

# The Talented Turkey Tail

A deep dive into the possibilities of *Trametes versicolor*

Gina Rivers, MycoHerbalist  
[mycoherbalism@gmail.com](mailto:mycoherbalism@gmail.com)





## The Talented Turkey Tail

A deep dive into the possibilities of *Trametes versicolor*

- **Vocabulary Words**
- **Meet the Mushroom**
- **Identification of *true* turkey tail**
- **Look-alikes and how to tell them apart**
- **Mycoremediation & ecological impact**
- **Bioactive compounds**
- **Clinical research & uses**
- **Preparation & extraction tips**



## The Talented Turkey Tail

### A deep dive into the possibilities of *Trametes versicolor*

#### Vocabulary Words:

Saprobe - Saprobes are the group of fungi that act as decomposers, feeding on dead and decaying wood, leaves, litter, and other organic matter. (syn. Saprophyte)

Substrate - any organic material that serves as a food source, nutrient provider, and structural support for mushroom mycelium and fruiting bodies.

Polypore - a wood-inhabiting basidiomycete fungus that forms a fruiting body, or conk, with a spore-bearing surface on the underside composed of many tiny tubes, or pores, rather than gills.

Mycoremediation - a form of bioremediation that uses fungi to decontaminate environments by breaking down pollutants like heavy metals and organic compounds. (Paul Stamets, *Mycelium Running* 2005)



**Turkey Tail**  
**AKA: *Trametes versicolor***  
**"tram" = thin**  
**"etes" = one who is**  
**"versicolor" = of many colors**







## The Talented Turkey Tail

A deep dive into the possibilities of *Trametes versicolor*

Key facts about turkey tail as a saprobe:

**Role in decomposition:** As a wood-rotting fungus, it breaks down dead organic material, a process that enriches the soil for new plant growth.

**Primary colonizer:** It is among the first fungi to attack and decompose dead hardwoods and, less commonly, conifers.

**Weak parasite:** While it primarily feeds on dead wood, it can also act as a weak parasite on dying or stressed living trees.

**White-rot fungus:** Turkey tail is a "white-rot" fungus, which means it degrades the tough brown lignin of plant cells, leaving behind the whiter cellulose.

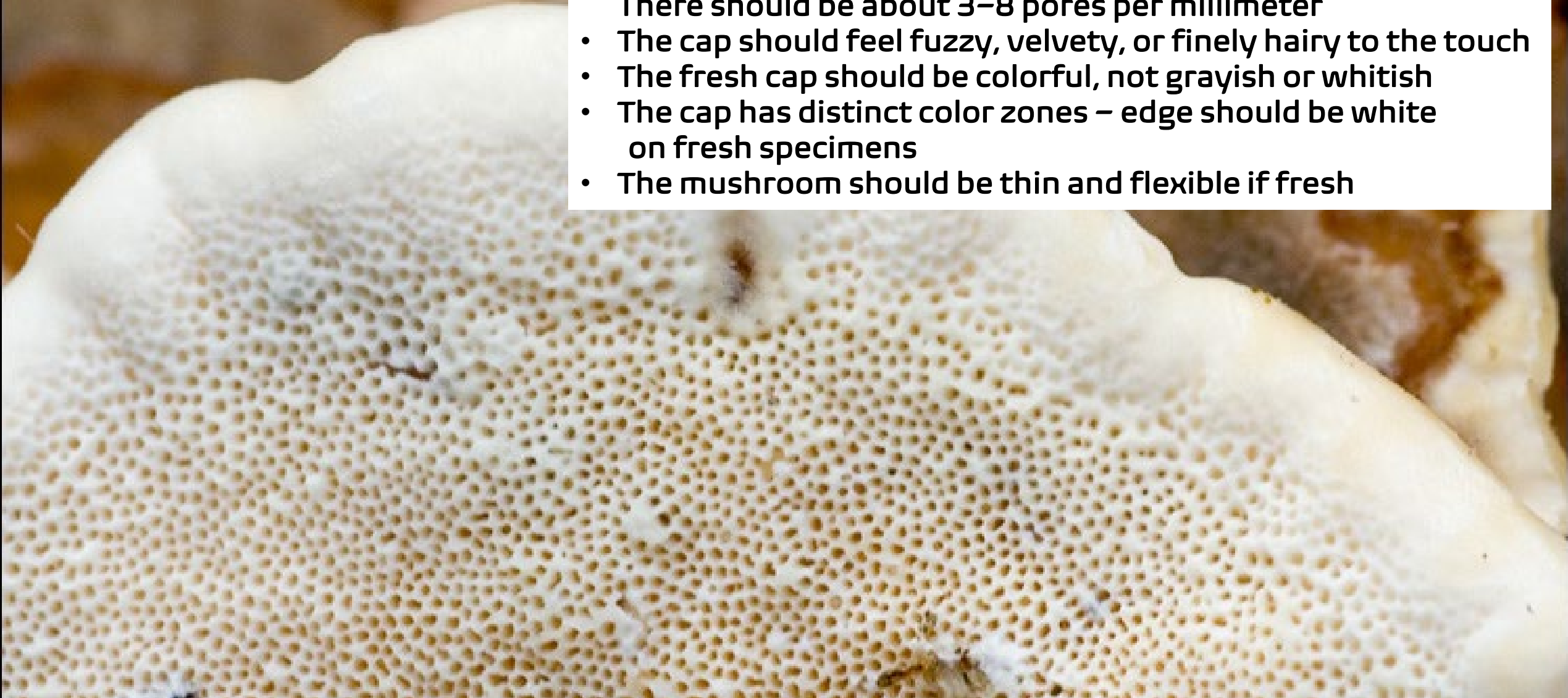
*Trametes versicolor*  
(Formerly *Coriolis versicolor*)

- Traditional Name: Turkey Tail
- TCM: Yun Zhi
- Earliest mention Shenong Bencaojing
- 2,000 years of use



Photo by Amadej Trnkoczy

- The underside of the mushroom contain pores
- (that should be white if fresh)
- There should be about 3–8 pores per millimeter
- The cap should feel fuzzy, velvety, or finely hairy to the touch
- The fresh cap should be colorful, not grayish or whitish
- The cap has distinct color zones – edge should be white on fresh specimens
- The mushroom should be thin and flexible if fresh



Tiny = 3-8 pore/mm

Turkey Tail Pores



A close-up photograph of a honeycomb cell. The cell is a light yellowish-brown color and has a distinct hexagonal shape. A ruler is placed horizontally across the top of the cell, with the text "Large = 1-3 pore/mm" written in white. Below the text are three small circles containing the numbers 1, 2, and 3. To the right of the cell, the text "Not Turkey Tail" is written in white. The background is a textured, brownish surface.

Large = 1-3 pore/mm

①②③

Not Turkey Tail

# Beware the Imposters!

*Stereum ostrea*  
False Turkey Tail

Side by Side Comparison



## Beware the Imposters!



**Violet-Toothed Polypore – *Trichaptum biforme***

# Beware the Imposters!

mykoweb.com



Gilled Polypore – *Trametes betulina* (Maze/Gill Polypore)

