

SoundSynergies BRITETone® Blocks Bacteria, Mold and Fungi Growth in Brass and Woodwind Instruments



It's no secret that brass and woodwind instruments are the perfect incubators for all types of bacteria, fungus, yeast, and molds many of which are associated with minor to serious infectious and allergic diseases. These microorganisms present a potential health risk for all players and should be taken seriously.

"Many children participate in their school's band ensemble and often the instruments they play are on loan," said R. Thomas Glass, DDS, PhD, lead author of the study. "Most of these instruments have been played by other students, and without the proper sanitation, bacteria and fungi can thrive for weeks and even months after the last use." [1]

The study examined 117 different instrument areas, including the mouthpieces, internal chambers, and cases, were tested on 13 previously played instruments of a high school band. Six of the instruments had been played within a week of testing, while seven hadn't been touched in about one month. The instruments produced 442 different bacteria, many of which were species of Staphylococcus, which can cause staph infections. Additionally, 58 molds and 19 yeasts were identified.

"Parents may not realize that the mold in their child's instrument could contribute to the development of asthma," said Dr. Glass. [1]

Yeasts are often ignored or overlooked as well, but the yeasts commonly found on instruments cause skin infections around the mouth and lips ("red lips").

Multiple studies within the last 10 years have attributed molds found in brass instruments contributing to more serious diseases. [2][3][4] These studies have all been named for the various instruments which were found to be the source; Trombone Player's Lung, Wind-Instruments Lung, Bagpipe Lung, etc.

When it comes to airborne bacteria and molds in wind instruments, "breath is a two-way street," as one doctor put it.

"Instruments should be cleaned after each use to reduce the number of organisms," said Dr. Sherwood. "And cleaning should not be confined to the mouthpiece, since the bacteria invade the entire instrument." [1]

Science

There are several factors that contribute to the growth of these microorganisms; nutrients, temperature, light, exposure to air, acidity or alkalinity (pH), and moisture.

Nutrients

Nutrient requirements for molds may vary from mold to mold. Some molds may thrive well on substrates with high sugar or salt content often present in saliva and perspiration.

Temperature

A majority of molds are mesophilic, i.e., they can grow at temperatures within the range of 10-35°C (50-95°F). Optimum temperatures for growth may range between 15 and 30°C. A significant number of bacteria and molds are also able to grow both at freezing point and at room temperature.

Light

Many mold species grow well in the dark, inside your instrument for example, but some prefer daylight or alternate light and darkness for them to produce spores.

Aeration

Almost all molds require air to grow. A player provides a stream of warm, moist air which is perfect for propagation of microorganisms.

pH

Molds differ in their pH requirements. Most will grow well over the pH range 3-7. Some such as *Aspergillus niger* and *Penicillium funiculosum* can grow at pH 2 and below. The pH scale measures how acidic or basic (alkaline) a substance is. It ranges from 0 to 14. A pH of 7 is neutral. A pH less than 7 is acidic, and a pH greater than 7 is basic (alkaline).

Moisture

All molds require moisture for growth but the amount required varies widely. Molds are capable of growing at very low water activity or at very high water activity.

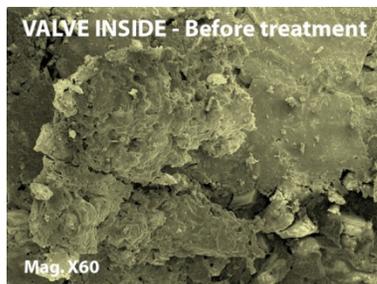
Prevention

Many Doctors and Band Directors advise cleaning the instrument by immersion in 99 percent isopropyl alcohol (2-propanol), others employ a detergent-sanitizer bath. While alcohol immersion is the defacto cleaning standard, there are many other descalers, sanitizers and cleaners available on the market today. These methods and products may work well to a certain degree, but they provide little if any protection after the fact. Cleaning and sanitization methods do not provide a protective barrier between surfaces and corrosive salts produced by saliva, perspiration and other environmental factors.

