



FIG. 1. Infra-red spectra of isolated sesamin and standard sesamin.

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#### GLYCOGEN FRACTIONS DURING EXERCISE OF THE DYTISCID BEETLE *CYBISTER CONFUSUS*

It is well recognised now that certain insects utilize glycogen as a primary fuel for flight<sup>1,2</sup>. Bloom *et al.*<sup>3</sup> have reported that glycogen of the liver and muscle is separable into acid extractable [cold trichloroacetic acid (TCA) extract] and residual (hot KOH extract) fractions. That these two glycogen fractions disappear at different rates during muscle stimulation has been demonstrated by Bloom and Knowlton<sup>4</sup>. In our previous investigation on the leg and flight muscles of the Dytiscid beetle *Cybister confusus*, it has been deduced that leg muscles are organized for short rapid action for which glycogen appears to be the chief fuel source; in contrast the flight muscles are adapted for prolonged contractions utilizing fat as the principal energy source<sup>5</sup>. The present investigation is undertaken to elucidate whether the glycogen in the leg muscles as well as in the fat body exists in two fractions and if so, whether preferential utilization of one fraction or another during exercise by the leg muscles of *C. confusus* occurs.

To test this, seven male beetles were selected from a number of them kept in the laboratory aquarium. The fresh weight of beetles selected fell within a range of 3.63 gm to 3.87 gm with an average of 3.71 gm. The beetles were starved for 24 hr before they were subjected to exercise. In order to exercise the leg muscles vigorously, they were introduced into an aquarium where they were kept under continuous swimming activity by letting a forceful water jet from one side. At the end

1. Elyakova, L. A., Dzizenko, A. K., Sova, V. V. and Elyakov, G. B., *Khim. Prirodn. Soedin.*, Akad. Nauk Oz. SSR, 1966, 2, 149.
2. Kaku, T. and Ri, H., *Keijo J. Med.*, 1938, 9, 1.
3. Masumura, M., *Nippon Kagaku Zasshi*, 1955, 76, 1318.
4. Cameron, D. W. and Sutherland, M. D., *Austr. J. Chem.*, 1961, 14, 135.
5. Hollis, A. F., Prager, R. H., Ritchie, E. and Taylor, W. C., *Ibid.*, 1961, 14, 100.
6. Antonaccio, L. D. and Gottlieb, O. R., *Anais. Assoc. Brasil Quim.*, 1959, 18, 183.
7. Kimura, H., *Japan*, September 11, 1959, p. 8129.
8. Haensel, R. and Zander, D., *Arch. Pharm.*, 1961, 294, 699.
9. Atal, C. K., Girotra, R. N. and Dhar, K. L., *Ind. J. Chem.*, 1966, 4, 252.
10. Budowski, P., *J. Amer. Oil Chem. Soc.*, 1964, 41, 280.
11. Khanna, P., Mohan, S. and Nag, T. N., *Lloydia*, 1971, 34, 168.
12. — and Staba, E. J., *Ibid.*, 1968, 31, 180.
13. Murashige, T. and Skoog, F., *Physiol. Plantarum*, 1962, 15, 473.
14. Paech, T. and Tracey, M. V., *Modern Methods of Plant Analysis*, 1955, 3, 440.
15. Kries, H., *Mitt. Lebensm. Hyg.*, 1928, 19, 385.

of each 10 min. interval of exercise the beetle was killed by decapitation. The leg muscles and fat body were removed separately and stored at 0°C until used. The results obtained from unexercised beetles served as control readings. The acid extractable glycogen (AEG) from leg muscles and fat body was extracted with cold TCA following the method outlined by Kugler and Wilkinson<sup>6</sup>, while residual glycogen (RG) was extracted with hot 20% KOH<sup>3</sup>. The glycogen content in the extracts was quantitatively determined by the anthrone method as described by Seifter *et al.*<sup>7</sup>.

TABLE I

Effect of exercise on the glycogen content of the leg muscles and fat body of the *C. confusus*

Time in min.	Leg muscle glycogen mg/100 mg wet tissue		Fat body glycogen mg/100 mg wet tissue	
	AEG	RG	AEG	RG
0	0.89 ± 0.07	0.67 ± 0.08	0.90 ± 0.10	1.75 ± 0.39
10	0.52 ± 0.01	0.59 ± 0.03	0.67 ± 0.05	1.10 ± 0.12
20	0.20 ± 0.37	0.28 ± 0.05	0.33 ± 0.02	0.80 ± 0.10
30	0.07 ± 0.01	0.11 ± 0.12	0.30 ± 0.10	0.33 ± 0.03
40	..	..	..	1.27 ± 0.22

The results are averages of four determinations.

It will be seen from the results obtained, that the AEG fraction is more than or comparatively equal to the RG fraction in the leg muscles; the fat body on the other hand shows more amount of RG fraction than AEG. During the first 10

min. of exercise the leg muscles seem to have utilized their AEG fraction at a rate 29 µg/min., while the RG fraction remained practically unaffected. However, in subsequent intervals of exercise considerable reduction in both AEG and RG fractions of the leg muscles and fat body was observed.

It may be concluded from the preceding account that during exercise the leg muscles of *C. confusus* preferentially utilize AEG fraction to begin with; later on as the glycogen store gets depleted in the leg muscles, both fractions of the glycogen reserves from the fat body are drawn upon.

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Dharwar-3, January 15, 1973.

1. Drummond, G. I., *Fortschr. Zool.*, 1967, 18, 360.
2. Sacktor, B., *The Physiology of Insecta.*, Ed. M. Rockstein, AP, New York, 1965, 2, 483.
3. Bloom, W. L., Lewis, G. T., Schumpert, M. Z. and Tsung-Menshen, *J. Biol. Chem.*, 1951, 188, 631.
4. — and Knowlton, G. C., *Amer. J. Physiol.*, 1953, 173, 545.
5. Kallapur, V. L., *J. Anim. Morphol. Physiol.*, 1970, 17, 37.
6. Kugler, J. H. and Wilkinson, W. J. C., *J. Histochem. Cytochem.*, 1960, 8, 195.
7. Seifter, S., Dayton, S., Novic, B. and Muntwyler, E., *Arch. Biochem.*, 1950, 25, 191.

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