

## 【論文】

Seasonal changes in the content of the (oxalato)aluminate complex, an antimicrobial substance of the “shiro” of *Tricholoma matsutake*, and the bacterial community structure in the shiro area

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## [Abstract]

Colonies of *Tricholoma matsutake*, which consist of fairy rings and the area they enclose, are called shiros in Japanese. We recently identified the antimicrobial substance at the active mycorrhizal zone, the shiro front, of *T. matsutake* as the (oxalato)aluminate complex. In the present study, seasonal changes in the content of the complex, the mycelial density of *T. matsutake*, antimicrobial activity, and pH were analyzed in the shiro area. Bacteria were isolated from the shiro area in October and identified, and their sensitivity to the complex was also examined. The change in the content of the complex approximately correlated with that of the mycelial density, and closely correlated with antimicrobial activity and pH. The bacteria from the shiro front were resistant to the complex, while some bacteria sensitive to the complex were found inside and outside the shiro front. This suggested that the complex expels sensitive bacteria from the shiro front along with the outward extension of the shiro, contributing to the protection and development of the shiro.

Key words: Aluminum complex, Bacterial community structure, Fairy ring, Mycorrhiza, *Pinus densiflora*

## [摘要]

マツタケ *Tricholoma matsutake* シロの先端である活性菌根帯には抗菌物質・シュウ酸アルミニウム錯体が含まれている。今回年間を通じて、同錯体の活性菌根帯とシロ内側および外側の濃度、マツタケ菌体量、抗菌活性および pH を測定した。その結果、同錯体は活性菌根帯にのみ検出され、その濃度変化はマツタケ菌体量と概ね相関し、抗菌活性と pH とはそれぞれ正および負の相関を示した。10月のシロ土壌におけるバクテリアの密度と種類および同錯体に対する感受性も調べた結果、バクテリア密度は活性菌根帯が低く、シロ外側次いで内側が高かった。同錯体に対する感受性菌の存在比率は外側が高く、活性菌根帯のバクテリアは全て耐性を示した。このことは、マツタケは同錯体の抗菌作用を利用して土壌中の微生物環境を制御することにより、シロを維持拡大していることを強く示唆している。