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EFFECTS OF ACTIVE MOLLUSCICIDAL AGENTS OF COMMON SPICES ON BIOCHEMICAL PARAMETERS IN THE OVOTESTIS OF *LYMNAEA ACUMINATA*

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ABSTRACT

The effects of active molluscicidal components of *Zingiber officinale* (citral and [6]-gingerol, respectively) and *Trachys permum ammi* (thymol) on total protein, free amino acids and nucleic acid levels, and phosphatase activities were studied in the ovotestis of *L. acuminata*. Sublethal exposure to these components caused significant alterations in these biochemical parameters. Maximum reduction in protein levels of ovotestis (35% of control) was observed in snails exposed for 96 hr to 80% of 24 hr LC_{50} of [6]-gingerol. Significant reduction in amino acid levels was observed in ovotestis of [6]-gingerol- and thymol-treated snails whereas a significant increase was observed in citral treated snails. Significant reduction in nucleic acid level and acid/alkaline phosphatase activity in ovotestis were observed in all three groups of treated snails. Withdrawal experiments showed that these changes were reversible.

ABSTRAK

Kesan komponen-komponen moluskisid aktif dari *Zingiber officinale* (sitral dan [6]-gingerol, masing-masing) dan *Trac hyspermum ammi* (timol) ke atas protein keseluruhan, aras asid amino bebas dan asid nukleik, serta aktiviti protease ;elah dikaji daiam ovotestis *L. acuminata*. Pendedahan subletal terhadap bahan-bahan ini menyebabkan pertukaran signifikan ke atas parameter-parameter biokimia tersebut. Pengurangan maksimum aras protein dalam ovotestis (35% dari kawalan) Jicerap dalam haiwan yang terdedah selama 96 jam kepada 80% LC_{50} 24 jam [6]-gingerol. Pengurangan signifikan aras asid amino dicerap dalam ovotestis haiwan terdedah kepada [6]-gingerol dan timol. Dalam haiwan yang terdedah kepada iitral aras asid amino meningkat dengan signifikan. Dalam ketiga-tiga kumpulan haiwan pengurangan signifikan aras asid mkleik dan aktiviti asid/alkalin fosfatase dicerap. Kesan-kesan ini adalah berbalik.

Key words: Citral, [6]-gingerol, molluscicide, spices, thymol

REFERRENCES

Bergmeyer. U.H. 1967. Methods of Enzymatic Analysis. Academic Press, New York, 1129 pp.

Ibrahim, A.M., Higazi, M.G. and Demian, E.S. 1974. Histochemical localization of alkaline

phosphatase activity in the alimentary tract of the snail Marisa conmarietis (L.). Bulletin oj Zoological Society of Egypt, 26: 94-105.

Lowry, O.H., Rosenbrough, N.J., Farr, A.L. and Randall, R.J. 1951. Protein measurements with folin phenol reagents. Journal of Biological Chemistiy, 193: 265-275.

Mustafa. T., Srivastava, K.C. and Jensen, K.B. 1993. Drug development report (9) : Pharmacology of ginger Zingiber officinale. Journal of Drug Development, 6: 25-39.

Pilo, B., Asnani, M.V. and Shah, R.V. 1972. Studies on wound healing and repair in pigeon. III. Histochemical studies on acid and alkaline phosphatase activity during the process. Journal of Animal Morphology and Physiology, 19: 205-212.

Singh, O.K. and Agarwal, R.A. 1989. Toxicity of piperonyl butoxide-carbaryl synergism on the snail Lymnaea acuminata. International

Revueingh, K. and Singh, D.K. 1995. Effects of Azadirachta indica (Neem) on biochemical parameters in ovotestis of Lymnaea acuminata. Malaysian Applied Biology, 24: 7-11.

Singh, O. and Agarwal, R.A. 1981. Toxicity of certain pesticides to two economic species of snail in Northern India. Journal of Economic Entomology, 74: 568-571.

Singh, R. 1981. Pharmacological studies on the chemosterilization of the snail Lymnaea acuminata. Ph.D. thesis, University of Gorakhpur, Gorakhpur.

Singh, R. and Agarwal, R.A. 1983. Chemosterilization and its reversal in the snail Lymnaea acuminata. Acta Pharmacology et Toxicology, 52: 112-120.

Singh, S., Singh, V.K. and Singh, D.K. 1997a. Molluscicidal activity of some common soiceplants. Biological Agriculture and Horticulture,14: 237-249.

Singh, S., Singh, V.K. and Singh, D.K. 1997b. Effectof certain spices on reproduction of snailLymnaea acuminata. Zeistschrift fur Angew.Zoologie, (communicated).

Sokal, R.R. and Rohlf, R.J. 1973. Introduction toBiostatistics. W.H. Freeman, San Francisco, 368pp.

Spies, J.R. 1957. Colorimetric procedure for aminoacids. In: Methods in Enzymology. S.P.Colowick and N.O. Kaplan (eds). AcademicPress, 464 pp.

Srivastava, K.C. 1988. Extract of a spice- omum(Trachyspermum ainmi)- shows antiaggregatoryeffects and alters arachidonic acid metabolismin human platelets. Prostaglandins Leukotrienesand Essential Fattv Ari/ii 33: 1-6