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QUERCETIN 3-(2″-GALLOYLGLUCOSIDE), A MOLLUSCICIDAL FLAVONOID FROM *POLYGONUM SENEGALENSE*

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Schistosomiasis in its various forms, second only to malaria as the world's most widespread parasitic disease, is increasing significantly owing to the spread of irrigated agriculture [1]. Owing to the social and economic importance of the disease, a safe and biodegradable molluscicide of plant origin is being sought. Commercially available molluscicides, although active at 0.5–2 ppm, have limited use [2]; hence efforts are underway to find plant molluscicides which may be useful in the control of schistosomiasis in rural areas. A variety of tropical plants have been known for sometime to have molluscicidal properties. For example, *Phytolacca dodecandra* [3–4], *Balanites aegyptica* [5], *Warburgia ugandensis* [6] and *Cornus florida* [7] have given encouraging results in laboratory and field trails. Our earlier studies showed that crude aqueous methanol extract of *P. senegalense* forma *sengalense* exhibited molluscicidal activity [8]. Maradufu *et al.* [9] have recently reported the identification of a chalcone derivative from this plant having molluscicidal activity at 40 ppm.

Further chemical investigation of leaves of *P. senegalense* forma *senegalense* (voucher specimen deposited in the Herbarium at the University of Nairobi) has resulted in the isolation of the known flavonoid, quercetin 3-(2″-galloylglucoside) **1**. The compound was separated by Sephadex LH20 column chromatography followed by HPLC (JASCO Trirotor with a UV indicator) using a μ-Bondapak-C_{18}, 4 mm × 30 cm column and MeOH–H_2O (9 : 1) as solvent gradient; R_t 5.6 min, quercetin R_t 10.5 min. The identification of **1** is based on the following evidence: mp 204°, mmp 205°; $C_{28}H_{24}O_{16}$ (elemental analysis and MS); UV λ_{max}^{MeOH} nm: 258 (sh), 268 (ε 25 600) and 365 (ε 17 800), addition of NaOAC and $AlCl_3$ gave characteristic bathochromic shifts of a flavonol having a substituted OH at C-3 [10]; IR γ_{max}^{nujol} cm^{-1}: 3360 (OH), 1600 and 1708 (C=O) [10]; ^1H NMR and ^{13}C NMR signals in DMSO-d_6 are also in accordance with reported values [10].

Compound **1** possesses significant molluscicidal activity. At 10 ppm concentration it exhibits 100% mortality within 12 hr against 3 species of snails, *Lymnaea natalensis*, *Biomphalaria pfeifferi* and *B. glabratus*. Snails of uniform sizes were used as far as possible. Bioassay was carried out by placing two snails in deionized water solution of known concentration. At several time intervals, the snails are placed on a Petri dish, light is shone from the bottom, and the heart-beat is checked by a microscope [6, 8]. Being a natural product, **1** may become a cheap and effective means of controlling vector snails; however, extensive laboratory and field evaluations are needed in view of a recent report that quercetin and other 3,5,7-trihydroxyflavones show significantly high mutagenic action [11, 12].

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