Microorganisms attach themselves more readily to irregular metal, wood, and plastic surfaces that are corroded, pitted, cracked, or otherwise worn. Bends, ridges, grooves, peaks, pits, and valleys also give them the perfect anchor to nest and propagate. And microorganisms can just as easily grow and proliferate on coated (acrylic) as well as uncoated metal surfaces.

Before and After Imaging

Scanning Electron Microscope (SEM) images of a typical trumpet valve reveal bore ridges after cleaning with BRITETone®.



Mechanical Properties

How does BRITETone® help to block the growth of microorganisms such as bacteria and molds? BRITETone's superior penetrating ability flushes out moisture pockets and lifts-away dirt, grime, and corrosion leaving behind a multi-layer protective barrier film that "fills in" micro surface irregularities. BRITETone® does not migrate after application and "self-levels" establishing a uniform thickness thus eliminating trapping areas which make it difficult for microorganisms to establish a foothold.

Antimicrobial Properties

BRITETone's unique tri-boundary barrier film also suppresses any potential microbial corrosion, also known as bacterial corrosion. These types of microbes will both attack and feed off the by-products of material decomposition. Microbial corrosion can affect both metals and non-metallic surfaces.

BRITETone® has a pH range of 4.85–4.92 (20°C-21°) further discouraging the growth of most microorganisms.

We tested a number of common cleaners often used by individuals and repair shops to clean and “sterilize” music instruments. We did not run test comparisons on specific music instrument cleaners as they all contain similar ingredients such as Isopropanol, Ethylene glycol, cleaning agents referred to as surfactants, disinfectants, pH adjusters, dyes, etc.

Testing Equipment & Materials



pH Test Results

pH Buffer Solution (meter calibration)

7.00 ± .01 @ 25°C

7.02 ± .01 @ 20°C

4.02 ± .01 @ 20°C

Sample	pH/Temp Readings	Notes
BRITETone®	4.92 @ 20.0°C 4.91 @ 20.8°C 4.85 @ 21.0°C	100% solution (Mild Acidity)
Isopropyl Alcohol - 99.5% by volume (2-Propanol, electronic grade – A.C.S. spec)	7.00(neutral)	Similar to medical grade which is often used as a disinfectant.
Hydrogen Peroxide	4.46 @ 21.2°C	(stabilized) 3% First Aid Antiseptic Oral Debriding Agent
Deionized Water	6.13 @ 21.5°C	(reference)
Tap Water (no fluoride or chlorine compounds)	6.64 @ 20°C	Note: moist water-soaked cloth commonly used for cleaning brass and woodwind instruments.
Heinz White Distilled Vinegar	2.39 @ 19.8°C	Acetic Acid(5% by volume)
Windex, Original with Ammonia D®	9.60 @ 20.9°C	Mainly a base cleaning agent (surfactant) possessing very few disinfectant properties.
Windex, Multisurface with Vinegar	3.25 @ 21.8°C	(no ammonia)
Windex, Multisurface Disinfectant	2.99 @ 21.9°C	Contains lactic acid
Formula 409 All Purpose Cleaner	10.51 @ 21.2°C	“Antibacterial Kitchen” Mainly a base cleaning agent (surfactant) possessing very few disinfectant properties.
Formula 409 All Purpose Cleaner	10.60 @ 21.0°C	“Antibacterial” Mainly a base cleaning agent (surfactant) possessing very few disinfectant properties.

