EXPERIMENTAL STUDIES ON SODHANA OF ACONITE

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ABSTRACT: Sodhana, a preliminary treatment is known to reduce toxicity, enhance therapeutic merits of drugs and even impart additional pharmacodynamic properties. The present study – Sodhana Aconite, conducted to establish the effect in toxicity chemical changes and comparative pharmacological activity, show definite reduction in the intense cardiotoxic effect in crude Aconite,

Introduction:

The Āyurvedic system of medicine has been using poisonous materials of both vegetable and mineral origin as effective therapeutic agents after a preliminary treatment known as śodhana. It is claimed that this process of śodhana not only reduces the toxicity but also enhances the therapeutic merit of the drugs and at times imparts additional pharmacodynamic activities, not originally present in the crude material. Āyurveda recommends a veriety of methods for śodhana. The otherwise toxic materials after śodhana are administered in fairly large doses in Āyurvedic clinical practice. In order to verify the claims about the beneficial effect of śodhana, a preliminary study on the effect of śodhana of the poisonous plant Aconite, known as viṣa, ativiṣa and prativiṣa in Ayurveda, has been undertaken. This study includes the śodhana of Aconite as per Ayurvedic method, study of Chemical Changes in the composition of the drug as a result of śodhana and comparative pharmacological activity as well as toxicity of the crude and śodhit Aconite. Āyurveda recommends two methods for śodhana of Aconite, one method involves maceration of the Aconite root with cow's urine for seven days, peeling out the cortical layer of the urine–treated drug and washing the product with water to remove adherent urine, the second method consists of treating the drug with boiling milk for 12 hours peeling out the cortical layer and finally washing with water. Both the methods have been used in the present study. The present paper deals with the toxicity studies of the different preparations without cotex and with cortical layer.

The toxicities have been assessed on the result of ED_{50} (effective dose to produce cardiac irregularity) and LD_{50} studies.

Materials And Methods

(A) Estimation of cradiac activity (ED_{50}) *in frog heart perfusion experiment*

Large sized frog *(Rana Trigrina)* were used in these experiments and perfusion fluid was the usual frog Ringer solution. After taking the normal tracing, the test drugs were introduced through the cannula in graded ranging from 10–600 mg. and the response in each case was recorded. The effect of the drug on the force of contraction and the rate of heart beat were noted for calculation of the ED_{50} doses, taking control tracing as 100%.

(B) Estimation of LD_{50} *dose in mice:*

200 white mice (both sex) of the same strain were taken from the animal house of the Institute and after careful selection of the healthy animals, 174 mice were selected out for the experiment. These were divided into three groups with 68, 58 and 48 mice in group 1, 2, & 3 respectives. Each of these group were marked seperately as B (for group 1) II (for group 2) and

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V (for group 3) corresponding to the drug to be administered. The mice were kept in lots of 6 in each cage. The test drug B, II and IV were administeredto the similarly labelled groups of mice in graded doses by intraperitoneal injection.The animals were kept under observationfor 24 hours and the mortality in each group was noted at the end of this period. The animals closely observed during this period for the reactions to the drug, if any. Log dose probit mortality curves were drawn in accordance to Karber's method and themedian lethal dose was calculated.

Test drugs for toxicity experiment :

Aquous suspension of the total alcoholic extracts of the following seven samples :–

(1) Crude Aconite root (B)

(2) Urine treated Aconite root with contex (I)

(3) Sample I after removing outer covering (corticāl layer) (II)

(4) Outer covering (cortical layer only) of sample I (III)

(5) Drug treated with milk for 12 hours and with covering (IV)

(6) Drug treated with milk for 12 hours after removal of outer covering (V)

(7) Outer covering (cortical layer) only from milk treated drug (VI) see Figs.

Results and observation

Cardiac toxicity ED_{50} Determination in perfused

Frog heart :–

Drug	Does range in mg. studied	ED_{50} in mg. of drug sample
B	10 – 50	19. 5
I	10 – 200	52. 0
II	20 – 500	32. 5
III	100 – 500	125. 0
IV	100 – 500	147. 5
V	100 – 500	75. 0
VI	100 – 500	350. 0

The order of potency of the extracts in terms of cardiac toxicity as shown above was found to be

B II I V III IV VI.

