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Short Communication

**LABORATORY AND FIELD ASSESSMENT OF MOLLUSCICIDAL
ACTIVITY OF B-2 AGAINST *ONCOMELANIA HUPENSIS*, THE VECTOR
SNAIL OF SCHISTOSOMIASIS IN CHINA**

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SUMMARY: Molluscicidal activity of B-2 (sodium 2,5-dichloro-4-bromophenol; called as Phebrol and registered in WHO as OMS 3012) was evaluated in a laboratory and the field trials were performed in two different localities in Yueyang city, China, for control of *Oncomelania hupensis*. B-2 was effective against *O. hupensis* both in the laboratory and in the field. A dosage of 50 g/m² in 10% granular form or 20 ml/m² in 25% liquid form of B-2 would be recommendable as a standard mollusciciding dose for control of *O. hupensis*.

Laboratory and field assessment of B-2 (sodium 2,5-dichloro-4-bromophenol) against *Oncomelania nosophora*, the intermediate host of *Schistosoma japonicum* in Japan, was made by Kajihara et al (1,2). The results indicated its promising molluscicidal activity against the target snail and its toxicity to non-target animals seemed to be rather low. Further laboratory and field studies with this chemical revealed the molluscicidal effect on *Oncomelania quadrasi*, the vector snail of schistosomiasis in the Philippines (3). For aquatic snails, Taira et al. (4)

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reported that B-2 showed a molluscicidal activity against eggs, juveniles and adults of *Lymnaea ollula*, the intermediate host of *Fasciola* sp. in Japan. Thus B-2 seemed to be a very effective molluscicide against oncomelaneid snails as well as *L. ollula* and is now used as a practical molluscicide for control of *O. nosophora* in Japan. This chemical is also called Phebol and registered in WHO (OMS 3012) as a recommendable molluscicide.

The present paper deals with laboratory and preliminary field trials with B-2 as a potential molluscicide against *Oncomelania hupensis*, the intermediate host of *S. japonicum* in China.

In the laboratory trial, Komiya's technique (5) was adopted to bring the snails in contact with the chemical. Thirty snails were exposed to each of several consecutive twofold dilutions of the 25% liquid form at 27 C for 48 hr. Triplicate tests with the serial dilution of the chemical were carried out and LC₅₀ and LC₉₀ were calculated by the method of Litchfield and Wilcoxon (6). Figure 1 shows the result of laboratory trials. LC₅₀ and LC₉₀ in concentration of the active ingredient of the chemical were 0.378 ppm and 0.809 ppm, respectively. The LC₅₀ values of B-2 against *O. hupensis*, *O. nosophora* (1) and *O. quadrasi* (3) are shown in Table I.

Fig. 1. Dosage-effect curve of B-2 on *Oncomelania hupensis* in the laboratory.

Table I. LC₅₀ of B-2* against *Oncomelania* snails determined in the laboratory

Snail	LC ₅₀ (ppm)	Reference
<i>Oncomelania hupensis</i>	0.38	
<i>Oncomelania nosophora</i>	0.38 - 0.54	Kajihara et al. (1979a)
<i>Oncomelania quadrasi</i>	0.47 - 0.55	Hosaka et al. (1984)

*25% liquid form of B-2 was used.

Field trials were performed in two different localities, Junshan and Louxiwan in Yueyang city, Hunan Province, an endemic area of schistosomiasis in China. B-2 in either 25% liquid form or 10% granular form was applied in each of 4 m² quadrates which were set in the snail habitat and were surrounded with a man-made canal of about 30 cm in depth. Sixteen quadrates were made in Junshan field. The grass of eight quadrates was mowed to about 10 cm before chemical application. In other eight quadrates, grass of about 30 cm in height was not mowed. In the second trial in Louxiwan, the grass of all quadrates was mowed as in the eight quadrates in Junshan. The chemical in liquid form was sprayed with handy sprayers in each quadrate at a dosage of 0 ml, 5 ml, 10 ml or 20ml/m². The chemical in granular form at a dosage of 0 g, 12.5 g, 25 g or 50 g/m² was spread by hand as evenly as possible. Before and after treatment, snails were sampled on day 0 and/or 3, 7 and 14. Snails from five points in each quadrate were collected and observed for their fate. The results are shown in Table II. The treatment with doses of 10 ml and 20 ml/m² of 25% liquid form gave snail mortality rates higher than 80% after 14 days of chemical application. Mortalities of snails treated with 50 g/m² of granular form of B-2 were higher than 85% 7 days and 14 days after treatment with the chemical. Although a dose of 25 g/m² of granular form gave snail mortalities of 81% or lower than 75% 7 and 14 days after treatment, the mortality of snails from the fields in which grass was mowed was rather high. During the second trial in Louxiwan field, post-treatment snail sampling was continued for 7 days after application of the chemical but not after because of a flood of the experimental field. The result of this trial seems to be similar to that of the first trial in Junshan as shown in Table III.

Table II. Molluscicidal activity of B-2 against *Oncomelania hupensis* in the field*

Form of the chemical	Grass mowing	Dose (ml or g/m ²)	Mortality of snails in each sampling (Snails dead/number examined)			
			Before application (%)	7 days after application (%)	14 days after application (%)	
25% liquid form	Yes	20 ml	5/73	62/80	57/60	95.0
		10	2/81	76/89	55/63	87.3
		5	1/79	42/67	36/55	65.4
		0	0/68	8/43	16/43	37.2
	No	20 ml	2/60	61/68	81/84	96.4
		10	1/78	64/68	51/63	81.0
		5	0/69	48/79	30/53	56.6
		0	2/66	6/54	9/57	15.8
10% granular form	Yes	50 g	1/110	74/81	56/57	98.2
		25	6/59	47/63	83/102	81.4
		12.5	3/61	40/53	26/44	59.1
		0	2/85	10/47	22/46	47.8
	No	50 g	3/85	65/74	58/66	87.9
		25	9/53	43/61	44/85	51.8
		12.5	6/52	10/59	34/55	61.8
		0	2/57	5/49	7/43	16.3

*Trials were made in Junshan habitat of *O. hupensis*.

Table III. Molluscicidal activity of B-2 against *Oncomelania hupensis* in the field*

Form of the chemical	Dose (ml or g/m ²)	Mortality of snails in each sampling (Snails dead/number examined)			
		Before application (%)	3 days after application (%)	7 days after application (%)	
25% liquid form	20 ml	13/102	12.7	92/103	89.3
	10	17/102	16.7	88/103	85.4
	5	23/104	22.1	78/107	72.9
	0	22/104	21.2	31/98	31.6
10% granular form	50 g	7/105	6.7	102/103	99.0
	25	17/104	16.3	69/102	67.6
	12.5	24/104	23.1	54/101	53.5
	0	36/106	34.0	47/116	40.5
				103/106	97.2
				92/95	96.8
				67/103	65.0
				27/110	24.5
				121/130	93.1
				96/126	76.2
				88/111	79.3
				36/156	23.1

*Trials were made in Louxiwan habitat of *O. hupensis*.

For the practical use of B-2 in control of *O. nosophora* in Japan, the dosage of 25 g/m² in 10% granular form or 10 ml/m² in 25% liquid form has been adopted as a standard mollusciciding dose (2). To obtain the same level of molluscicidal activity of the compound for control of *O. hupensis* in China, a higher dose of the chemical than that for *O. nosophora* in Japan would be needed. From the result of this field trial, the dosage of 50 g/m² in 10% granular form or 20 ml/m² in 25% liquid form of B-2 would be required for control of *O. hupensis* in China.

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