



# **CHAMPION® Expanding Encyclopedia Of Mortuary Practices**

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## **FORMALDEHYDE EMBALMING SPRAYS: A MODERN MYTH**

### **Part 1**

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*ABSTRACT: An old and popular myth — the efficacy of formaldehyde embalming sprays is critically evaluated. The history of its use up to the present is discussed. Their value as a disinfectant in embalming is debunked and catalogued. The exposure hazards involved in formaldehyde spray usage is discussed. Modern alternatives to formaldehyde sprays are compared and contrasted. A summary and conclusion is given that confirms the ineffectiveness of formaldehyde sprays, verifies the exposure dangers of their use and advocates their replacement with more suitable modern alternatives.*

**INTRODUCTION:** Formaldehyde embalming sprays, under various brand names, is seemingly used by virtually all embalmers at one time or another. The popularity and ubiquitousness of these simple embalming formulations is immense. They have been used for years in the embalming profession and deliver a perception of disinfectant action and protective value to the embalmer. The belief in these formaldehyde sprays is so great, that some even advocate the usage of them in arterial injection to stop tissue gas and other forms of decomposition. In most instances, they are sprayed over almost anything in the embalming room — surfaces, bodies, instruments, equipment, walls, floors, etc.. The assumption is that effective disinfection action is occurring due to the fact that a modified embalming fluid is being used as a topical spray. Unfortunately, the truth is far from this conclusion held by most embalmers. Spraying formaldehyde in a volatile alcohol-based spray contributes to overall formaldehyde exposure in embalming rooms and exacerbates exposure dangers of formaldehyde — which is significant enough without an additional exposure mechanism. Is there any value to these formaldehyde sprays and do they deliver anything to the embalmer that is not available in a modern low-exposure alternative? With this question in mind, let us take a serious look at formaldehyde embalming sprays and the mythology that surrounds them.

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**HISTORY:** Formaldehyde embalming sprays have been with the embalming profession almost since the beginning of formaldehyde embalming itself. Most of the formaldehyde embalming sprays came onto the market somewhere in the 1920's and 1930's (from examination of old literature and embalming catalogs). They were basically a response to a commonly used technique of the time — dilution of concentrated arterial or cavity fluid with water or alcohol and attachment of a spray device for use by the individual embalmer. The fluid manufacturers successfully marketed these pre-packaged formaldehyde dilutions to the embalming profession and the rest is history. Why 1% formaldehyde dilutions were advocated and formulated is uncertain except that 1% final dilutions were considered mild by standards of the time and somehow just seemed right. What is amazing is that today the formulations are virtually unchanged from the originals that were available 70-80 years ago. Some of the names of the chemicals were reminiscent of disinfection and "killing ability" and implied effectiveness that, at the time, was believed. Disinfection during those years was a murky, ill-defined term and disinfection could be assigned to any number of chemicals or techniques with impunity. When formaldehyde embalming sprays were invented and marketed, the concept and efficacy of disinfection was literally in the eye of the beholder. The Champion Company was no exception and created and marketed an embalming spray that was formaldehyde-based. This product is no longer made or sold and was replaced by superior alternative products several years ago. Surprisingly, most other embalming chemical companies still actively market these ancient formulations. The names and composition of these 1920's-1930's chemicals are unchanged to this day. Some cannot be found in current catalogs but are known to be available anyhow (usually upon request). Despite all the questions about their effectiveness, exposure potential and suitability for use, they continue to thrive on namesake and legend.

**DISINFECTING ABILITY:** The capability of formaldehyde as a disinfectant is usually placed in the range of 5-8% concentrations before formaldehyde exhibits a high-level disinfection or sterilization effect. Occasionally you will find reference to 4% formaldehyde concentrations or 2% concentrations with another disinfectant as an additive. A typical example would be Gigasept (popular in the European market) with formaldehyde at 4% and another aldehyde as a booster. Gigasept has a dubious record, at best, as several studies have called it's sterilization ability into question. There are very few formaldehyde stand-alone disinfectants in current medical/hospital use, as they have all been replaced by more modern and effective alternatives (particularly the glutaraldehydes). Consequently, the only research on formaldehyde disinfection that is current involves formaldehyde usage in gaseous form, which still is rather popular in certain medical and lab situations (decontamination of culture and incubation bins).

Formaldehyde is still used effectively as a "bomb" disinfectant for animal barn and chicken hatcheries and coops by heating paraformaldehyde and allowing the concentrated formaldehyde fumes to permeate the surroundings. It is difficult to find any significant tests or studies involving formaldehyde at 1% concentrations in use as a disinfectant. There are extensive testing and research in the older literature (early 60's) that demonstrated very poor disinfection ability with a variety of organisms and blood burden for formaldehyde concentrations of .7%. Particularly dismal was the capability of .7% formaldehyde solutions against hepatitis (HBV) with reasonable blood burden that only resulted in 20-30% inactivation and dissolution. Compared to

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other disinfectants, formaldehyde at .7% was inefficient and ineffective under a variety of scenarios comparing efficacy as a function of time and concentration. A surprising recent investigation in a German hospital traced an outbreak of ICU sepsis to a contaminated formaldehyde disinfectant that was being used at .25-.5% (below recommended concentrations due to exposure complaints by hospital staff) where *Klebsiella oxytoca* (the bacteria responsible for the outbreak) was actually cultured from the buckets where the disinfectant was stored. Based on these results and investigations, 1% formaldehyde solutions are probably, at best, low-level disinfectants or sanitizers.

Actually, the real effectiveness of the formaldehyde embalming sprays as disinfectants is due to the carrier alcohol that is used in the formulation. Typically, a formaldehyde embalming spray will use isopropyl alcohol as the carrier solvent for the spray. The alcohols, in general, at concentrations of 60-80% are very effective medium-level disinfectants with good reaction times under reasonable blood burden. They have little or no effect on spores and are never considered for sterilization purposes. They have anywhere from excellent to fair activity according to organism type. Overall, they are relatively effective as an in-use disinfectant for surfaces and pretreatment of instruments or other critical devices. The use of isopropyl or similar alcohol as the carrier in high concentration makes the presence of formaldehyde at 1% concentration redundant in embalming sprays. No observable reduction in disinfection ability would occur if the formaldehyde was removed — due to the high working concentration of alcohol in the formulations. Consequently, the most important ingredient to most embalmers — the formaldehyde — in the formulation is actually unnecessary.

Actually, an embalmer could just as easily use rubbing alcohol purchased at the drugstore and attach a sprayer and have an equally effective disinfectant spray as any of the formaldehyde sprays available to embalmers today. This solution is less than desirable, as the exposure and irritation of using a concentrated alcohol and spraying it into the breathing zone of the embalmer still exists. One formulation of formaldehyde embalming spray even incorporates an older style quat-type disinfectant to apparently attempt to bolster disinfectant action of the embalming spray. Again, the concentration is so low that the medium-level disinfecting ability of the isopropyl carrier alcohol swamps any perceived increase in disinfecting capability. The disinfecting capability of the currently available formaldehyde embalming sprays is not due to formaldehyde or other additives, but due solely to the high concentration of alcohol in the spray.

CONTINUED: Formaldehyde Embalming Sprays: A Modern Myth  
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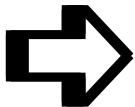
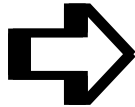
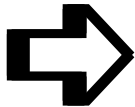
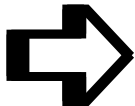
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