



Newsletter for Wild Mushrooms PNW ❖ www.wildmushroomspnw.com

Using Fungi Mycelium as Building Material

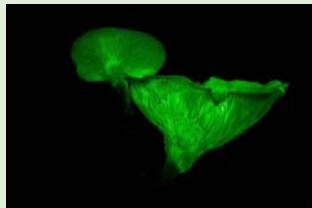
Mycelium are beneath the ground that form a wide network of thin, root-like fibers. Mycologist, Phillip Ross, discovered that mycelium when dried could be used to form a super-strong, water-, mold-, and fire-resistant building material. This dried mycelium can be grown and formed into just about any shape, and has a remarkable consistency that makes it stronger, pound for pound, than concrete. It is a 100% organic and compostable material. Ross is erecting a small lab where he will grow mushrooms that will produce a series of chairs and stools showing that it is possible to create a product using local agricultural waste.



As building material the mycelium would be formed into a brick that becomes super hard, and yet lightweight, once it dries. One of the mushrooms used was *Ganoderma lucidum* (Reishi) as pictured above. A variety of lacquers and finishes can be applied to the outer layer of the bricks to seal them and give them a glossy finish. It has the potential to be a substitute for many petroleum-based plastics. Another way Ross used this product is as a medium for fine art. When you read all the different articles about making mycelium into products, it sounds like its potential is vast and varied. (from Inhabitat.com, 2014, by Mark Boyer, *Philip Ross Molds Fast-Growing Fungi Into Mushroom Building Bricks That Are Stronger Than Concrete*)

Can Fungi Light Our Streets?

If you were walking on a moonless night deep in a Brazilian rainforest the only thing you are likely to see are tiny smears of light from flitting fireflies or the ghostly glow of mushrooms scattered around the forest floor. Both effects are the results of bioluminescence, a peculiar ability of some organisms to behave like living night-lights. Bioluminescence serves a variety of purposes, from attracting mates and luring prey to warding off predators, but its existence in fungi was thought to be rare, if not unique. This ghostly glow became known as “foxfire” probably from the old French word *fois* meaning “false.” It is now thought that this night-light attracts insects and other animals to the fruiting bodies of fungi, who then spread the spores far and wide. This additional dispersal mechanism might indicate that this fungi has some advantage especially in a dense forest. Researchers of bioluminescence found eventually allow the creation of a luminescent plant this chemical by itself, not needing the fungi. Then modified tree that could glow in the dark and act as a sustainable source of street lighting.



(from *theguardian*, July 2016, by Steve Connor)

Fantastic Fungi: www.fantasticfungi.com

Watch the trailer of a film that is being developed by Louie Schwartzberg. He asks the question, “What is the foundation of life on Earth?” Of course, it is fungi. You can also make a donation to his kick starter fund.

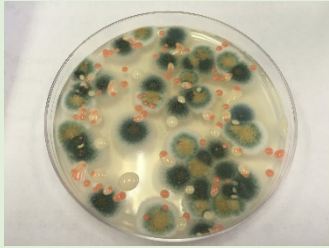
50 Million year Old Mushroom Found Trapped in Amber

The first ever mushroom discovered in amber was captured alongside the exoskeleton of a small insect and the hair of a rodent. Scientists say that this insight into life occurred shortly after the dinosaurs became extinct. From what can be seen in this amber, a tiny mushroom was bitten off, probably by the rodent, at the base of a tree. An insect, similar to a walking stick, was probably also trying to feed on the mushroom. It appears to have immediately jumped out of its skin and escaped just as the tree sap flowed on it. Thousands of insects, plants, and other life forms have been found trapped in ancient amber deposits, but never have creatures gotten away. The insect and the mushroom in the fossil are now extinct. This specimen is from the Baltic amber deposit, the largest in the world, and continues to be mined today. (from *The Telegraph*, July 2016, by Sarah Knapton)



Chernobyl Fungi from the Radioactive Wasteland Launched into Space

Eight species of fungi gathered from Chernobyl, the site of the world's worst nuclear disaster, traveled to the International Space Station aboard a SpaceX rocket. Scientists hope to understand how these fungi are able to shield themselves from radiation. What they hope to find could lead to major developments, not only in how we treat illnesses on Earth, but how we will explore the universe outside our planet. It is estimated that the explosion at Chernobyl

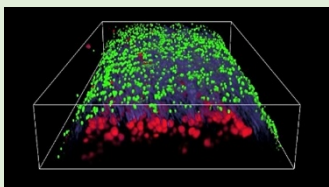


nuclear power plant released as much radioactive material into the environment as 400 atomic bombs. It destroyed all plant and wildlife in the area. Thirty years later the area is still pretty barren, but these resilient fungi are the first forms of life to grow and actually thrive in this radioactive wasteland. Some of these fungi actually grow towards the radiation. It is thought that perhaps it is the melanin, the same dark pigment we have in our skin, that allows the fungi to shield themselves from the harmful radiation and helps convert it into a food source.

Scientists are sending them into space to see if they make new compounds there. Previous studies showed that these fungi can produce special biological molecules that could possibly be used in medicine to fight illnesses such as depression and cancer. The benefits of this research help us in the quest to explore and colonize other planets. The universe is brimming with high energy radiation in the form of cosmic rays and astronauts are constantly exposed to it, which could cause mutations that lead to cancer. This research could help develop a “sunblock” to protect humans traveling in space and create crops that can thrive in extreme, radiation-rich environments, such as on Mars. Didn't I see a movie recently about this very subject? (from *Business Insider*, July 2016, by Ali Sundermier, *Scientists just launched fungi from the radioactive wasteland of Chernobyl into space, and it could change the way we treat cancer*)

What Are Lichens Anyway?

Most people think that lichens are those flaky, light green things that grow on tree bark, and learned there is a mutually beneficial partnership between fungi and algae. But now scientists have made the shocking new discovery that many lichens are also made up of a previously undiscovered third partner – a new kind of yeast. This new yeast has gone undetected in lichens despite the fact that scientists all over the world have devoted their entire careers to their study, closely studying them with microscopes and genetic testing. How come so many people missed it?



Traditional DNA analysis relies on probes or lures to fish out certain characteristic regions of genetic material, partly based on what scientists expect to find. Newer techniques instead look for all genes that are in the process of being translated into proteins via “messenger” molecules called RNA. This give a sense of what an organism is doing at any given time.

Future analysis showed it to be a new kind of yeast, but in the same group as button mushrooms. It was not related to the yeasts used to brew beer or bake bread. Now, there is insight into how one of the most fascinating symbioses works. (CBC News, July 2016, by Emily Chung, *Lichens aren't quite what we thought, shocked scientists discover*)

Nutritional Profile of Mushrooms

Mushrooms are naturally low in sodium, fat, cholesterol, and calories. They also have the presence of antioxidants and beneficial dietary fibers such as chitin and beta-glucans. One cup of chopped or sliced raw white mushrooms contains 15 calories, 0 grams of fat, 2.2 grams of protein, 2.3 grams of carbohydrate which includes 0.7 grams of fiber and 1.4 grams of sugar. Although there are a large variety of mushrooms available, most provide similar amounts of the same nutrients per serving. Mushroom are rich in B vitamins such as riboflavin, folate, thiamine, pantothenic acid, and niacin. They are the only vegan, non-fortified dietary source of vitamin D. They also provide selenium, potassium, copper, iron, and phosphorus.



Beta-glucans are a type of fiber found in the cell walls of many mushrooms. Recently, they have been the subject of their role in improving insulin resistance and blood cholesterol levels and providing an immunity boost. Another important nutrient is choline that helps with sleep, muscle movement, learning and memory. Choline assists in the transmission of nerve impulses, supports proper fat absorption and reduces chronic inflammation. When buying mushrooms at the

market, choose ones that are firm, dry, and unbruised. Avoid mushrooms that appear slimy or withered. Store them in the refrigerator in paper bags and do not wash or trim them until ready for use. (from *Mushrooms: Health Benefits, Facts, Research*, Jan. 2016, by Megan Ware RDN, LD)

Here are some quick tips:

1. Sauté any type of edible mushroom with onions for a quick and tasty side dish.
2. Add sliced crimini mushrooms or white store-bought mushrooms to top any salad.
3. Make stuffed portabella mushrooms by filling them with your favorite ingredients and baking.
4. Add sliced or chopped mushrooms to omelets, breakfast scrambles, and quiches.
5. Grill portabella mushrooms and use them on sandwiches or in wraps.
6. Make sure edible wild mushrooms are cooked before eating.

For breakfast I sautéed some chopped yellow onions and Chanterelles and then added my eggs and scrambled. Seasoned with salt and pepper to taste. Once everything was cooked I added some cheddar cheese and allowed it to melt. That was really good. Do read my articles on this website about wild mushrooms. Remember make 100% sure of your identification before ever thinking of eating any wild mushroom.

Mushroom of the Month – Lobster Mushroom (*Hypomyces lactifluorum*)

This parasite grows on *Russula brevipes* and sometimes a *Lactarius* species. It takes the shape of the host mushroom deforming the stalk and gills and coloring it a bright fluorescent orange to orange-red; sometimes has whitish areas. The surface may be roughened like sandpaper where the parasite has created small bumps on the host's surface.

This parasite transforms the ordinary mushroom so it appears that the host is a favorite and well-flavored mushroom with fruity flavors. You might find them on the ground in the woods usually under conifers until November. Look for them



Russula brevipes into an excellent edible. In the PNW, this mushroom is safe. The lobster mushroom since it creates an abundance of rich and growing solitary, scattered, or in groups conifers. They are fruiting now and will partially buried in conifer debris.

The Lobster Mushroom dries well (see my website). In fact, drying brings out the rich stews, and terrines. Slice thin and sauté with onions and new potatoes. Blend in omelets or scrambled eggs. Lobster mushrooms hold their baked pasta dishes, as well paper bag in the refrigerator after picking them and they mushrooms is usually the Newhouse, adjacent K. Scates



info about drying mushrooms on this flavor and preserves it. Add to soups, texture after cooking and may be added to stuffing or as simple broth soups and cream sauces. Store in a until use. I had some in the refrigerator for a week were still good. The picture of the two white original host, *Russula brevipes*. © Photo above by B.

Quick Lobster Mushroom Bisque (modified from the recipe on the website *The Gastrognome*)

This dish makes a perfect entrance when those foggy and rainy days start in the fall.

3 ounces fresh Lobster Mushrooms that have been chopped and sauteed*

4 Tbsp. butter

½ cup flour

6 cups chicken or turkey stock

Salt and pepper to taste

1 tsp. Thai Curry rub (used Lesley Elizabeth, inc.), but probably any Thai Curry would work. Because it was a rub it had some peppercorns in it that had to be filtered out, but the taste of the soup was great

½ tsp. powdered ginger

¼ tsp. toasted sesame oil

Make a roux by melting the butter in the bottom of a soup pan, adding in the flour and stirring. Don't brown. It's used for the thickness, not the flavor. When it's ready (stir frequently, don't let it brown or burn) add the stock, bringing it to a boil. Have the chopped Lobster Mushrooms ready, *saute in butter until tender, then put in a food processor and chop until fairly small.

Add mushrooms to the pot and let it simmer for about 5 minutes. Add seasonings and allow them to blend in the pot for another 2 minutes. The roux makes for a soup that has some thickness to it, seemingly creamy without any cream. If you do desire some sour cream on top, I think that would be a great addition, but I haven't tried it that way. To really taste the flavors don't serve too hot. Serve with a hunk of crusty bread and you are good to go.

The basic steps are to melt the butter in the soup pan, stir in a little bit of flour at a time to make the roux, add the broth, bring to a boil, blend with the sauteed mushrooms, add the seasonings, and serve. It will be even better tomorrow when the flavors have a chance to meld. If it becomes too thick after refrigerating the soup, add some broth or I added some half and half and found that yummy.

This soup would be great served as a sauce over rice or you could add vegetables to the soup such as cooked carrots and onions. There's room for experimenting with the basic soup. I might try to use it as a sauce over potatoes. This recipe is so easy you will be making it everytime the weather is cool or rainy. Of course, you need to get out there and find the Lobster Mushrooms first. The first week of August when I was in the grocery store they wanted \$30/pound for this mushroom.

