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ENIGMA: CHAMPION'S FOURTH GENERATION CHEMOSTASIS INFUSION CHEMICALS: EMBALMING REDEFINED FOR THE 21ST CENTURY.

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ABSTRACT: Champion's Fourth Generation of non-toxic, non-hazardous, extreme low exposure Ecobalming chemicals is introduced and discussed in detail. The Champion Enigma Line of ecobalming chemicals fulfills the revised Modern Tenets of Embalming and presents a natural, safe, green and responsible alternative to archaic traditionalist formaldehyde embalming. The checkered past of toxic and dangerous embalming from the 1800's to the present is delineated. Champion's single-handed accomplishments in toxic reduction by the implementaion of the Second and Third Generation of embalming chemicals are reviewed in depth. Champion's Fourth Generation Ecobalming Enigma chemicals are shown to have completely clean-sheet MSDS's and fully disclosed formulations. An indepth discussion of chemical composition demonstrates the safety, practicality and enviro-responsible formulations of Champion's Enigma chemicals. Use, new defining principles and implementation of Enigma chemicals in ecobalming for the 21st Century is discussed. A final summary stresses the necessity and redefinition of embalming in the years to come and confirms the ability of Champion's Fourth Generation fluids to effectively bridge the gap to the future of embalming.

Invent the future, if not, the future will reinvent us.
-JHB

INTRODUCTION: Champion is proudly introducing a new line of embalming chemicals that literally redefine what embalming will be in the 21st Century. The Champion Enigma line of Ecobalming chemicals creates the ability to deliver a safe, nonhazardous alternative to toxic formaldehyde embalming of the past and allows a natural, green and eco-responsible choice for modern, forward thinking embalmers and discerning, knowledgeable and informed society. But first, we need to examine the tarnished past the industry has emerged from and the reasons we are still mired in it. Only then, will we fully appreciate the immense leap that Champion's Fourth Generation of Enigma Ecobalming chemicals will allow the funeral industry to take.

HISTORY: Chemical toxicity of traditional embalming is an extreme and lingering problem in the industy. As embalmers and the funeral industry in general, we have been lying to ourselves about so many things, for so very long, that all perspective and forward-thinking has long departed us. Chemically we have been in a toxic rut for about a century, or so, with little apparent desire to crawl out of the morass. We are embalming like we did over a hundred years ago, and very happy about it. This fact combined with the speed of light changes of social attitudes, mores and norms, in all spectrums of society, spells doom for the funeral industry in general. Lethargic, recalcitrant, archaic, self-fixated — all describe the funeral industry, much to our detriment and probable demise. Truly, the industry is a "dead man walking", no pun intended. Due to our built-in never-change attitude, the cremationists, memorial societies, natural burialists and independent/alternative/lay/home funeral celebrants, in all probability, will take the lead and effectively commandeer the 21st Century for the majority of informed and knowledgeable society. Pockets of traditionalist/ethnic/religious holdback will exist for some, but be limited and meager, at best. When the most popular lecture on the funeral circuit is about how they paraded Lincoln's embalmed corpse around 150 years ago, that tells you all you need to know. In fact, that's just about the time embalming started, and all because of the Civil War. The whole point was corpse preservation for the wealthy war dead to facilitate shipment back home (to avoid burial on the enemies soil) and hardly anything else. Toxic metal salt mixtures were used and results, surprisingly, were relatively good. So, basically it was dangerous toxicity and plenty of it for embalming from the get go.