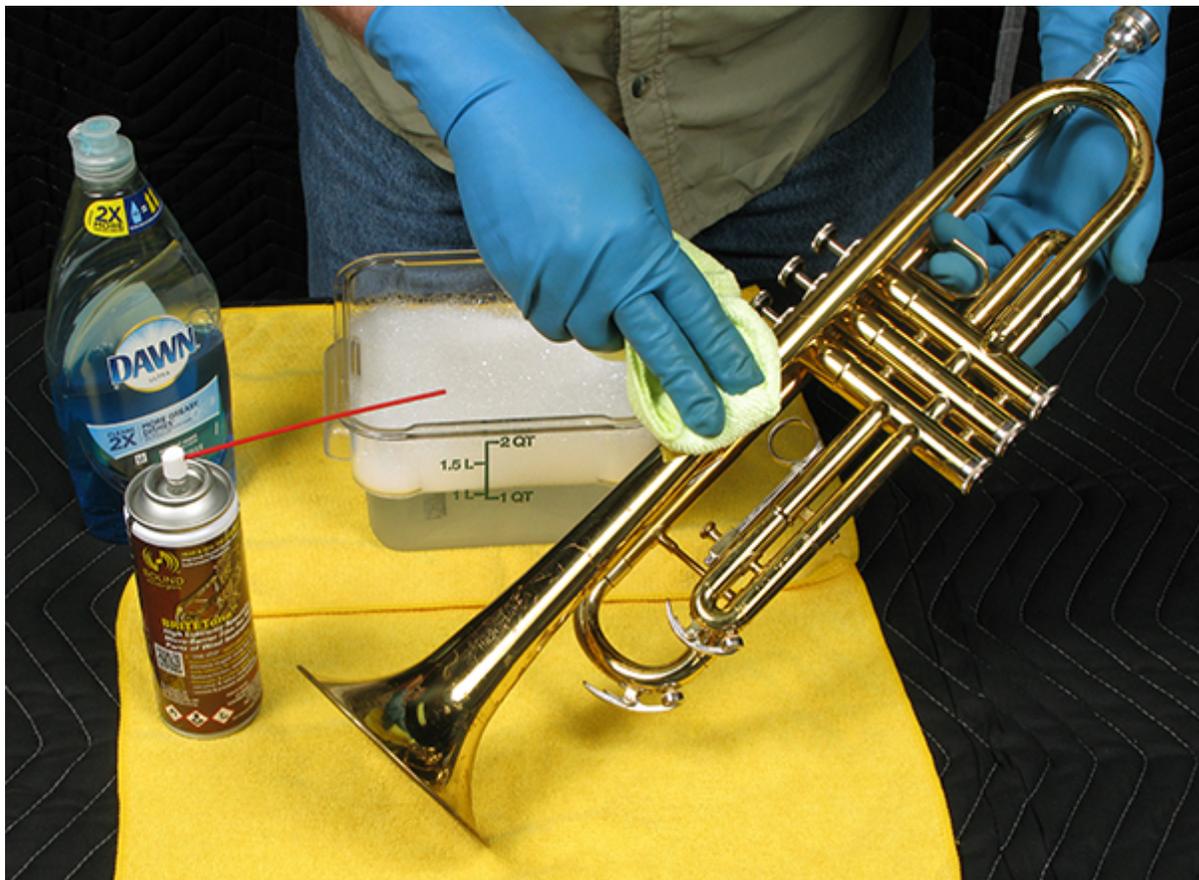
Application

A special note regarding use on brass and woodwinds. **The mouthpiece should be removed before servicing the mouthpiece receiver.** We recommend applying BRITETone® to the mouthpiece internal areas only where scale is likely to build up. The internal surfaces of the mouthpiece should be treated with BRITETone® after the mouthpiece is cleaned and sterilized using conventional methods.

Cleanup



BRITETone® is safe, non-toxic and easy to clean up. Keep a handy container with dishwashing detergent and warm water handy to remove any excess BRITETone® from mouthpiece caused by overspray. Tap, Deionized, or Distilled water will not remove BRITETone®. We have found that a microfiber cloth moistened with Dawn dish detergent and water works best for cleanup, but other dish detergents will work just as well. Gloves are optional.



References

[1] *Academy of General Dentistry*. "Used woodwind and brass musical instruments harbor harmful bacteria and fungi, study suggests." *Science Daily*, 14 March 2011.

[2] Bagpipe lung; a new type of interstitial lung disease?
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