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A Laboratory Animal Study on Their Effects on Body Electrolyte

Medani, El Badwi, S. M. A. and Amin, A. E.

Department of Pharmacology and Toxicology, Nile College, Sudan

Abstract

Six heads of Newzealand rabbits were divided into 2 groups. Group 1 animals were the undosed controls. The test group was given 1% alum and 1% polydadmac at 1:2 for a period of 10 weeks after an adaptation period of two weeks during which the animals were under ideal experimental conditions. Fluctuations in electrolyte levels of Mg, Fe, Na, K, Ca and P were monitored in comparison to the undosed control rabbits. On evaluation of the above results, The interactive water treatment with 1% alum and 1% polydadmac at 1:2 was considered toxic to Newzealand rabbits at the dose rates tried Practical implications of the results were highlighted and suggestions for future work were put forward.

Keywords

Alum, polydadmac, interactive, drinking water treatment, Newzealand rabbits

Introduction

In the Sudan, the first use of a chemical to reduce the turbidity of the Nile water especially during the flood season to be suitable for the healthy human consumption with a maximum allowable level (MAL) of 150 mg/L, was 1925. Most of the available working staff is not satisfactorily qualified educationally and the disposal system to eliminate the outcome of the sludge of the chemical reactions that happen during treatment of the turbid water is not adjusted well to the laws of environmental health regulations.

Through –out time , alum did not give satisfactory results in the reduction of turbidity of water ,so new methodologies were introduced with special preference in use of polydadmac polymer .Toxicological tests were always lacking and hence subjected this use to a lot of debate .This experiment is a trial to lead the way out.

Material

Animals Six, 5-7 month old mixed, clinically healthy Newzealand rabbits were purchased from Balsam Pharmaceutical Laboratories in the vicinity of Khartoum North and housed, prophylacticly dosed. The rabbits were ear tagged, given a 2-week preliminary period during which lucerne was fed and Nile drinking water was provided ad libitum.

Administration of the doses:Test materials, polyDADMAC and alum (AlSO4), were prepared in separate stocks each as 1% solution. The two test solutions were blended at 1:2 of the polymer and alum respectively. Animals were weighed-distributed into two experimental groups. Test blend was given orally to rabbits of group 2. In drinking Nile water daily. The untreated controls were rabbits of group 1. Chemical methods.

Blood samples obtained the ear vein of rabbits before and after dosing with the joint solution(Schalm, 1965). Venous blood samples were centrifuged at 3000 r.p.m. for 5 minutes and stored at -20oC until analyzed and investigated for the changes in the electrolytes magnesium, iron, sodium, potassium, calcium and phosphorus.

Statistical methods

The difference between mean values of data were analysed by the un-paired students- t-test (Snedecor and Cochran, 1989).

Results

Chemical electrolytes changes:

Group /Dose	Mg (mg/dl)	Iron (µg/dl)	Na (mg/dl)	K (mg/dl)	Ca (mg/dl)	P (mg/dl)
G1 (un-dosed)	1.56±0.17	256.23±39.81	125.41±3.22	5.07±0.12	11.38±0.10	4.34±0.13
G14 (1:2 solution)	0.39±0.42**	35.93±9.50**	ND	ND	3.17±0.67**	1.52±0.09***

ND= Not determined ** denotes P<0.01 *** denotes P<0.001

The concentrations of all the electrolytes in the serum of test rabbits showed significant ($P < 0.01 - 0.001$) decreases, when compared to the control group.

Discussion

In this study,the slow movement, hind limb were mostly pertenent to the stimulation of the central nervous system (CNS) with suggested inhibition of the serum cholinesterase activity which was not , unfortionately, measured leading to abnormal posture and gaits and nervous sings due to the action of the organochlorides as a diffuse stimulant of the C.N.S. (Clarke, 1975; Humphreys, 1983 and Mohamed, 1987).this can be attributed to significant change in electrolytes. This may lead in some instances to muscle shivering , tremors and paralysis especially if accompanied by the miscellaneous polymer effects indicated by the significant ($P < 0.01 - 0.001$) decreases in some electrolytes like sodium, potassium, calcium, phosphorus and magnesium. These electrolytes have effects on muscle action, potential and eventual spasms (Underwood, 1977 and Ganong , 2003).

The lungs of the rabbits of group 2 showed adhesions, congestions , haemorrhages and lymphocyte infiltrations were clear. These pulmonary disorders may be attributed to the direct irritant action of the drug as whole or alum alone.

Severe congestions, haemorrhages of cortex and medulla ,shrinkage of glomeruli and renal focal areas of necrosis may be attributed to renal damage due to severe decrease in electrolytes (Burrows, 2002).

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