After reduction with ascorbic acid at pH 7·4, Aplysia Cyt. *h* is oxidized by a beef heart cytochrome oxidase preparation in absence of any Cyt. *c*[4]. Added Cyt. *c* increases the rate of oxidation, but is not necessary for the reaction as was found for the Helix pigment[1]. Beef heart preparation catalyses the reduction of Aplysia Cyt. *h* in the presence of cyanide and of DPNH. When succinate is used, cyanide is not necessary.

From the above data it seems that the pigment extracted from Aplysia Hepatopancreas can be identified with Helix Cyt. *h*. Although they differ from each other in certain respects, both pigments have many properties in common.

More work is required to establish if the term of Cytochrome *h* can be maintained, or if the pigment must be listed in one of the already known groups of cytochromes. Whereas its spectrum is similar to that of mammalian Cyt. b_5, Aplysia Cyt. *h*, like the Helix pigment, has several properties in common with Cyt. *c*. A cytochrome having the same spectrum as mammalian Cyt. *c* can, however, be extracted from Aplysia's muscles by the method of KEILIN and HARTREE[5], while all attempts to extract Cyt. *h* from organs of the animal other than the Hepatopancreas, were unsuccessful.

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Riassunto

Nell'epatopancreas di due Gasteropodi marini: *Aplysia depilans* e *A. limacina* è presente un emocromogeno assai simile al citocromo *h* di Helix. Il pigmento è stato estratto e purificato e le sue proprietà fisiche, chimiche e biologiche sono state confrontate con quelle dell'emoproteina di Helix.

[4] D. KEILIN and E. F. HARTREE, Proc. Roy. Soc., London [B] *125*, 171 (1938).

[5] D. KEILIN and E. F. HARTREE, Proc. Roy. Soc., London [B] *122*, 298 (1937).

Toxicity of Benzenethiol and its Derivatives on *Musca domestica* (DDT-Resistant Strain) and on *Periplaneta americana*

In the course of our research on the insecticidal properties of a series of halogenoacetates[1] on the resistant flies, it has been observed that benzenethiol chloroacetate and benzenethiol bromoacetate are markedly more toxic than all other esters tested.

The greater toxicity of such products might be due to to benzenethiol itself; in fact, benzenethiol and some of its derivatives have been employed in the past as insecticides[2] and are also known as bactericidal agents[3].

[1] M. BOCCACCI and S. BETTINI, R. C. Ist. sup. Sanità *19*, 1237 (1956); in press (1958).

[2] D. E. H. FREAR, *A catalogue of insecticides and fungicides*, vol. 1 (Waltham, Mass., U.S.A. 1947). – W. V. KING, *Chemicals evaluated as insecticides and repellents at Orlando, Fla.*, U.S. Dept. Agric., Agric. Handbook No. 69 (1954).

[3] A. BALLIO and E. CINGOLANI, Boll. Soc. ital. Biol. sper. *29*, 622 (1953).

We have studied the toxicity of these substances on insects under the same conditions as employed for halogenoacetates.

A highly DDT-resistant strain (K_1) of *M. domestica* and a strain of *P. americana*, both bred in laboratory, have been used. Acetonic solutions of the substances have been injected into roaches. A contact method to be described[4] has been used for the housefly: slightly volatile substances only have been tested.

Toxicity of benzenethiol and some of its derivatives on *P. americana* and on *M. domestica*

Compound	*P. americana* LD_{50} µg/g, (Injection)	*M. domestica* LD_{50} g/m² (Contact)
Benzenethiol chloroacetate . . .	100	—
Benzenethiol bromoacetate . . .	100	—
Benzenethiol	45	—
Phenyl disulfide	50	> 1
Benzenethiol benzoate	400	> 1
Benzenethiol caproate	150	0·9
Benzenethiol caprylate	>680	0·5
Benzenethiol caprate	300	0·5
Benzenethiol laurate	>680	>1·0
Benzenethiol myristate	>680	>1·0
p-Toluenthiol	130	—
p-Tolyl disulfide	600	>1·0
p-Toluenthiol caprate	>680	0·9
p-Acetyl benzenethiol	500	—
p-Acetyl benzenethiol chloroacetate	470	>1·0
p-Nitrobenzenethiol chloroacetate	>680	>1·0

As can been seen from the Table, benzenethiol shows a toxicity superior to that of its chloro- and bromoacetates. Phenyl disulfide only, among the derivatives, maintains a toxicity equal to that of benzenethiol; the thioesters are much less toxic; the addition of a group in the para position causes a marked loss of activity.

Very little is known yet on the mode of action of these substances. Recently VAN EYS and KAPLAN, and VAN EYS *et al.*[5] have shown that thiol compounds may react with pyridine nucleotides (DPN) and TPN) interfering with the activity of the dehydrogenases which depend from them.

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Riassunto

Gli autori hanno studiato la tossicità del tiofenolo a di alcuni suoi derivati per gli insetti. Il tiofenolo si è rivelato notevolmente tossico sia per *Periplaneta americana* che per *Musca domestica* (ceppo resistente al DDT), mentre la maggior parte dei suoi derivati è fornita di scarsa tossicità.

[4] S. BETTINI, M. BOCCACCI, and GIUSEPPINA NATALIZI, J. Econ. Ent. in press (1958).

[5] J. VAN EYS and N. O. KAPLAN, J. biol. Chem. *228*, 305 (1957). – J. VAN EYS, F. E. STOLZENBACH, L. SHERWOOD, and N. O. KAPLAN, Biochem. Biophys. Acta *27*, 63 (1958).