# Beware the Imposters!



**Hairy Bracket – *Trametes hirsute***  
(noticeably fuzzy)

# Beware the Imposters!



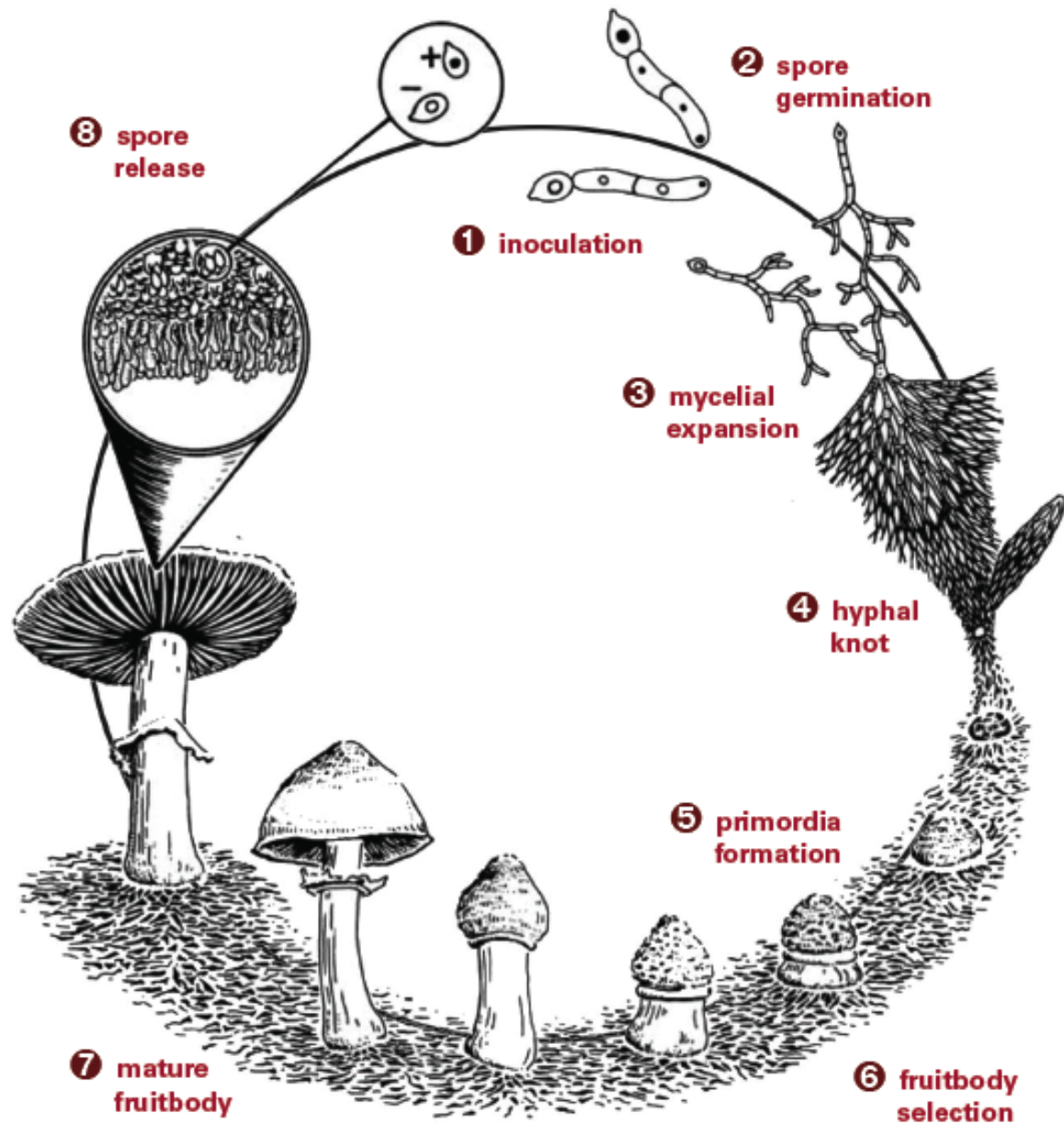
Dark-footed Tinpore  
(*Microporus affinis*)

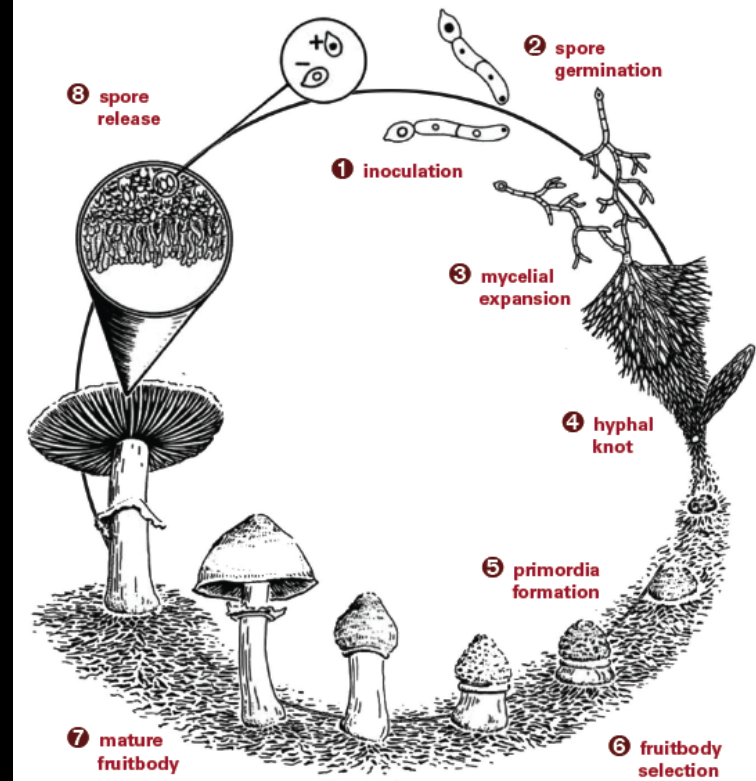
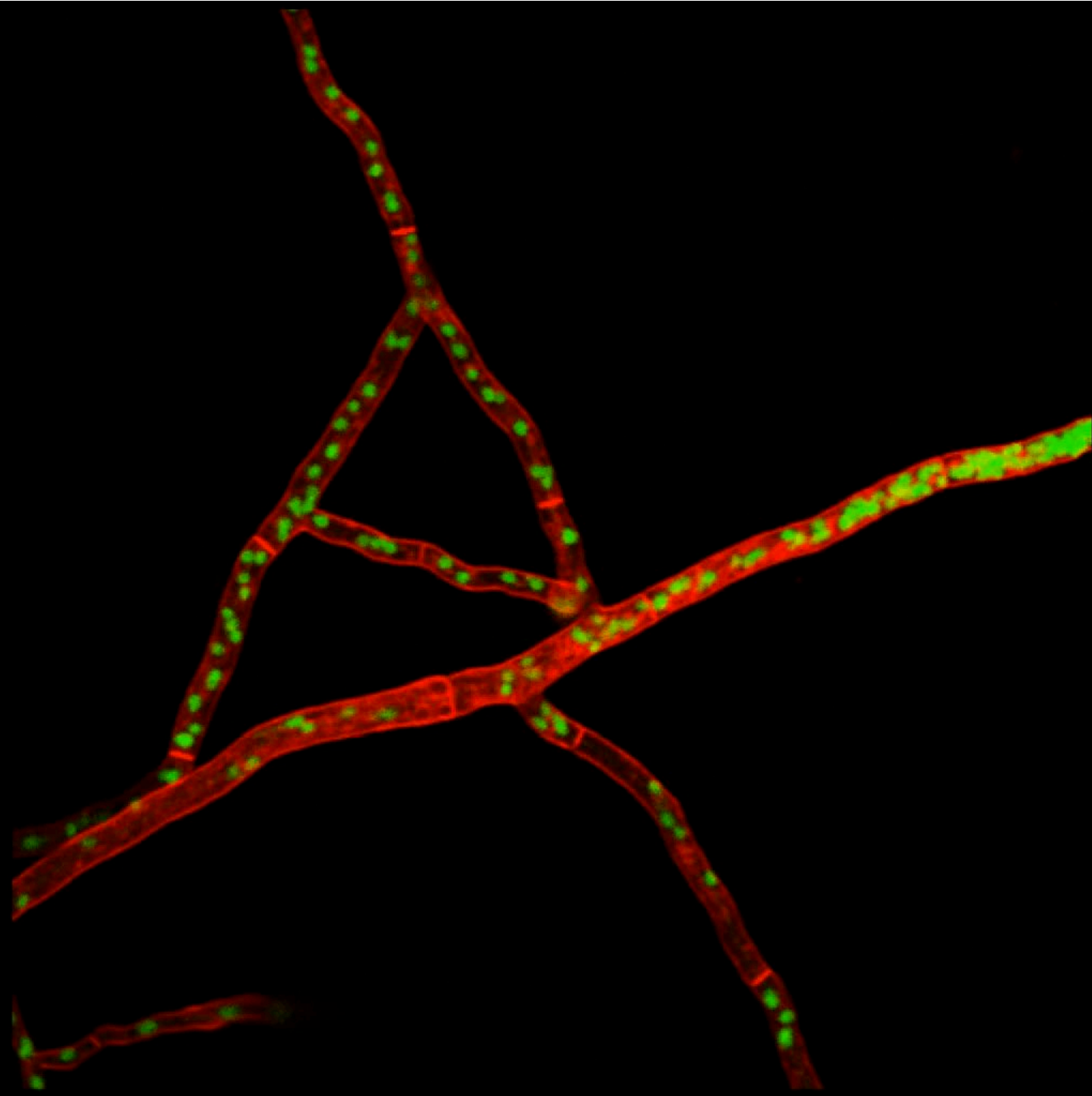


Crimped Gill  
(*Plicaturopsis crispa*)



Hairy Hexagonia  
(*Hexagonia hydnooides*)



