

## A Potential Bio-Pesticidal Molecule Derived from Indian Traditional Plant

**Authors :** Bunindro Nameirakpam, Sonia Sougrapakam, Shannon B. Olsson, Rajashekar Yallappa

**Abstract :** Natural sources for new pesticidal compounds hold promise in view of their eco-friendly nature, selectivity and mammalian safety. Despite a large number of plants that show insecticidal activity and diversity of natural chemistry with inherent eco-friendly nature, newer classes of insecticides have eluded discovery. *Artemisia vulgaris*, known as Mugwort, is a universal herb used for folk medicine and religious purposes throughout the ancient world. In India, the essential oils of *Artemisia vulgaris* are used for its insecticidal, anti parasiticidal and antimicrobial properties. Traditionally, the dried leaves of *Artemisia vulgaris* are used to repel insects as well as rats in and around the granaries in the North-East India. *Artemisia vulgaris* collected during November from different ecological sites were studied for the bio-pesticidal utility against the stored grain pests. The insecticidal activities were found in the crude extracts of n-hexane and methanol from the samples collected in Sikkim and Manipur respectively. Using silica gel column chromatography protocol, we have isolated one novel bioactive molecule from the aerial parts of *Artemisia vulgaris* L based on various physical-chemical and spectroscopic techniques (IR, <sup>1</sup>H NMR, <sup>13</sup>C NMR and mass). The novel bioactive molecule is highly toxic and very low concentration (4.35 µg/l) is needed to control the stored product insects. In additional experiment results clearly showed the involvement of sodium pumps inhibition in the insecticidal action of purified compound in the *Sitophilus oryzae*. The knockdown activity of the purified compound is concomitant with the in vivo inhibition of Na<sup>+</sup>/ K<sup>+</sup>- ATPase. Further, our study showed insignificant differences in the seed germination of control and the treated grains. The lack of adverse effect of the novel bioactive molecule on the seed germination is highly desirable for seed/grain protectant and showing the potential to be developed as possible natural fumigants for the control of stored grain pests. The novel bioactive molecule is selective insecticide with a high margin of safety to mammals and showed promise as novel biopesticide candidate for grain protection. It is believed that Bio-pesticides can serve as the most important pest management tools as far as global safety is concerned.

**Keywords :** Indian traditional plant, *Artemisia vulgaris*, bio-pesticides, Na<sup>+</sup>/ K<sup>+</sup>- ATPase, seed germination

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