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LETTER TO THE EDITOR

ANALGESIC EFFICACY OF TWO DERIVATIVES OF O-HYDROXY-NAPHTHOQUINONE

Sir,

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Two derivatives of O-hydroxy-naphthoquinone viz,. 2-hydroxy 3-methyl 1,4-naphthoquinone monosemicarbazone (HMNQS) and 2-hydroxy 1,4-naphthoquinone monothiosemicarbazone (HNQTS), were evaluated for their physico-chemical properties, chelation behaviour and biological properties. In this letter, we wish to report the analgesic activity of the two compounds since there are earlier reports about the analgesic efficacy of some quinone derivatives (1, 2, 3, 4)

Charles Foster rats and albino mice (both sexes) with average weight of 100-150 g and 25-30 g respectively, were employed in the studies. The animals were maintained at 26±2°C temperature and 12 hrs of light period. They were fed with a standard diet (Lipton India Ltd.) with free access to drinking water. The animals were fasted overnight prior to the onset of the study.

In the acute toxicity study, mice were randomly distributed in control and test groups of 6 animals each. The test drugs were used in the form of uniform suspension in 10% v/v Tween-80. The test groups of animals received 500 mg, 750 mg and 1000 mg/kg, p.o. of the test compounds; the control group receiving only the vehicle. All the groups of animals were observed for 48 hrs for any signs of toxic symptoms and mortality.

The analgesic activity was assessed by Eddy's hot plate method and Acetic acid-induced writhing test. In the Eddy's hot plate method, the temperature of the plate was maintained at 55-55.5°C. The rats were treated with the suspension of the test drugs and subjected to the test 30 min thereafter. The results are presented in Table I. In the acetic acid-induced writhing test, the mice were treated with the test drugs and after 30 min, acetic acid was given (300 mg/kg, ip) as 3% w/w aqueous solution. The writhing score was recorded for the next 30 min (Table II). Aspirin (300 mg/kg, po) was used as the standard in each test.

From the Tables, it is evident that both HMNQS and HNQTS possess significant analgesic activity. In hot plate method, both the compounds showed gradual increasing activity after 15 min post-treatment culminating in peak

TABLE I : Analgesic activity of HMNQS and HNQTS (Eddy's hot plate) in rats. Each value represents mean ± S.E. (n=6). All drugs administered po.

	Drug	*Dose (mg/kg)*	*IRT (sec)*	*Minutes after drug administration*					
				15	*30*	*60*	*90*	*120*	*240*
Group A	HMNQS	10	2.45±0.33	3.37±0.19	12.43±0.27	16.73±0.17	15.49±1.26	11.61±0.34	3.79±0.13
Group B	HMNQS	20	2.71±0.27	5.44±0.34	13.76±0.24	17.24±0.36	17.17±0.47*	14.49±0.61	5.88±0.22
Group C	HMNQS	50	2.20±0.62	5.61±0.24	18.47±1.17	21.62±0.84	22.21±0.63**	18.62±0.32	2.68±0.17
Group D	HNQTS	10	2.63±0.14	3.94±0.15	13.15±0.23	16.58±1.22	17.62±0.27	13.55±0.19	3.41±0.32
Group E	HNQTS	20	2.57±0.35	4.11±0.13	17.48±0.62	19.47+0.17	20.51±0.18*	14.26±0.46	4.49±0.14
Group F	HNQTS	50	2.49±0.21	4.25±0.21	19.56±0.25	22.52±0.43	24.73±0.25**	17.48±0.29	6.45±0.14
Group G	Aspirin	300	2.77±0.29	5.76±0.25	22.18±0.72	26.37±0.69	27.97±0.17**	19.17±0.83	8.41±0.22

*P<0.05; **P<0.01

TABLE II : Analgesic activity of HMNQS and HNQTS (Writhing method). Each value represents mean±S.E. (n=6). All drugs administered po; acetic acid soln. by ip.

	Treatment	*Dose (mg/kg)*	*Wriths/30 min per mouse*	*% protection*
Group I	Acetic acid	300	69.44 ± 3.46	0.0
Group II	HMNQS+acetic acid	10 300	47.35 ± 4.1	31.81
Group III	HMNQS+acetic acid	20 300	31.82 ± 3.4*	54.17
Group IV	HMNQS+acetic acid	50 300	20.42 ± 2.5**	70.50
Group V	HNQTS+acetic acid	10 300	41.67 ± 3.1	39.99
Group VI	HNQTS+acetic acid	20 300	29.49 ± 2.7*	57.53
Group VII	HNQTS+acetic acid	50 300	18.52 ± 3.4**	73.32
Group VIII	Aspirin+acetic acid	300 300	11.27 ± 1.7**	83.77

*P<0.05; **P<0.01

and highly significant activity (P<0.01) after 90 min. A dose-dependent activity was also observed. By acetic acid-induced-writhing method, HNQTS produced 73.32% protection and HMNQS produced 70.50% protection against writhings produced by acetic acid at 50 mg/kg, po dose level. By both methods HNQTS seemed to be the more potent analgesic of the two compounds. No toxic symptoms or mortality was observed during acute toxicity studies with either one of the two compounds. LD_{50} in both HMNQS and HNQTS is more than 1000 mg/kg, po in mice.

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REFERENCES

1. Atal CK, Siddiqui MA, Zutshi U, Amla V, Johri RK, Rao PG, Kour S. Non-narcotic orally effective, centrally acting analgesic from an Ayurvedic drug. *J Ethanopharmacol* 1984; 11 : 309-317.
2. Dhar SK, Johri RK, Zutshi U, Atal CK. Effect of potassium embelate, a novel analgesic compound on the neurotransmitter content of cerebrospinal fluid of dog. *Curr Sci* 1986; 555 : 511-512.
3. Dhar SK, Johri RK, Zutshi U, Atal CK. Energy reserve of the brain during potassium embelate-induced antinociception in rat. *Indian J Physiol Pharmacol* 1987; 31 : 287-288.
4. Jain SM, Ravi Kant, Sarin AN, Dhar SK, Dhar KL. Synthesis and analgesic activity of nitrogen heterocyclic derivatives of embelin. *Ind J Chem* 1989; 288 : 790-792.

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