It is apparent that the crude drug (B) is most toxic, whereas the drugs samples after treatment with cow's urine and or with cow's milk become comparatively less toxic.

The drug has got negative inotropic effect and also causes ventricular fibrilliation, resulting in ultimate cardiac arrest. The heart rate was more or less consistantla reduced with increasing doses. The cardiyc depressent effect persisted even after atropinisation thus perecluding any cholinergic involvement in this action of the drugs.

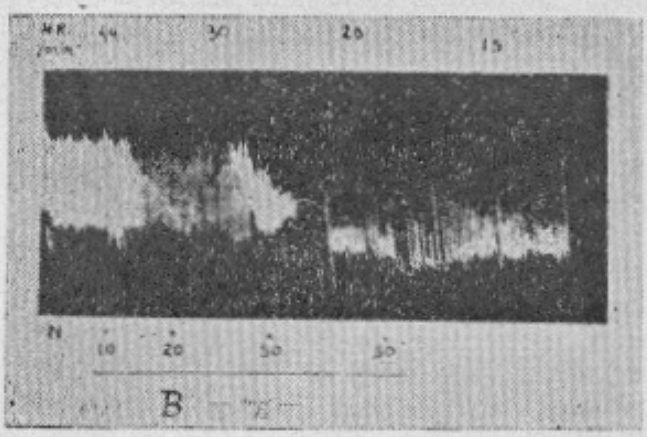
Determination of LD_{50} *dose*

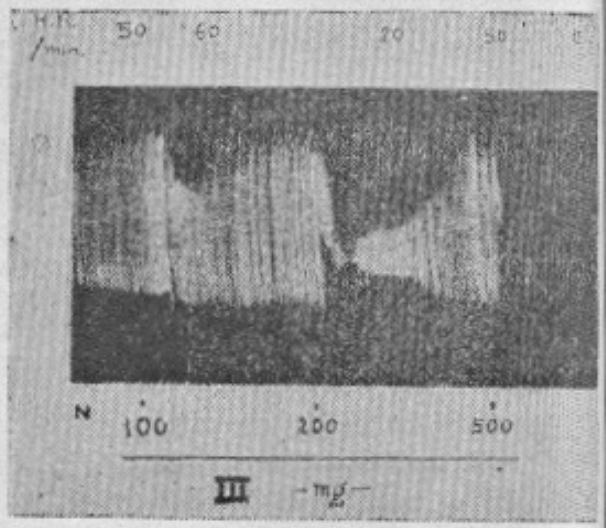
Mortality percentage was calculated in albino mice with graded dose of B. II and V by the Karbar's method. The 0% and 100% moratality was corrected by the the formulae $100\,\frac{(0.25)}{n}$ and $100\,\frac{(n-0.25)}{n}$ respectively. Log dose probit mortality curves were drawn and the medium lethal dose was calculated as the dose which produced probit 5 mortality. The results of the studies as given below :–

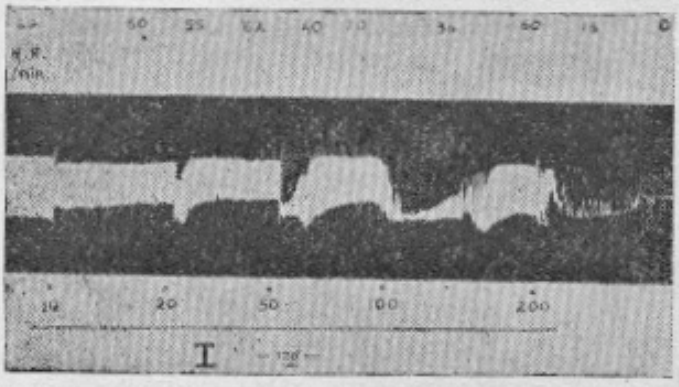
Sl. No.	Drug	No. of Animal	L. D_{50}
1.	B	58	130 mg/kg. I. P.
2.	II	68	1.7 gm/kg. I. P.
3.	V	48	2.1 gm/kg. I. P.