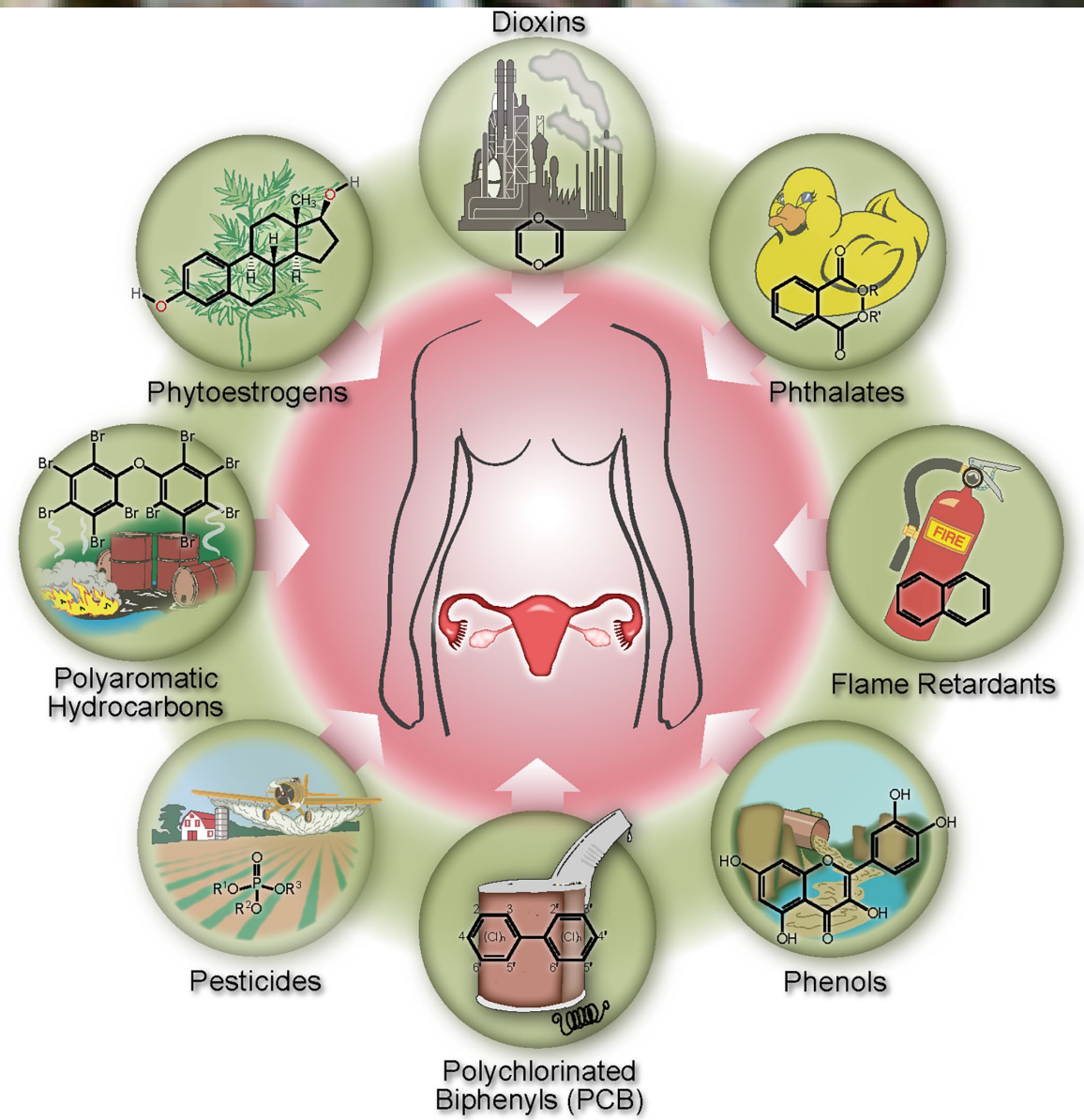


© 2017 Paul Stamets, all rights reserved. Do not duplicate without permission.

video clip created by Patrick Hickey

A close-up photograph of several Turkey Tail mushrooms (Trametes versicolor) growing on a wooden surface. The mushrooms exhibit characteristic concentric rings of color, including shades of white, grey, blue, orange, and brown. The background is a dark, textured surface, possibly wood or bark, with some green moss visible. A semi-transparent white banner is overlaid across the center of the image, containing the text.

# Turkey Tail's Role in *Mycoremediation*



## Xenoestrogens or Endocrine Disrupting Compounds (EDCs):

- \* Ubiquitous in our Environment
- \* Block Estrogen Receptors (agonists)
- \* Trick Body into Adjusting Endogenous Hormones

The background of the entire page is a close-up photograph of several sliced mushrooms. The slices are arranged in a somewhat circular pattern, showing the concentric rings of the gills. The colors are vibrant, with shades of blue, orange, and white. The lighting is bright, highlighting the texture of the mushroom caps.

# Exploitation of *Trametes versicolor* for bioremediation of endocrine disrupting chemicals in bioreactors

Published: June 2, 2017 <https://doi.org/10.1371/journal.pone.0178758>

## Abstract

Endocrine disrupting chemicals (EDCs) are environmental contaminants causing increasing concerns due to their toxicity, persistence and ubiquity. In the present study, degradative capabilities of *Trametes versicolor*, *Pleurotus ostreatus* and *Phanerochaete chrysosporium* to act on five EDCs, which represent different classes of chemicals (phenols, parabens and phthalate) and were first applied as single compounds, were assessed. *T. versicolor* was selected due to its efficiency against target EDCs and its potentialities were exploited against a mixture of EDCs in a cost-effective bioremediation process. A fed-batch approach as well as a starvation strategy were applied in order to reduce the need for input of 'fresh' biomass, and avoid the requirement for external nutrients. The fungus was successfully operated in two different bioreactors over one week. Semi-batch cultures were carried out by daily adding a mixture of EDCs to the bioreactors in a total of five consecutive degradation cycles. *T. versicolor* was able to efficiently remove all compounds during each cycle converting up to 21 mg L<sup>-1</sup> day<sup>-1</sup> of the tested EDCs. **The maintained ability of *T. versicolor* to remove EDCs without any additional nutrients represents the main outcome of this study, which enables to forecast its application in a water treatment process.**



## The Talented Turkey Tail

A deep dive into the possibilities of *Trametes versicolor*

### How *Trametes versicolor* Remediates Pollutants

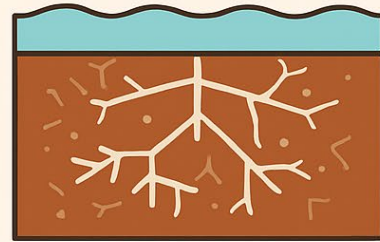
Keum, Y. S., & Li, Q. X. (2004). "Degradation of 2,4,6-trichlorophenol and its metabolites by laccase of *Trametes versicolor*." *Chemosphere*, 56(11), 1081-1089. **This study demonstrates the capacity of *T. versicolor*'s laccase enzyme to degrade a chlorinated aromatic compound.**

Plackova, L., et al. (2012). "Laccase activity profiling and gene expression in PCB-degrading cultures of *Trametes versicolor*." *International Biodeterioration & Biodegradation*, 71, 22-28. **This paper examines the role of laccase in PCB degradation and links the fungus's ability to the production of this enzyme.**

Schauer, F., et al. (2022). "Filamentous fungi for sustainable remediation of pharmaceutical compounds, heavy metal and oil hydrocarbons." *Journal of Environmental Management*, 321, 115980. **This review article provides an overview of the topic, citing the potential of *T. versicolor* for PCB remediation.**

# TURKEY TAIL

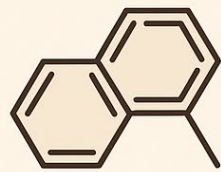
## REMEDIATES POLLUTANTS



- THE FUNGAL MYCELIUM COLONIZES THE CONTAMINATED AREA, (SOIL, WTR, ETC.)



- IT SECRETES LACCASE AND PEROXIDASE ENZYMES



- THESE ENZYMES ATTACK AND BREAK THE CHEMICAL BONDS WITHIN POLLUTANTS LIKE PCBs



- THE LARGE, TOXIC MOLECULES ARE REDUCED TO SIMPLER, LESS HARMFUL COMPOUNDS THAT CAN BE ABSORBED BY THE MUSHROOM, OR FURTHER DEGRADED BY OTHER MICROORGANISMS



## The Talented Turkey Tail

### A deep dive into the possibilities of *Trametes versicolor*

## How *Trametes versicolor* Remediates Heavy Metals

### **Biosorption of Heavy Metals**

Instead of breaking down heavy metals, *T. versicolor* uses a physical process to remove them from a contaminated site.