The next toxic leap was from the heavy metal salts to a toxic gas trapped in water, formaldehyde, and so-called "modern" embalming was off and running. Move the clock forward one whole century, and guess what, no change, no change whatsoever, nothing. The industry is still wholeheartedly married to the concept that toxic, carcinogenic formaldehyde is the only usable embalming chemical on the face of the earth, and it will be employed at all costs and without regard for it's horrendous exposure dangers and inherent toxicity. Herein lies the deepseated problem. The funeral industry and embalmers are trying to operate in the 21st Century like it was the 1920's. Sanitation arguments, despite their intrinsic validity, were half-heartedly spun into the discussion only at a later date and only then as just a lame justification for mandatory formaldehyde embalming. Cosmetic restoration also became a desirable goal to facilitate the display of corpses and hopefully minimize mortuary greasepaint make-up. Consequently, embalming was more-or-less defined as Three Tenets: preservation, restoration, sanitation, and in whatever order of importance you preferred to list them. Now, nearly a decade into the 21st Century, this standard of embalming is essentially unchanged. The future for this type of embalming looks bleak, indeed.

One company, The Champion Company, never bought into this rutted road of non-modernization, non-change and non-improvement in embalming. Champion's Second Generation of glutaraldehyde/formaldehyde blended fluids, that are legend in the industry, lead the way to reduced total exposures during embalming and accelerated sanitizing ability with drastically improved cosmetic result over conventional and archaic formaldehyde/methanol/water bathtub recipe embalming fluids. With the advent of Champion's Third Generation of Millenium New Era chemicals, which completely eliminate formaldehyde as a toxic hazard and implement glutaraldehyde/mono-dialdehydes/phenolics in a synergistic mixture to effectively embalm at a drastic overall reduction in total chemical exposure to the embalmer. The ultimate goal for The Champion Company, of course, has been total elimination of toxicity, exposures and elimination of negative environmental impacts. To that end, we are proud to announce the arrival of Champion's Fourth Generation of Ecobalming chemicals to the industry.

THE MODERN SOLUTION: The Enigma Line of Chemostasis Infusion Factor chemicals completely redefines what embalming is and will be in the 21st Century. In fact, we don't even call it conventional embalming in any way, shape or form. But, first, even the very tenets of embalming need redefined. I believe the Modern Tenets of Embalming are and should be as follows:

Public Safety / Sanitation
Cosmetic Restoration
Temporary Preservation

Ecobalming, then, should be nontoxic, nonhazardous, safe, practical, acceptable for natural/green burial and ecocremation, ultra-low enviro-impact, readily biodegradable and capable of fulfilling the Modern Tenets. In addition, all chemicals used in the embalming products should be fully disclosed with no missing references to any hazardous or potentially hazardous chemical or containing any "trade-secret" ingredients. And finally, there should be no potential for release of any toxic/hazardous chemicals during use and disposition, whether it be natural/green burial or ecocremation. All this vitally important information regarding these products should be truthful; transparent, fully researched and public, irregardless of whether OSHA or other regulatory agencies require or demand the reporting on MSDS's or other forms. Ecobalming , as an alternative to traditional high exposure formaldehyde embalming, redefines the entire process of post mortem body preparation and blends into the new thinking and new awakening trends of the funeral industry where traditionalism, in all its archaic forms and embodiments, are being abandoned in favor of a modernist, practical and more meaningful end-of-life celebration. To this end, the Enigma Line of Ecobalming chemicals by Champion achieve these goals.

Enigma is predicated on synergistic mixes of essential, plant-based oils and their purified or synthesized/derivitized active aldehyde or phenolic-like components in a near-anhydrous carrier to deliver maximum tissue action both arterially and cavity-wise and additionally in a topically applied spray and a solid absorption compound. The undiluted use of Enigma chemicals, without any water whatsoever, delivers acceptable temporary preservation, good cosmetic appearance and induces temporary sanitizing effects. The Modern Tenets are therefore completely fulfilled. A fully-disclosed, clean-sheet MSDS accompanies all

Enigma chemical products confirming their nontoxic, nonhazardous nature and environmental impact. The result is an extremely safe and practical substitute for dangerous and toxic traditionalist formaldehyde embalming. Chemostasis effects, retarding /slowing of decomposition, are immediately noted after injection/infusion/application and are sufficient for effective holding of 3-5 days, and in some instances, possibly, a week or more (particularly with supplemental cooling, refrigeration). This allows adequate time for holding/transport and planning of the end-of-life celebration. The intent of ecobalming chemicals is to temporarily delay but not stop or inhibit natural decay processes and the natural and inevitable return to the elements of human remains.

