

*Tricholoma matsutake*, a basidiomycete, forms ectomycorrhizas with *Pinus densiflora* as the host tree. Its fruiting body, “matsutake” in Japanese, is an edible and highly prized mushroom, and it grows in a circle called a fairy ring. Beneath the fairy ring of *T. matsutake*, a whitish mycelium-soil aggregated zone, called “shiro” in Japanese, develops. The front of the shiro, an active mycorrhizal zone, functions to gather nutrients from the soil and roots to nourish the fairy ring. Bacteria and sporulating fungi decrease from the shiro front, whereas they increase inside and outside the shiro front. Ohara demonstrated that the shiro front exhibited antimicrobial activity, but the antimicrobial substance has remained unidentified for 50 years. We have identified the antimicrobial substance as the (oxalato)aluminate complex, known as a reaction product of oxalic acid and aluminum phosphate to release soluble phosphorus. The complex protects the shiro from micro-organisms, and contributes to its development.

“Antimicrobial activity of the matsutake shiro” for left figure. “The antimicrobial substance, the (oxalato)aluminate complex, from the matsutake shiro” for right figure.