### **Key Mechanism:**

**Biosorption:** The cell walls of the fungal mycelium contain molecules that act as natural binding sites. Heavy metals are attracted to and trapped on these surfaces.

### **Process:**

1. The mycelium grows and spreads through the contaminated medium.
2. As it expands, its large surface area comes into contact with heavy metal ions (e.g., copper, lead, cadmium).
3. The metal ions bind to the fungal cell walls.
4. The metals are accumulated and concentrated within the fungal biomass, effectively removing them from the surrounding environment.

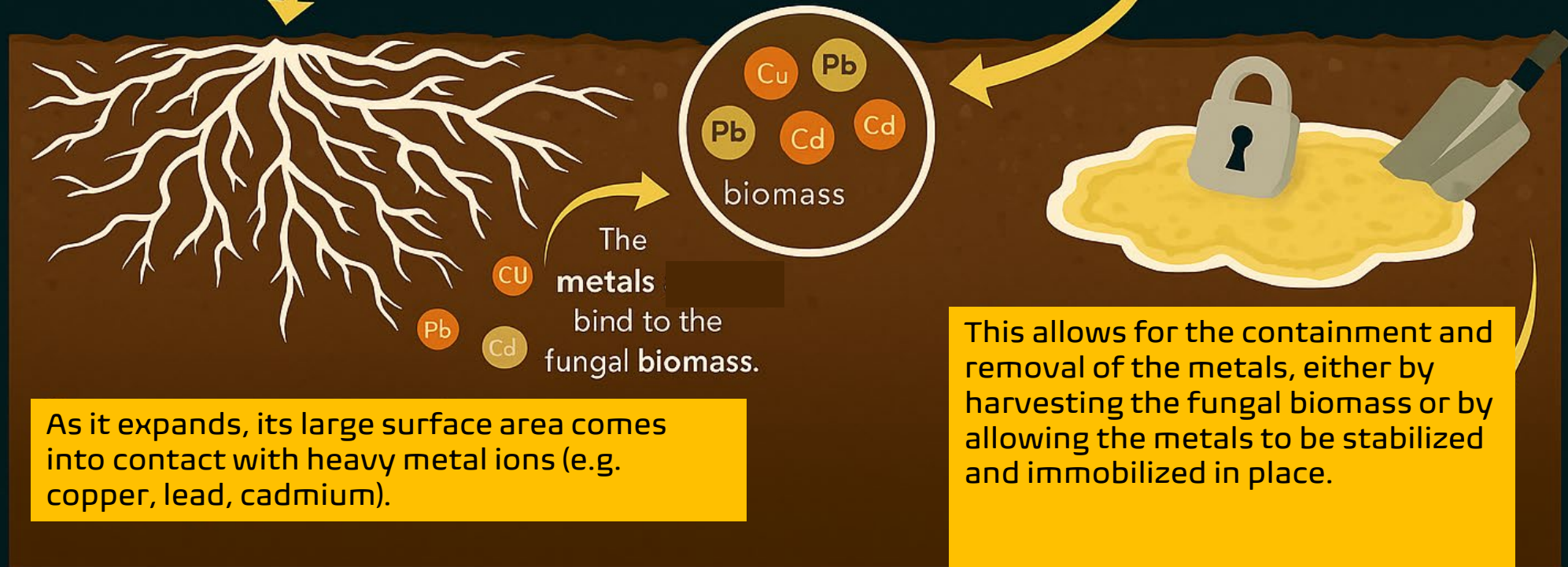
This allows for the containment and removal of the metals, either by harvesting the fungal biomass or by allowing the metals to be stabilized and immobilized in place.

# HEAVY METAL BIOREMEDIATION

by *Trametes versicolor*

The mycelium grows through the contaminated medium.

The metals are accumulated and concentrated within the fungal biomass, effectively removing them from the surrounding environment.



As it expands, its large surface area comes into contact with heavy metal ions (e.g. copper, lead, cadmium).

This allows for the containment and removal of the metals, either by harvesting the fungal biomass or by allowing the metals to be stabilized and immobilized in place.



## The Talented Turkey Tail A deep dive into the possibilities of *Trametes versicolor*

### How *Trametes versicolor* Remediates Heavy Metals

Bayramoglu, G., et al. (2003). "Biosorption of heavy metal ions on immobilized white-rot fungus *Trametes versicolor*." *Journal of Hazardous Materials*, 101(3), 285-300.

**Specifically explores the biosorption capacity of *T. versicolor* for heavy metals like copper, lead, and zinc.**

Aguinaga, D. A., & Cabrera Carranza, C. F. (2023). "Pleurotus *Ostreatus* and *Trametes Versicolor* Fungi to Decontaminate Soils Containing Organophosphates Methamidophos and Cadmium." *Chemical Engineering Transactions*, 100, 97-102.

It was established that the fungi *Pleurotus ostreatus* and *Trametes versicolor* allowed reducing the presence of Methamidophos and Cadmium in agricultural soils. **After the treatment it was possible to reduce 73% of the organophosphate insecticide and 99% for Cadmium; this means that it is possible to use fungi of this type to recover contaminated soils** in an environmentally sustainable way and of easy application, requiring only basic training, with the perspective of using the method in areas of agricultural soils with intensive use of pesticides in order to reduce their contamination.



## The Talented Turkey Tail

A deep dive into the possibilities of *Trametes versicolor*

Mahan, R. K., et al. (2020). "Sustainability, 14(2), 935. Biosorption and bioleaching of heavy metals from electronic waste varied with microbial genera."

**Research highlights the ability of *T. versicolor* to remove heavy metals from electronic waste.**





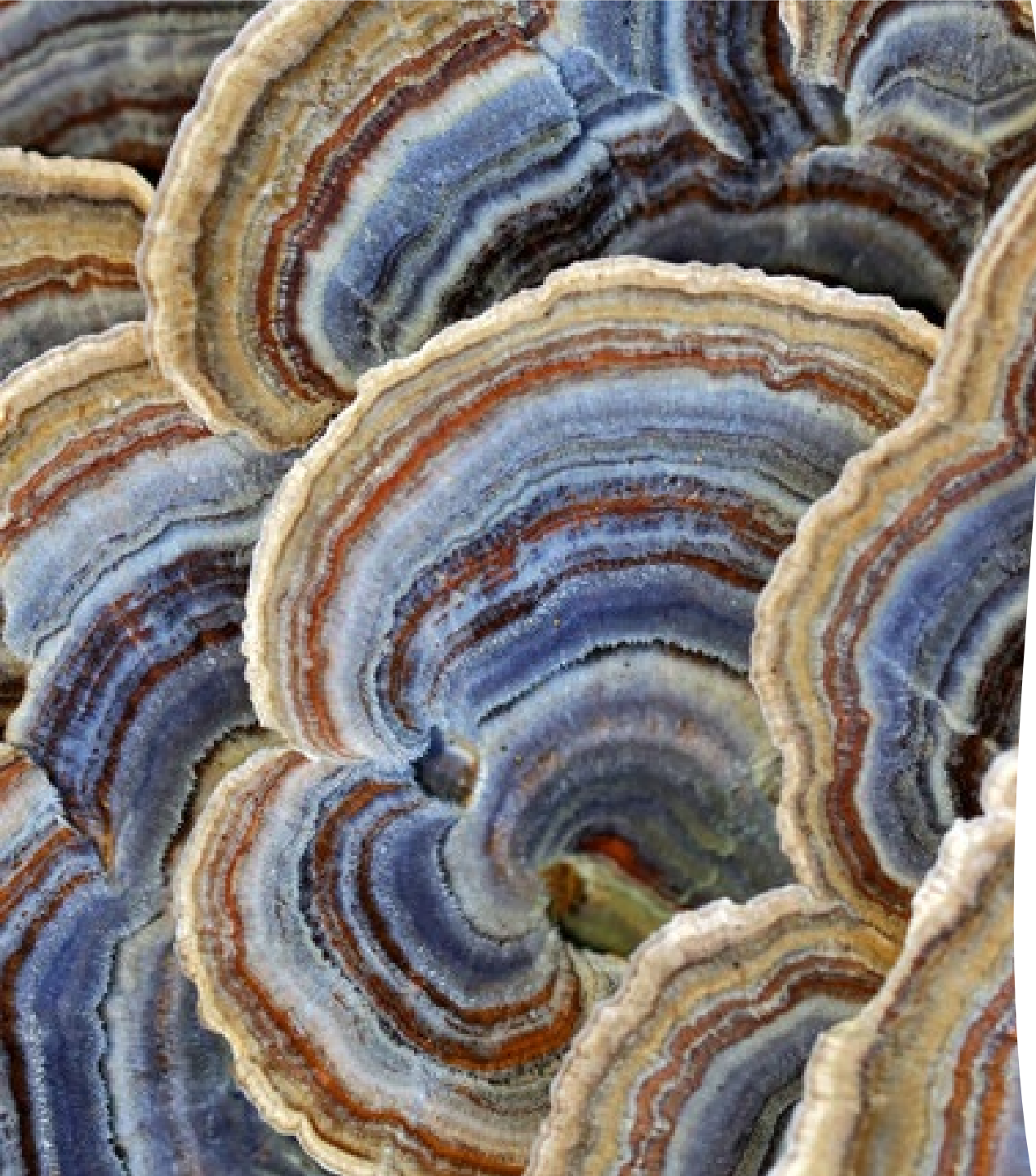
## The Talented Turkey Tail

A deep dive into the possibilities of *Trametes versicolor*

Degradation of Low-Density Polyethylene Using Laccase Produced by *Trametes versicolor* (Turkey Tail) Cultured on *Oryza sativa* (Rice) Stems - Journal of Interdisciplinary Perspectives, vol. 3 no. 3 (2025)

- Mechanisms involved laccase and cytochrome P450 enzymes
- 48% removal over 30 days





## **The Talented Turkey Tail**

### **A deep dive into the possibilities of *Trametes versicolor***

#### **Forward-Thinking Directions**

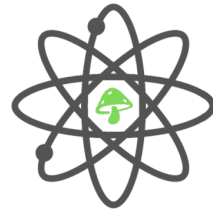
- **Designer Substrates** → Custom nutrient blends to cultivate strains with optimized metabolite profiles.
- **Synthetic Biology** → Engineering *T. versicolor* enzymes for industrial-scale green chemistry.
- **Circular Economy Models** → Using agricultural or forestry waste as substrate, then repurposing spent mushroom substrate (SMS) as soil amendment or biofuel.
- **Smart Mycelium Materials** → Incorporating Turkey Tail mycelium into biodegradable packaging, textiles, and filtration systems.



The Talented Turkey Tail  
A deep dive into the possibilities of *Trametes versicolor*



*Field & Forest Products*®



**Myco Labs**



**EVERYTHING  
MUSHROOMS**

FUNGI SUPPLY AND RESOURCE CENTER

# The Talented Turkey Tail

A deep dive into the possibilities of *Trametes versicolor*

What's inside Turkey Tail?

Sterols

Terpenoids

Phenols

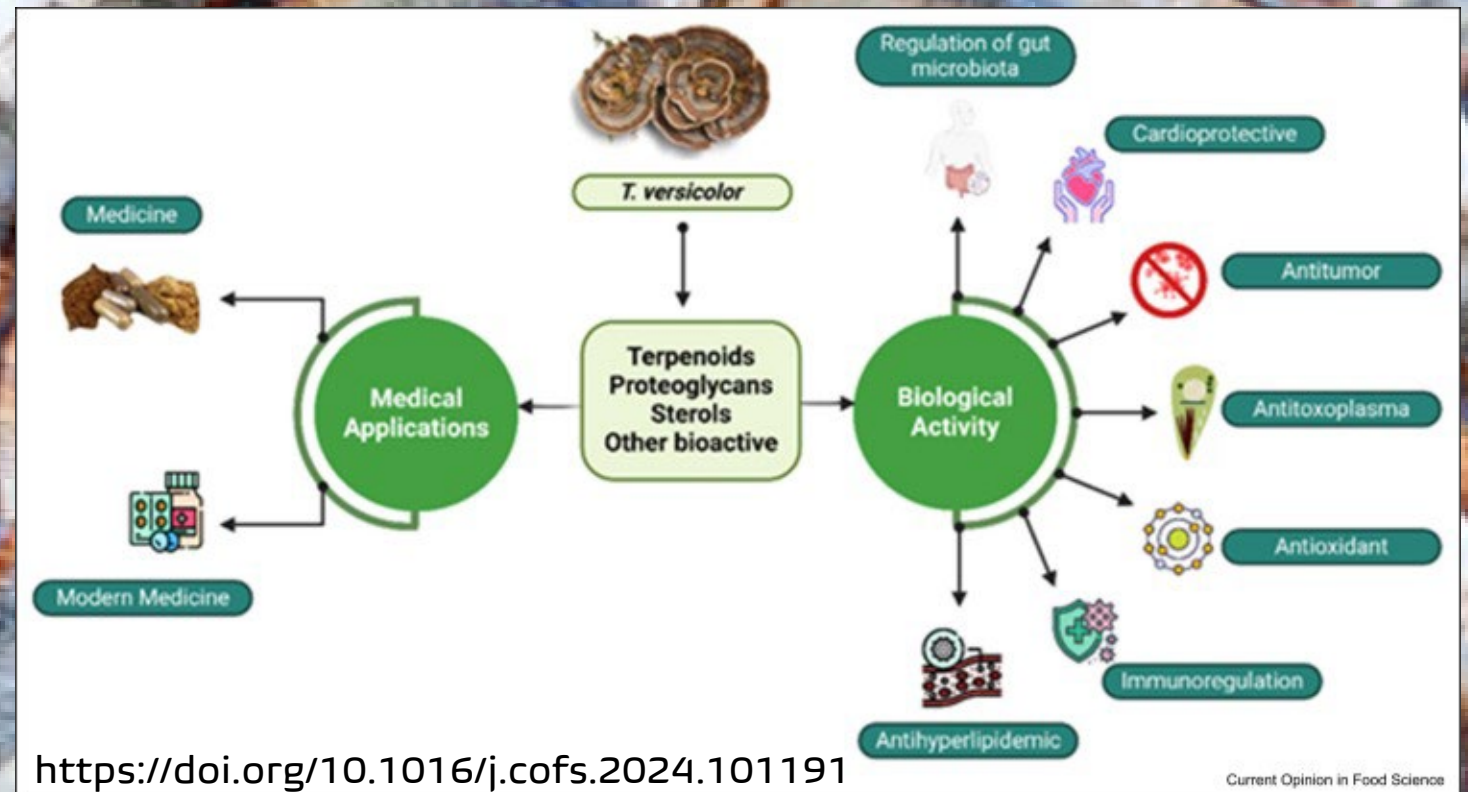
Lipids

Proteoglycans

Beta glucans (1,3 1,6 beta glucans)

PSK (polysaccharide K -Krestin)

PSP (polysaccharide P)



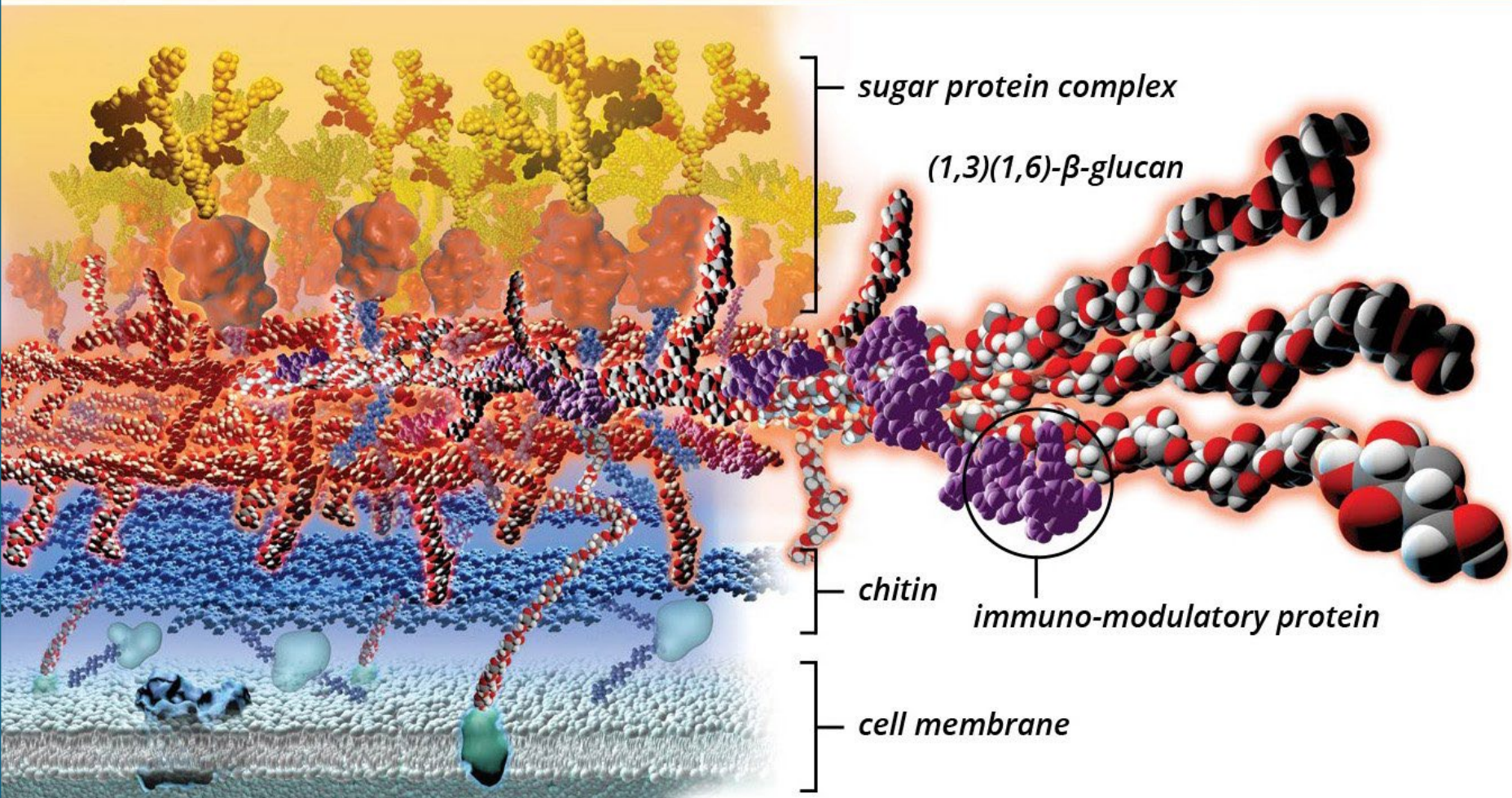
# The Talented Turkey Tail

A deep dive into the possibilities of *Trametes versicolor*



Fungal Cell Wall

Extracted Triple Helix Structure

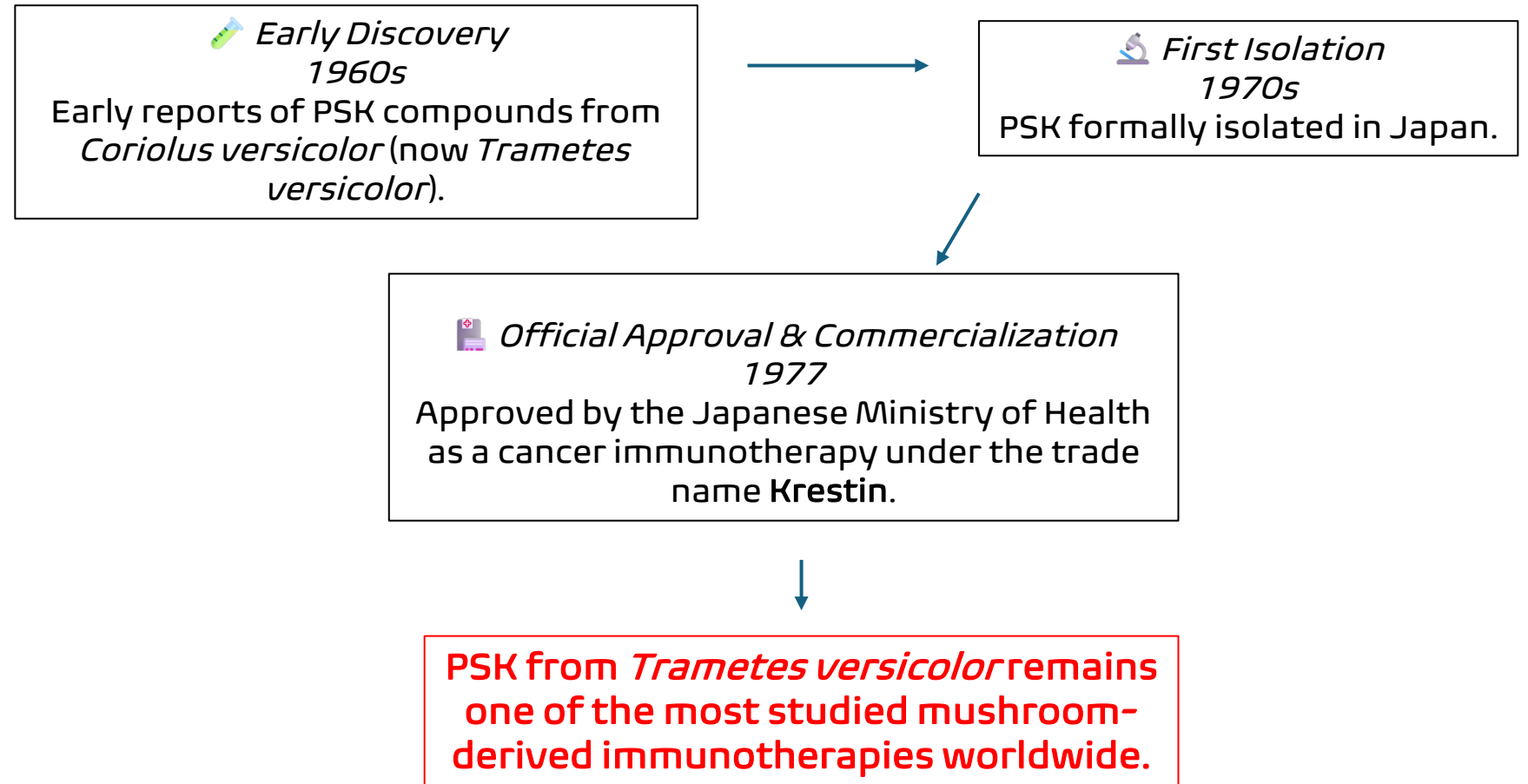




# The Talented Turkey Tail

## A deep dive into the possibilities of *Trametes versicolor*

### Timeline of PSK (Krestin)





## The Talented Turkey Tail

### A deep dive into the possibilities of *Trametes versicolor*

Oncotarget. 2017 Jul 6;8(51):89108–89118. doi: 10.18632/oncotarget.19059

#### **Gastrointestinal Cancer (GIC) Meta-Analysis (2017)**

A network meta-analysis covered randomized controlled trials examining PSK combined with chemotherapy in gastrointestinal cancers. The study included:

**23 trials, comprising 30 analyses**

**Involved 10,684 patients**

- PSK treatment significantly increased 1–5 year overall survival and resulted in positive trends in 6–7 year overall survival
- significant increases were also found in 1–7 year disease free survival, while no increase in side effects was observed
- Significant efficacy outcomes obvious in colorectal and gastric cancer groups, as well as PSK combined with chemotherapy groups
- Network meta-analysis revealed that PSK combined with chemotherapy was superior, with significantly increased 3-year and 5-year OS.



## The Talented Turkey Tail

### A deep dive into the possibilities of *Trametes versicolor*

Integr Cancer Ther. 2015 May;14(3):201-11. doi: 10.1177/1534735415572883. Epub 2015 Mar 17

#### **Lung Cancer Systematic Review (2015)**

Focused on PSK (and *Coriolus versicolor* extracts) in lung cancer treatment:  
Reviewed **31 reports**, derived from **28 distinct studies**

Included 6 randomized controlled trials, 5 non-randomized controlled trials and 17 preclinical studies

- Fifteen of 17 preclinical studies supported anticancer effects for PSK through immunomodulation and potentiation of immune surveillance, as well as through direct tumor inhibiting actions in vivo that resulted in reduced tumor growth and antimetastatic effects.
- Nonrandomized controlled trials showed improvement of various survival measures including median survival and 1-, 2-, and 5-year survival.
- Randomized controlled trials showed benefits on a range of endpoints, including immune parameters and hematological function, performance status and body weight, tumor-related symptoms such as fatigue and anorexia, as well as survival.
- PSK was safely administered following and in conjunction with standard radiation and chemotherapy.



# The Talented Turkey Tail

## A deep dive into the possibilities of *Trametes versicolor*

ISRN Oncology; Volume 2012, Article ID 251632, 7 pages

### **Phase 1 Clinical Trial of *Trametes versicolor* in Women with Breast Cancer**

Carolyn J. Torkelson, Erin Sweet, Mark R. Martzen, Masa Sasagawa, Cynthia A. Wenner, Juliette Gay, Amy Putiri, and Leanna J. Standish

#### **Abstract**

**Introduction:** Orally administered preparations from the *Trametes versicolor* (Tv) mushroom have been hypothesized to improve immune response in women with breast cancer after standard chemotherapy and radiotherapy.

**Methods.** A phase I, two-center, dose escalation study was done to determine the maximum tolerated dose of a Tv preparation when taken daily in divided doses for 6 weeks after recent completion of radiotherapy. Eleven participants were recruited and nine women completed the study. Each cohort was comprised of three participants given one of three doses of Tv (3, 6, or 9 grams). Immune data was collected pre- and post-radiation, at 3 on-treatment time points and after a 3-week washout.

**Results.** Nine adverse events were reported (7 mild, 1 moderate, and 1 severe), suggesting that Tv was well tolerated. Immunological results indicated trends in (1) increased lymphocyte counts at 6 and 9 grams/day; (2) increased natural killer cell functional activity at 6 grams/day; (3) dose-related increases in CD8+ T cells and CD19+ B cells, but not CD4+ T cells or CD16+ 56+ NK cells.

**Conclusion.** These findings show that up to 9 grams/day of a Tv preparation is safe and tolerable in women with breast cancer in the post-primary treatment setting. This Tv preparation may improve immune status in immunocompromised breast cancer patients following standard primary oncologic treatment.



## The Talented Turkey Tail

A deep dive into the possibilities of *Trametes versicolor*

### Additional Trial and Study Examples (Not Exhaustive)

**Colorectal cancer meta-analysis (2005):** Examined PSK efficacy in postoperative colorectal cancer patients via centrally randomized trials.

**“results of this meta-analysis suggest that adjuvant immunochemotherapy with PSK can improve both survival and disease-free survival of patients with curatively resected colorectal cancer.”**

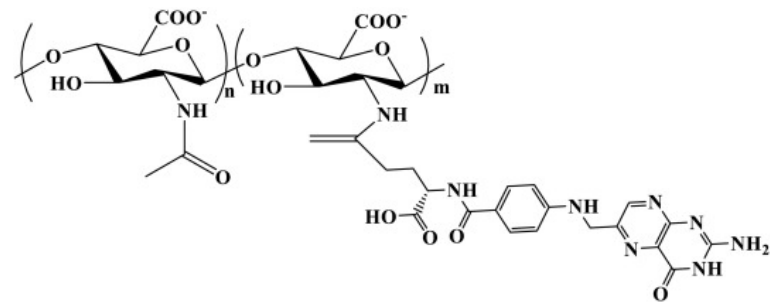
**Gastric cancer meta-analysis (2006):** Analyzed eight clinical trials involving nearly 5,164 patients to evaluate PSK’s impact on 5-year survival.

**“The results of this meta-analysis suggest that adjuvant immunochemotherapy with PSK improves the survival of patients after curative gastric cancer resection.”**



## The Talented Turkey Tail

A deep dive into the possibilities of *Trametes versicolor*



**Polysaccharide Peptide (PSP)** was first isolated in 1983 from *Coriolus versicolor* (now *Trametes versicolor*) in China. It's structurally similar to PSK but differs in peptide content and molecular structure.

### Key Differences in Use:

- **PSK** is more clinically standardized and integrated into conventional oncology in Japan.
- **PSP** is often used for general immune enhancement and as an adjunct in complementary medicine, with less formal regulatory approval.
- **PSK** is usually obtained from mycelium, whereas **PSP** is usually obtained from the fruiting body.

The peptide component in PSP is slightly different from PSK, likely due to differences in the protein composition of the fruiting body versus the mycelium.



## The Talented Turkey Tail

### A deep dive into the possibilities of *Trametes versicolor*

Effects of polysaccharopeptide from *Trametes versicolor* and amoxicillin on the gut microbiome of healthy volunteers: A randomized clinical trial.

**"...administration led to consistent prebiotic-like shifts in the gut microbiome, including increased short-chain fatty acid production and a rise in beneficial bacteria such as *Bifidobacterium* and *Lactobacillus*. In contrast, amoxicillin caused significant and prolonged alterations in the microbiome, including an increase in *Escherichia/Shigella* populations."**

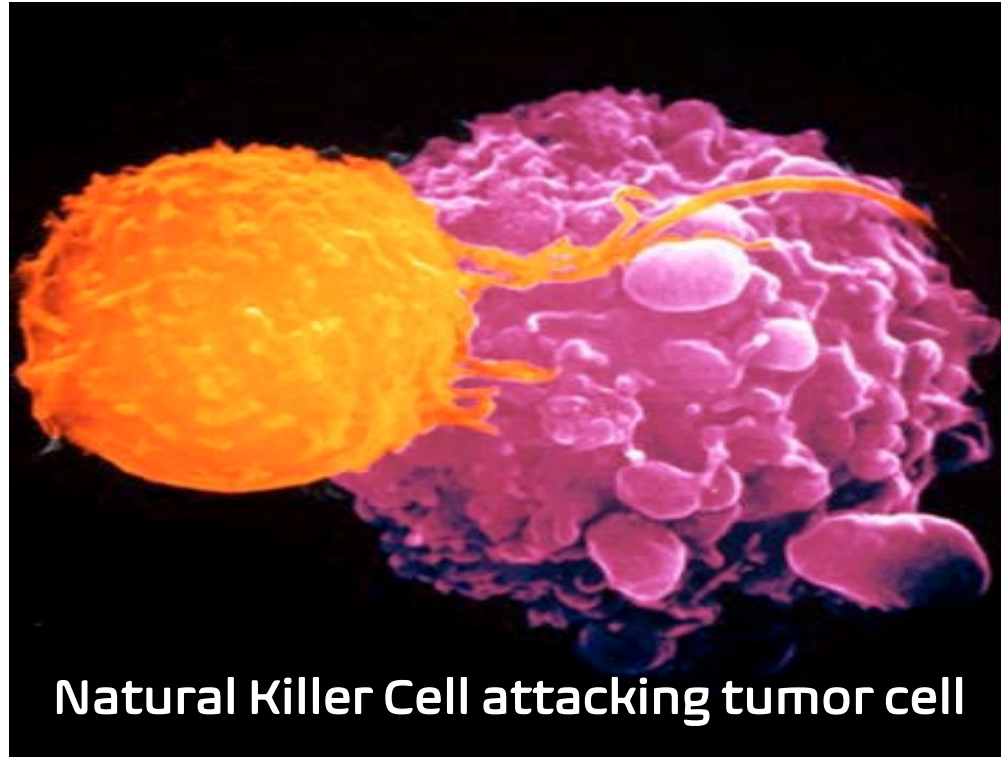
Trametes versicolor extract modifies human fecal microbiota composition in vitro

**"...Trametes versicolor, a common East Asian botanical, contains putative prebiotic agents that alter human gut microbiota and pH. This prebiotic-like activity may help explain some of the plethora of the health benefits attributed to this traditional Chinese medicine."**

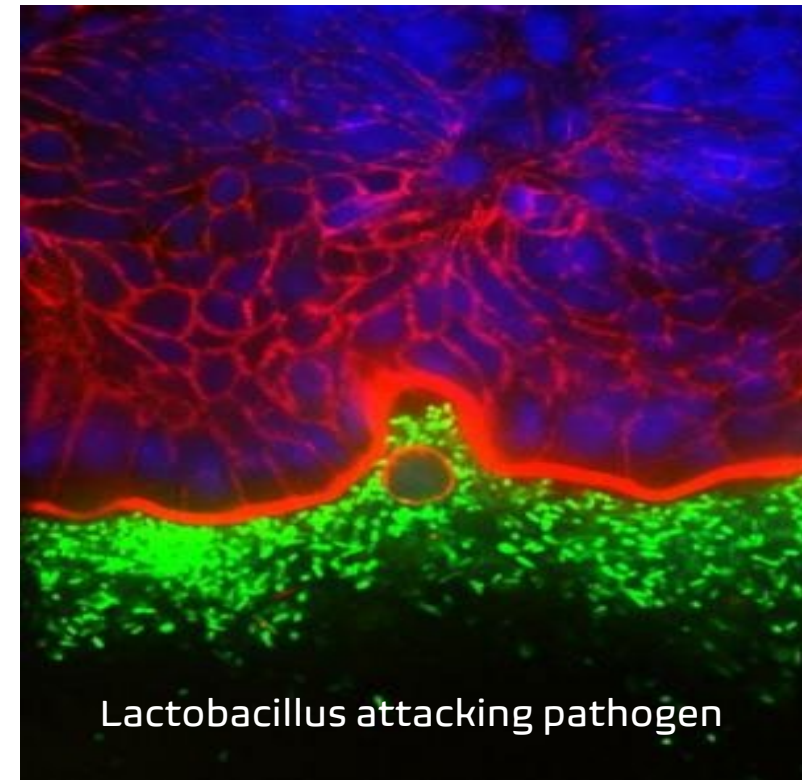


## The Talented Turkey Tail

A deep dive into the possibilities of *Trametes versicolor*

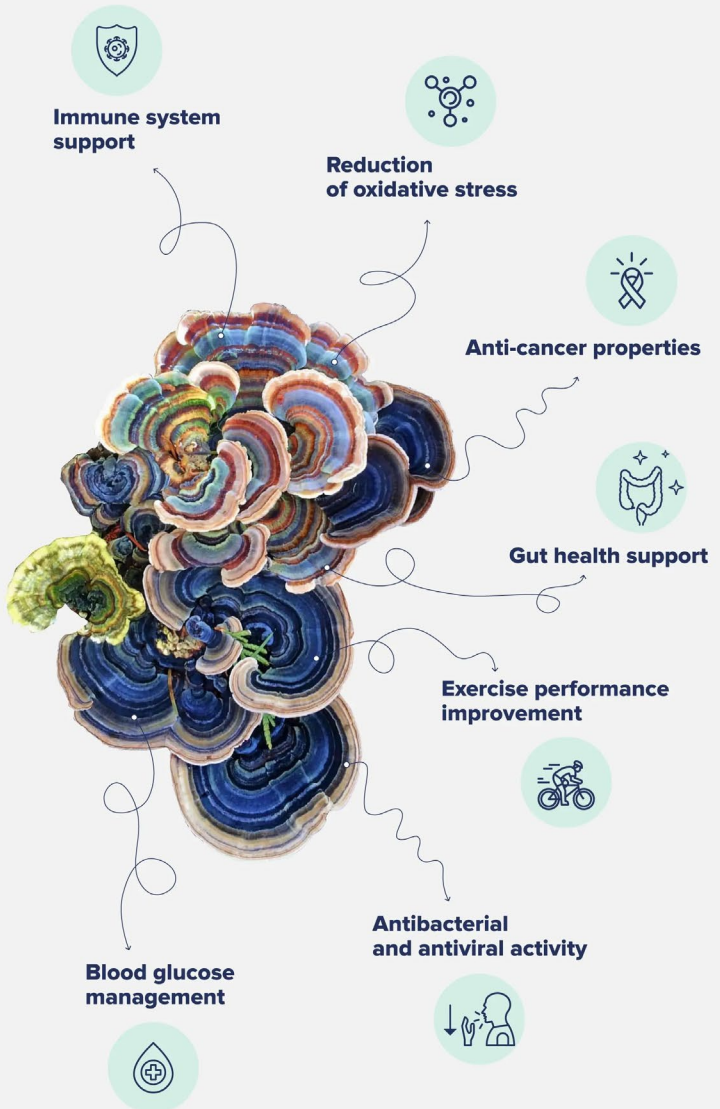


Natural Killer Cell attacking tumor cell



Lactobacillus attacking pathogen

# Health Benefits of Turkey Tail Mushroom



## The Talented Turkey Tail A deep dive into the possibilities of *Trametes versicolor*

### Additional Therapeutic Possibilities:

- Overall Immune System Support
- Antioxidant
- Support for healthy cell replication
- Gut health support
- Anti-fatigue activity
- Antibacterial
- Antiviral
- Antifungal
- Blood Glucose Support



## The Talented Turkey Tail

A deep dive into the possibilities of *Trametes versicolor*

Traditional Method:  
Decoction of Fruiting Body

- Extracts Polysaccharides and Sugars (Hydrophilic)
- Triterpenoids? Sterols? Lipids? (Hydrophobic)
- Strongly Immunostimulatory
- Not Shelf Stable





## The Talented Turkey Tail

A deep dive into the possibilities of *Trametes versicolor*

Modern Methods used in Supplement Industry:

- Dual Extraction methods (fruit body, mycelium, fermented substrate)
- Extraction of fruit body and sprayed on a carrier (if encapsulated)
- Solid State Fermentation
- Liquid Culture Fermentation





## The Talented Turkey Tail

A deep dive into the possibilities of *Trametes versicolor*

### Easy Double Extraction for Medicinal Mushrooms (Gina's Granny Method)

Materials needed: 2-quart mason jars, 1 half gallon mason jar, stockpot, stove, 150-190 proof EtOH (highest proof legal in your state), approximately 3 cups (24 oz) of dried medicinal mushroom pieces of your choice, coffee or other herb grinder (the smaller the pieces, the better), clean and empty tincture dropper bottle, cheesecloth and/or tea strainer, funnel.



## The Talented Turkey Tail

### A deep dive into the possibilities of *Trametes versicolor*

- Start with dried mushrooms, cut up into smallest size possible. I use a Ninja-pro blender, but a coffee grinder can work as well, just ensure you start with a clean grinder. \*Note: If you have wildcrafted your mushrooms, cut them into approximately ½" by ½" pieces when they are still pliable and easy to cut, and then dry them in a food dehydrator. I use an electric knife for larger polypores like Reishi. Make certain the pieces are fully dry to prevent cross-contamination with mold or other microorganisms. Then grind.
- Fill a 1<sup>st</sup> quart mason jar with 3 cups of the cut and dried mushrooms, then pour EtOH (higher proof is better for terpene extraction) over the marc to just below the top and cap tightly. \*Note 1: The smaller the mushroom pieces are the more you can fit, thus the stronger the extract. Leave at least ½ inch to 1 inch space at the top as the pieces will expand slightly when rehydrated with the alcohol.
- Corky mushrooms, such as Reishi, absorb quite a bit of the alcohol initially. Check the next day to ensure the marc is still submerged in the alcohol, you may need to top it off with additional alcohol, recap, and shake vigorously.



## The Talented Turkey Tail

A deep dive into the possibilities of *Trametes versicolor*

- Place in cool, dark location for 2-4 weeks and shake daily.
- Strain the first extraction through cheesecloth into a separate jar, gently but firmly squeezing the marc to remove as much soaked-in menstruum as possible. You should have around 2 cups of alcohol extraction. Set marc aside in a bowl for the second extraction.
- Measure out 64oz (1/2 gallon) of clean well/spring water or distilled water and pour into a large, heavy bottomed stockpot. Bring water to a boil on the stove.



## The Talented Turkey Tail

### A deep dive into the possibilities of *Trametes versicolor*

- When water is boiling, turn heat down to a simmer temperature. Once water appears to be simmering (not a roiling boil) add reserved marc to the water and stir.
- Simmer, uncovered, for approximately 2 hours, stirring occasionally. The goal is to reduce the water by half, leaving approximately 32 oz (1 quart) for the extract. Evaporation happens differently with different climates, altitudes, and stove temps, so keep an eye on the process – you may have to add a bit of water and that is OK!
- After 2 hours, remove from heat and let cool completely before handling. Repeat the straining method you used with the 1<sup>st</sup> extraction with cheesecloth using your 2<sup>nd</sup> quart mason jar. (Firmly squeeze so the marc will release any retained water.)
- Thank the marc for its gifts and compost appropriately 😊



## The Talented Turkey Tail

### A deep dive into the possibilities of *Trametes versicolor*

- Now you should have 1 quart mason jar approximately 1/3 full of alcohol extract, and 1 quart mason jar mostly full of water extract.
- Pour the alcohol extract and water extract into the half gallon mason jar, cap tightly and shake to combine. You now have a double extracted medicinal mushroom extract! The alcohol should equal at least 25%-30% of the final product and will be enough to keep the extract shelf stable for approximately 2 years. \*Note: If you want a higher terpene/phenolic content, or if you want shelf stability beyond 2 years, adjust to a 50% EtOH/ 50% water extraction.
- You can now pour into titrated tincture bottles or keep in a batch for addition to future herbal formula preparations. \* Note: The polysaccharides may fall out of solution with higher EtOH content, or the longer your mother extraction sits, so always shake well before using in formula or as a simple.



The Talented Turkey Tail  
A deep dive into the possibilities of *Trametes versicolor*

Questions?



















