Jesmin Akter et al., J Food Process Technol 2018, Volume: 9
DOI: 10.4172/2157-7110-C3-084

Isolation and identification of antifungal compounds from turmeric (*Curcuma* spp.) and their activities on *Fusarium solani sensu lato*

Jesmin Akter, Amzad Hossain, Ayako Sano and **Kensaku Takara**
University of the Ryukyus, Japan

Turmeric (*Curcuma* spp.) is a rhizomatous perennial herb with broad spectrum of pharmacological actions. There are more than 80 species of turmeric and 70 varieties/strains of *Curcuma* longa, which may have different chemical properties and biological activities. Hence, we compared the major active components (curcuminoides) and antifungal activity of three *Curcuma longa* strains (Ryudai gold: RD, Okinawa ukon and BK2), *C. xanthorrhiza, C. aromatica, C. amada* and *C. zedoaria* against four isolates (one, three, 10 and 17) of Fusarium solani senso lato (FSSL) derived from American manatees (Trichechus manatus) with three different genotypes. Curcuminoides were measured by HPLC and antifungal activity was measured by the diameter of colonies on Petri dish, microscopic observation and microdilution methods followed by CLSI. Our result suggested that the turmeric BK2 contained highest concentration of all the three active compounds followed by Ryudai gold, *C. xanthorrhiza*, Okinawa ukon and *C. aromatica*. These compounds were not detected in *C. amada* and *C. zedoaria*. All the turmeric species and strains inhibited fungal growth in a concentration dependent manner. The order of the IC_{50} against FSSL was RD (78 to 92 µg/ml) > BK2 (89 to 101µg/ml) > *C. xanthorrhiza* (98 to 114 µg/ml) > *C. aromatica* (183 to 204 µg/ml) > *C. amada* (183 to 206 µg/ml) > Okinawa ukon (191 to 216 µg/ml) > *C. zedoaria* (354 to 385 µg/ml). We have chosen Ryudai gold (contain curcuminoids) and *C. amada* (does not contain curcuminoids) for the isolation and identificaiton of antifungal compounds using silica gel column, toyopearl HW-40F column and high performance liquid chromatography. Structural identification of the antifungal compounds was conducted using 1H NMR, 13C NMR, and liquid chromatography-tandem mass spectrometry. The purified antifungal compounds were curcumin (1) demethoxycurcumin (2) and (E)-α-atlantone (3) from Ryudai gold and zederone (4) and furanodienone (5) from *C. amada*. These five compounds showed strong antifungal activity with a concentration dependent manner. The concentration required for 50% growth inhibition (IC_{50}) of F. solani ranged from 65 to 76 µM, 76 to 88 µM, 91-101 µM, 77-91 µM and 101-129 µM for compound one, two, three, four and five, respectively. Our results demonstrated that Ryudai gold (developed by the University of the Ryukyus, Okinawa, Japan) and C. amada have excellent antifungal activity against FSSL. These compounds could be the alternative choice for commercial antifungal agent and to prevent fungal contamination of stored food.

Biography

Jesmin Akter has completed Doctor of Veterinary Medicine (DVM) and Masters of Science (MS) in pharmacology from Bangladesh Agricultural University, Bangladesh. Now, she is doing Ph.D. in the United Graduate School of Agricultural Sciences, Kagoshima University, Japan. Her field of study is to check the pharmacological activities of different species and strains of turmeric and isolation and identification of active drugs from them.

jesminbau02@gmail.com

Notes: