

## ターメリックの *Fusarium solani* に対する抗真菌活性

### Antifungal activities of turmeric (*Curcuma* spp.) on *Fusarium solani*

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#### Back ground

Turmeric (*Curcuma* spp.) is a rhizomatous perennial herb with broad spectrum of pharmacological functions like antioxidant, anticoagulant, anti-carcinogenic, anti-mutagenic, antidiabetic, anti-bacterial, antifungal and unknown activities. There are more than 80 species of turmeric and 70 strains/varieties of *Curcuma longa* with different chemical properties which may possess different activities<sup>1)</sup>.

*Fusarium solani sensu lato* (FSSL), a pathogenic fungal specie, causes several diseases in human, animals and plants. It is well known fact that FSSL are resistant to commercially available antifungal agents.

#### Aims

There are a few reports on antifungal activities of turmeric extracts, especially for FSSL. Furthermore, some antifungal drugs show some side effects. On the other hand, herbal medicine has fewer side effects.

Then, at the present study, we evaluated antifungal activities of turmeric extracts on FSSL isolates.

#### Materials and Methods

Turmeric extracts derived from 3 *Curcuma longa*

strains, *C. xanthorrhiza*, *C. aromatica*, *C. amada* and *C. zedoaria* were evaluated for the antifungal activities on 4 isolates of FSSL derived from American manatees (*Trichechus manatus*) with 3 different genotypes<sup>2)</sup>.

The major active ingredients of turmeric known as curcuminoids, such as curcumin, demethoxycurcumin, and bisdemethoxycurcumin were measured by HPLC.

Antifungal activities were measured by the diameter of colonies on Petri dish and microdilution methods followed by CLSI<sup>3)</sup>.

#### Results and Discussion

*C. longa* strains, *C. xanthorrhiza*, and *C. aromatica* contained curcumin, demethoxycurcumin and bisdemethoxycurcumin, while *C. amada* and *C. zedoaria* were negative. Two strains of *C. longa* (strain BK2 and Ryudai Gold) contained higher amount of curcumin, demethoxycurcumin and bisdemethoxycurcumin compared to other turmeric.

Although, all the turmeric inhibited fungal growth, there was correlations between the antifungal activities and curcuminoids contents. Interestingly, the curcumin itself showed marked antifungal activities to FSSL followed to demethoxycurcumin, while the activities of bisdemethoxycurcumin was

extremely low. However, the *C. amada* and *C. zedoaria* had no curcuminoids but showed antifungal effects which indicated that other compounds of turmeric also inhibit the growth of FSSL.

Our results demonstrated that the turmeric strain Ryudai Gold developed by the University of the Ryukyus, BK2 and *C. xanthorrhiza* had higher curcumin contents and showed excellent antifungal activities against FSSL.

## References

- 1) Plant Genet Res 2005: 3(2) 230-251.
- 2) 獣医畜産新報. 66: 194-200, 2013.
- 3) The Clinical and Laboratory Standards Institute. Reference method for broth dilution antifungal susceptibility testing of yeasts; Approved standard-third edition, M27-A3. CLSI, Wayne, PA, USA, 2008.