purification Technology 03/2014; 124:155–162. DOI:10.1016/j.seppur.2014.01.021 · 3.07 Impact Factor

Improving the operational parameters with high electrical energy efficiency for UVC induced advanced oxidation and mineralization of Acid blue 29: Generation of eco-friendly effluent

M. K. Sahoo, L. Sayoo, D. B. Naik, R. N. Sharan

ABSTRACT: Mineralization of Acid blue 29 (AB 29), an anionic azo dye, was carried out at various pHs using UV254 in the presence of H₂O₂ (HP) or Na₂S₂O₈ (SPS) as oxidants. The influence of operational variables such as pH and intensity of UV light on mineralization was analyzed and their electrical efficiency were evaluated in terms of electrical energy per order (EE/O). It was observed that although HP and SPS worked as good oxidants at all pHs, mineralization ability of SPS was higher than HP. In fact it was noted in general that at a particular time, the mineralization increased with increase in intensity, e.g. the mineralization by UV/SPS system in 90 min at pH 6.69 (natural pH of AB 29) increased from 37.9% to 95.6% when the intensity was increased from 213 to 1755 $\mu\text{W cm}^{-2}$. The most important finding of the work is that >95% mineralization was achieved at all pHs except at pH 13, where it was 80%. Under the present experimental conditions, SPS showed higher biotoxicity removal efficiency (90.2%) than HP (64.6%) after adjusting the pH of the treated solution to 7. Thus, we have been able to generate eco-friendly effluent, which makes our work suitable for real scale applications.

Separation and Purification Technology 03/2013; 106:110–116. DOI:10.1016/j.seppur.2013.01.004 · 3.07 Impact Factor