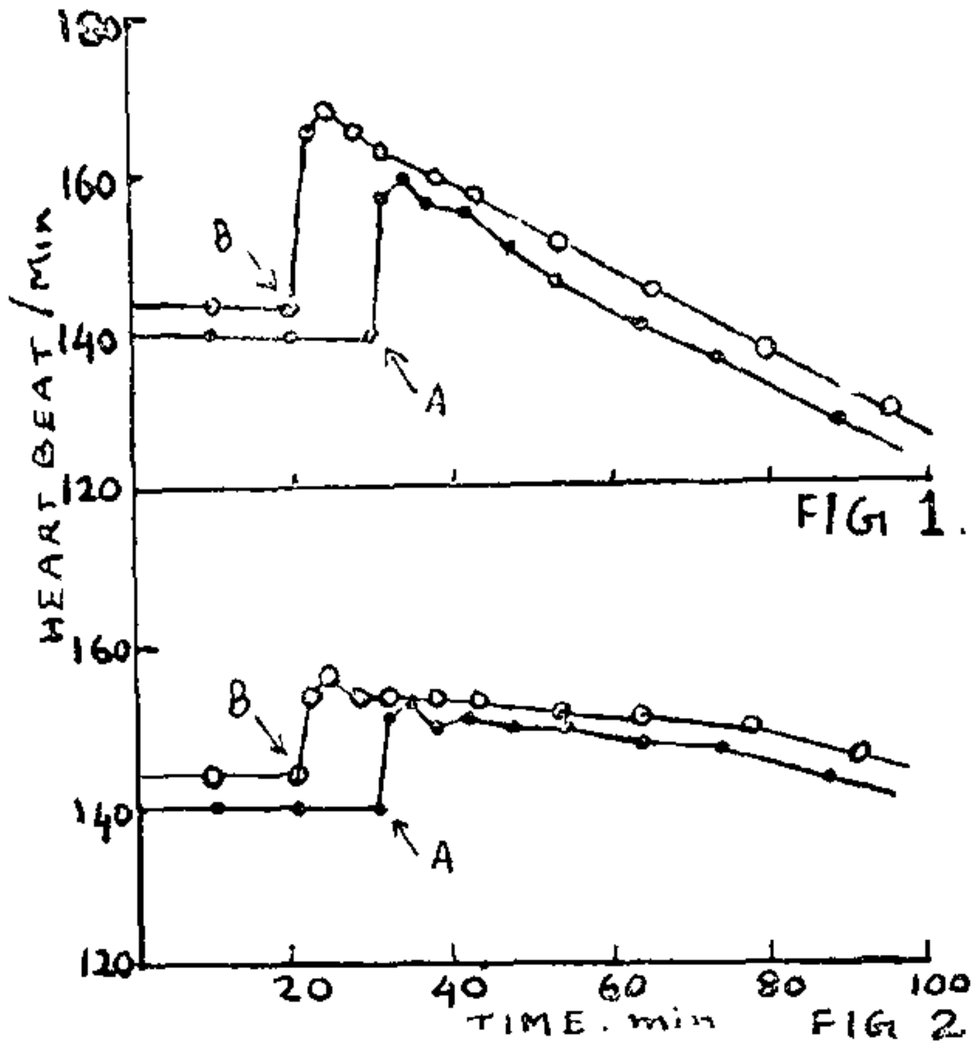
substance is probably not interfered with by the synergist.



FIGS. 1–2. Fig. 1. Effect of neuroactive substance (A = $1 \cdot 6 \times 10^{-6}$, B = $3 \cdot 3 \times 10^{-6}$) on isolated heart of Cockroach. Fig. 2. Effect of neuroactive substance in combination with A : Piperonyl butoxide ($1 \cdot 4 \times 10^{-6}$ M). B : Sesamin ($1 \cdot 4 \times 10^{-6}$ M). Arrows indicate addition of the test solution.

A detailed account on the nature and biological activity of neuroactive substance will be reported elsewhere.

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Department of Zoology, A. P. RAO.
University College,
Kakatiya University,
Warangal 506 009 (A.P.),
and
Division of Entomology, M. B. NAIDU.
Regional Research Laboratory,
Hyderabad 500 009 (A.P.),
May 10 1976.

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SOLUBILITY OF PROTEINS OF MUSCLE IN FATIGUE

IN isolated muscle fatigue is associated with the accumulation of lactic acid[1] and other metabolic byproducts and metabolism by acidification or otherwise[2,3] which contribute to disturbances of internal equilibria. Local accumulation of lactate might be expected to induce water and electrolyte shift due to osmotic acid-base changes in muscle cells[4-6]. To reduce the acidity and other side effects, the buffering capacities of sarcoplasmic preteins are utilized to safegaurd other structural components[7]. This paper is aimed at analysing the ionization and soluble properties of proteins of muscle in fatigue by salting out processes of various fractions of proteins.

