The potential of endophytic fungi isolated from Vietnamese medicinal plants

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ABSTRACT

Since Vietnam is a tropical country, with the primarily health care is still based on the traditional medicinal plants. But, as everywhere in over the world, Vietnam has been facing to the problems of environmental degradation, loss of biodiversity, and spoilage of land and water. Endophytes, microorganisms that reside in the tissues of living plants, are relatively unstudied and potential sources of novel natural products for exploitation in medicine, agriculture, and industry. It is noteworthy that, of the nearly 20,000 plant species that exist in Vietnam, each individual plant is host to one or more endophytes. Almost all of these plants have never been completely studied relative to their endophytic biology. Consequently, the opportunity to find new and interesting of finding new drugs that may be effective candidates for treating newly developing diseases in humans, plants, and animals is great. Novel antibiotics, antimycotics, immunosuppressant, and anticancer compounds are only a few examples of what have been found after the isolation, culture, purification, and characterization of some selected endophytes in the recent past.

The experimental biologically laboratory belong to the Institute of Natural Products Chemistry (INPC), which is the Vietnamese national institution responsible for fundamental and applied

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research in the field of natural products. Established in 1990, it originally belonged to the National Centre for Natural Sciences and Technology (NCNST), which changed its name in 2004 to the Vietnamese Academy of Science and Technology (VAST; www.vast.ac.vn). INPC is the only institute in Vietnam responsible for graduate training (M.Sc and PhD courses) in the chemistry of natural products (Code 62.44.27.02). Since November 1991, INPC is National Point of Contact on the Network for Chemistry of Natural Products of the UNESCO Regional in Asia and the Pacific Ocean.

In the course of our lab. research for the last 6 years up to now, about 300 strains of endophytic fungi were isolated from well-known medicinal plants such as: *Croton tonkinensis* Gagnep., *Mallotus apelta* Lour, *Artemisia annua*, *Fibraurea recisa*, *Taxus wallichiana*, etc. All isolates were fermented, extracted then evaluated their biological activities in antimicrobial, antioxidant, anticancer (cytotoxicity) and enzymological assays. 50% among isolated strains exhibited at least one biological activity, 12 most active strains were Latin name identified. In detail, up to 34% of all extracts showed cytotoxic activity (against at least 2 cancer cell lines), 42.6% exhibited antimicrobial activity against at least 3/8 tested strains, 11% were able to scavenge free radical of DPPH in antioxidant assay, 20% were enzymological active, and 15 bioactive compounds were chemical structure identified. The results contributed to emphasize the potential of endophytic fungi isolated from medicinal plants as a promising source for biologically active secondary metabolites.