Somewhere in Stamets' work, and possibly on the boards, I noted that charcoal may be helpful where spores are difficult to start. Adding charcoal to culture media seems to be beneficial. I don't know what it does but I do know a bit about charcoals.

Charcoal has a secret. Not a secret really, just largely unrecognized outside of Asia. Some charcoal gives off far-infrared radiation. Not just while it is burning, it radiates all the time. Far-infrared = thermal radiation. Some charcoals even emit negative ions. With this in mind, let's look at how we may employ it’s unique properties.

First let's look at regular and "activated" charcoal.

Regular charcoal is produced where hardwoods, sawdust, bone char, coconut shells, peat, coal or petroleum coke are fired in an enclosed burning environment. Restricting the amount of air provided to the burn runs off the water and volatile organic constituents in the wood, leaving blackened chunks of carbon mixed with traces of minerals from the original material.

Activated charcoal is made by taking regular charcoal and re-firing it with introduction of air blast, steam, oxygen or other gases to corrode the interior cell structure, creating a more porous structure. Activated charcoal attracts and retains organic matter run through it, as well as mechanically trapping particulate matter. These properties make it useful in a variety of applications, notably in water filtering.

Now let's look at infrared radiation and wavelengths.

When regular charcoal is burnt infrared radiation is released. This penetrating thermal radiation is what makes charcoal grilled foods different from flame grilled or broiled. The food is cooked on the inside by the radiation, reducing cooking time and sealing in juices as the out side is sealed by charring.

As stated earlier some charcoals give off infrared radiation all the time. Activated charcoal may give off infrared. I don't know. I expect this property may be dependent on the starting materials, but I've not found any information in these regards.

Now here is where things get interesting.

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EFFECT OF FAR-INFRARED IRRADIATION ON PASTEURIZATION OF BACTERIA SUSPENDED IN LIQUID MEDIUM BELOW LETHAL TEMPERATURE

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The purpose of this study is to examine the influence of far-infrared irradiation on pasteurization of bacteria suspended in liquid medium below the lethal temperature. Under this condition, Escherichia coli and Staphylococcus aureus are injured and killed by far-infrared irradiation. With increase in irradiation power and
with decrease in depth of the suspension, the ratio of the number of injured cells to the number of viable cells becomes higher, and the number of viable cells becomes smaller. Moreover, the pasteurization effect can be enhanced by raising the bulk temperature of the suspension. By estimating the temperature distribution within the suspension, it is suggested that the test bacteria are injured and killed in the very thin domain near the surface of the suspension.

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FAR-INFRARED IRRADIATION EFFECT ON PASTEURIZATION OF BACTERIA ON OR WITHIN WET-SOLID MEDIUM

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The present purpose is to study the influence of far-infrared irradiation on pasteurization of Escherichia coli and Staphylococcus aureus on or within a model for wet-solid food. Agar medium was used as the food model. By determining the thermal resistances of the test bacteria, the pasteurization effect of far-infrared irradiation (radiative heating) was compared with that of hot-air heating (a conventional method) from the viewpoint of thermal death kinetics. It was found experimentally that far-infrared irradiation is more effective than hot-air heating for the test bacteria on the agar-plate. Moreover, it is suggested that the surface temperature of the pasteurization sample irradiated by far-infrared radiation is higher than that measured by the thermocouples.

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So, what does all this have to do with anything?

Heated and evaporated water readily absorbs infrared radiant energy at 3, 4.5 and 6 µm. I suggest this radiation can affect water in bacterial cells, killing them.

Enter Bamboo Charcoal!

Bamboo Charcoal has the possibly unique properties of emitting infrared rays in the range between 4 and 16µm, even at room temperature, along with negative ions and canceling electromagnetic (EM) radiation. Negative ions also disable or kill bacteria.

A Russian research team headed by A L. Tchijevski found an exponential bacteria decay rate of 78 percent per minute in negatively charged air environments. The team concluded negative ions killed the bacteria. Other studies indicate negative ions also kill or disable viruses and fungus spores.

But why are ions therapeutic? Partly because they kill germs. Back in the 1930s, a Russian team headed by A L. Tchijevski found that large ion doses of either polarity retarded bacteria colony formation on plates. Ionization also sterilized enclosed air. Latter experiments duplicating Tchijevski's work noted an exponential bacteria decay rate of 23 percent per minute for untreated air, 34 percent per minute for air with pos-ions, and 78 percent per minute for negatively charged air. They concluded that the pos-ion decay rate was due to simple bonding or the ions with the bacteria, whereas the neg-ions actually killed them.

Some studies suggest that negative ions also have a biological effect on bacteria and viruses, killing them on contact in many cases.

Bamboo Charcoal is much more porous than other types, typically reaching surface areas of 300 to 700 square meters per gram. Wood charcoals area is around 30 square meters per gram. Coconut shell is somewhat higher. Bamboo Charcoal therefore is superior in many respects for filtration and absorption.

Bamboo Charcoal is high density and is very porous. It soaks up and releases moisture helping to maintain equilibrium. It is also a rich source of trace minerals, which it releases slowly to water.
Biological organisms absorb infrared in the 8-14 µm range utilizing the energy for a variety of metabolic processes.

Enough for now. Ponder how you might add this knowledge to your culture techniques, keeping in mind that liquid cultures may benefit where spores may not.

More to come as my trials continue.

Remember you heard it here first.