Rana hexadactyla were double pithed and the gastrocnemius muscle of both the legs were Isolated with least injury. They were washed in amphibian ringer[8], several times to recover from shock effects. One of the muscles was immersed in ringer and made to fatigue by giving electrical stimulations of 120 shocks per minute of 10 volts D.C. strength (INCO/CSIO student stimulator, AMBALA) continuously until there was no response. The fatigued muscle was rapidly cooled to 0° C to prevent residual metabolism. The contralateral control muscles were treated in the same way except that they were not stimulated. Total, soluble and insoluble proteins were estimated in the aqueous homogenates of muscle by the method of Knights *et al.*[9] (1962). Alpha, beta and gamma globulin and albumin type of proteins were sedimented from the supernatant fraction of the muscle homogenate, following the procedure of Cohn *et al.* (1940) for serum[10].

The decrease in the levels of soluble proteins is nearly proportional to the increase of insoluble proteins (Table. I). Practically there is no change

TABLE I

Levels of total, insoluble and soluble proteins in muscle expressed as mg/gram wet weight. The values are means of ten individual observations

Muscle	Total	Insoluble	Soluble
Control	164·1 ± 14·83	120·2 ± 15·29	43·9 ± 2·62
Fatigued	163·4 ± 15·74	122·3 ± 17·45	41·1 ± 2·38
% Deviation	− 0·43	+ 1·75	6·37
* 't' test	NS	NS	NS

* NS - Not Significant.

in total protein content. Significant fall in the levels of gamma globulin, alpha beta globulin, and albumin type of proteins is observed on fatigue (Table II). This indicates that solubility of these proteins is more affected during fatigue as it might be particularly involved in buffering action.

TABLE II

Levels of globulins and alubumin type of proteins in muscle expressed as mg/gram wet weight. The values are means of ten individual observations

Muscle	Gamma globulin	Alpha and beta globulin	Albumin
Control	7·78 ±0·53	12·30 ±0·98	16·55 ±1·61
Fatigued	6·43 ±0·43	10·60 ±1·23	13·85 ±1·81
% Deviation	−17·3	−13·8	−16·4
* 't' test	0·01 S	0·05 S	0·05 S

* S = Significant.

Alternation in the levels of different types of proteins is not because of the rapid degradation or synthesis since such changes cannot be expected after a short period of extensive work. Changes in the intracellular environment of the muscle affects the ionization of sarcoplasmic proteins[11] and also the buffering capcity of proteins[12]. So it is suggested that variation in different protein fractions is only due to the alteration in ionization and soluble properties because of their involvement in buffering of acid and other metabolic byproducts produced during fatigue to protect the structural components of contractile machinery.

Dept. of Zoology, S.V. University, Tirupati 517 502, India, *July* 9, 1976.

N. CHANDRASEKHARAM NAIDU.
K. S. SWAMI.

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GYNOPHORE NUTRITION IN GROUNDNUT

THE importance of Calcium in pod development is well known and direct absorption by developing fruits when calcium is applied in the peg region has been reported by Shibuya and Suzhuki[1], Bolhuis and Stubbs[2] and Seshadri[3]. But the presence of calcium at root region is not equally effective. The difference in ion uptake by pegs and roots deserves detailed study. An interesting observation by Pal and Laloraya[4] has indicated that root level sodium does not interfere with Calcium uptake. But calcium uptake by the developing pods is inhibited by sodium. The utility in terms of nutrient availability is obviously conditioned by the physico-chemical properties of the membranes of the root and the peg.

In the present investigations involving a provision of single and multiple deficiency conditions at the peg zone with complete nutrition at root zone, sand culture studies employing Arnon and Hoagland's[5] nutrient solution were made (K–390, Ca–120, Mg–48, NO_3N–224, NH_4–N–28, P–62 and S–64 ppm). TMV 2 bunch strain was used for the study. The gynophore regions were separated from the root zone by a plastic container. The technique adopted comprised insertion of the root of the young groundnut plant through a glass tube fitted to the plastic container. The root developed in the pot containing sand that was irrigated with complete nutrient solution. The junction of the glass tube at the base of the plastic container was sealed by wax. The plastic container was filled with washed sand irrigated with Arnon and Hoagland culture solution so modified as to provide single and multiple deficiencies (Table II). Chemical analysis of shell for nitrogen[6], phosphorus[7], potassium and sodium[8] and for calcium[9] and magnesium was made. Oil content of kernels (Soxhlet[10]) was determined.

Plants were harvested from five replicates. Yield of dry pods (g/plant) was determined and the data are presented (Table I).