



Wood Rot Fungi – Diagnostic Services

The Microbiology Laboratory at EMSL Analytical, Inc. provides expert wood-rot diagnostic services to the lumber industry, home builders, homeowners, and other concerned parties across the country. We employ traditional diagnostic techniques as well as modern technologies to identify the fungi and mushrooms causing wood rot damage. Any type of wood can be submitted for testing such as poles, posts, fences, bridges, lumber, and utility poles.

The main types of wood rot fungi:

There are three principal types of wood decay fungi: “white rot”, “brown rot”, and “soft rot”.

“Soft-Rot” Fungi

Soft rot fungi degrade the cellulose and hemicelluloses in the wood. This rot typically occurs in wood with high water content (e.g. *Chaetomium sp.*). Wood that has long been colonized by soft-rot fungi becomes spongy and soft. Commonly found in rotting wooden window frames, wet floor boards, basements, etc.

“White-Rot” Fungi

White-rot fungi (e.g., *Donkioporia expansa*, *Phanerochaete chrysosporium*) are predominantly found in hardwood. In North America, white rot fungi account for approximately 94% of the > 1700 known species of wood rotting fungi. They can metabolize all parts of wood (lignin, cellulose and hemicelluloses). As a result, the wood become somewhat moist, soft and spongy, or stringy, and appears whitish.

“Brown-Rot” fungi

Brown-rot fungi are commonly associated with softwoods. They degrade hemicellulose and cellulose but not lignin. Because of that, the wood shows a brown discoloration and shrinks. As a result of the shrinkage, longitudinal and transverse cracks occur which give the wood a cuboid appearance. As decay progresses, wood can be easily crushed into a brown powder. While some other members of the brown-rot fungi may grow in long root like structures (Rhizomorphs). When moist, they often get a sleeky and rubbery appearance. The presence of brown-rot fungi (e.g. *Serpula lacrymans*, *Meruliporia incrassata* and others) is a major concern for the integrity of wooden structures.

Ecology and occurrence of wood rot fungi

In most cases, a minimum wood moisture content of 20% is required to start the wood decay process caused by these wood rot fungi. The optimum moisture level varies from 40-80%. Unlike “white” and “brown” rot fungi, some “soft-rot” fungi tolerate high moisture well and, in some cases, can decompose wood completely submerged in water.



Identification of wood rot fungi

Accurate identification of wood rot fungi is important for the preservation of wooden structures.

Depending on the situation, fungal identification can be done in two ways:

- Direct DNA analysis from fruiting bodies (e.g. fresh mushroom) or hyphae.
- Isolation of fungi in pure culture followed by DNA analysis

Sample Collection for fungal testing:

- **Wood sample:**

Cut pieces of wood into blocks of a few square inches if possible. Ideally, the sample should be taken from the area where the deteriorated wood meets the unaffected wood.

- **Mushroom sample:**

The best way would be to collect the fresh fruiting bodies (mushroom) itself. It is important that samples being sent to the lab arrive in the best condition possible. Place sample in a paper bag and put paper bag in a box for shipping. Ship by overnight delivery whenever possible. Do not place samples in wet paper towels or in sealed plastic bags, this will cause the mushroom to rot and will make diagnosing difficult or impossible. Keep samples cool until shipping and mail as soon as possible.