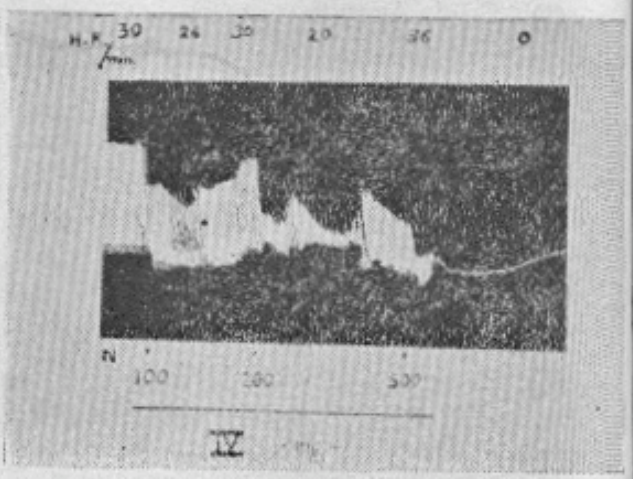
Whereas the LD_{50} of the crude drug (B) was found to be 130 mg/ kg. the LD_{50} of cow's urine-treated decorticated drug II was 1.7 gm/kg. and the milk treated decorticated drug (V) was 2.1. gm/kg. showing that the process of shodhana significantly reduced the toxicity. It was seen that all the drugs produced toxic reactions like convulsions, irregular breathing, protrusion of eyeball but the degree of reaction varied in cases of individual drugs. It was found further that the crude drug (B) induced drowsiness and lack of motor co-ordination whereas the

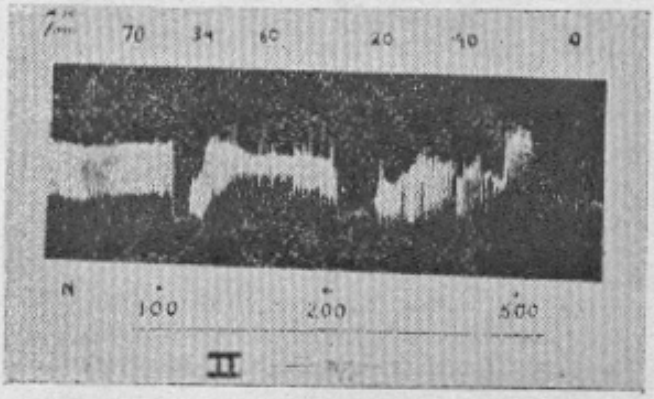
Figs.

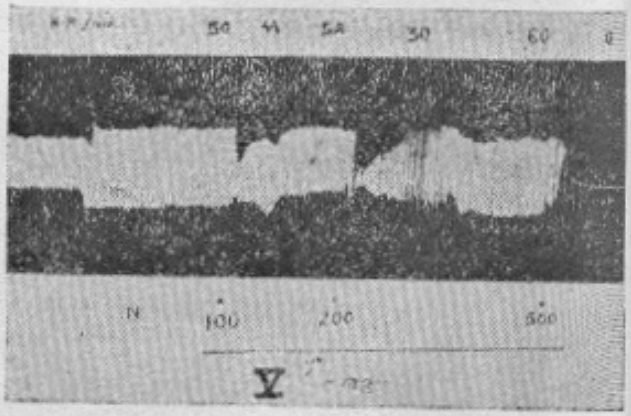












shodhit drugs II and IV treated with cow's urine and milk respectively, did not produce these symptoms.

Summary and conclusion

The results of the toxicity studies show that the process of śodhana definitely reduces the intense cardiotoxic effect of Aconite. A comparison of the ED_{50} dose of all the preparation tested shows that the crude drug is most toxic and those after treatment with either cow's urine or cow's milk are comparatively less toxic. The cortical layer of the treated drugs are less toxic than the decorticated treated samples. This is also apparent from the fact that the treated drug with cortex intact are found less toxic than the corresponding decorticated treated drugs. The LD_{50} doses of B, II and V i. e. untreated crude drug, decorticated urine–treated drug and decorticated milk–treated drug also confirms this. Thus there is no doubt that the process of śodhana reduces the toxicity of the drugs.

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