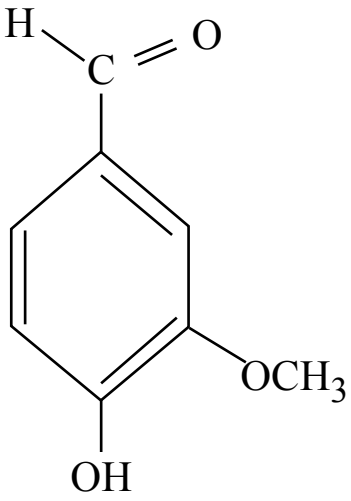
Ecobalming does not and will not create a rockhard, dehydrated, formaldehyde-like longterm preserved anatomical specimen. If this result is required, or demanded, then the embalmer must resort to a traditional, toxic formaldehyde style embalming. The exposure impacts of this type of embalming can never be eliminated, but they can be drastically mitigated and reduced by utilizing Champion's Third Generation Millenium New Era chemicals as an effective substitute for toxic formaldehyde. This approach minimizes or eliminates toxic formaldehyde exposures and substantially reduces, but cannot completely eliminate, overall total toxic exposures to all chemicals in the embalming mix. Consequently, there is a graded continuum of acceptable choices for embalmers from Champion's Second Generation reduced exposure, aldehyde blended fluids for improved traditionalist results, to Champion's Third Generation Millenium New Era formaldehyde-free fluids with drastic exposure reductions and acceptable traditional-like embalming results, to Champion's Enigma Ecobalming chemicals which offer the modern embalmer a non-hazardous, nontoxic, eco-safe alternative for temporary preservation prior to final disposition.

The active chemical components of Enigma Ecobalming fluids are fully disclosed on the MSDS sheet and label. They include vanillic aldehyde, guaiacol, and eugenol as the active essential oil ingredients and propylene glycol as the near-anhydrous carrier (See Figure 1). Let us examine each of these components and confirm their non-toxic/non-hazardous natures and minimalist and gentle/safe environmental impact during and after use.

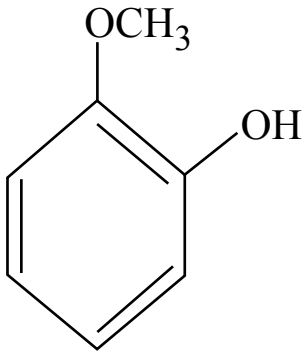
Vanillic aldehyde, or vanillin (4-hydroxy, 3-methoxy benzaldehyde) is the predominant and principal ingredient in vanilla oil extract that contributes to the intense flavor of the cured pods of the vanilla plant. It was discovered by the Europeans in approximately 1520 by association and wars with the Aztecs. Vanilla and chocolate had been used for sometime by the PreColumbian Mesoamerican people. Well over 60% of vanillin is used as a food additive with 3/4ths being dedicated to ice cream and chocolate flavoring. The other predominate uses are fragrance additives to perfumes, lotions, air fresheners, etc. Some use in pharmaceutical chemistry does exist as precursor reactant for various products.

Vanillic aldehyde is both a derivitized phenolic and an aldehyde and is the active aldehyde-driver precipitant/reactant for Enigma Ecobalming chemicals. Notable protein precipitation/coagulation is effected with both the aldehyde moiety and phenolic group. The pH of vanillic aldehyde in 5% water is an acidic 4.3 and thus, contributes to precipitation action. Vanillin presents little or no exposure impact when in liquid solution and only commonsense precautions need be taken. In pure form it is a whitish, needle-like

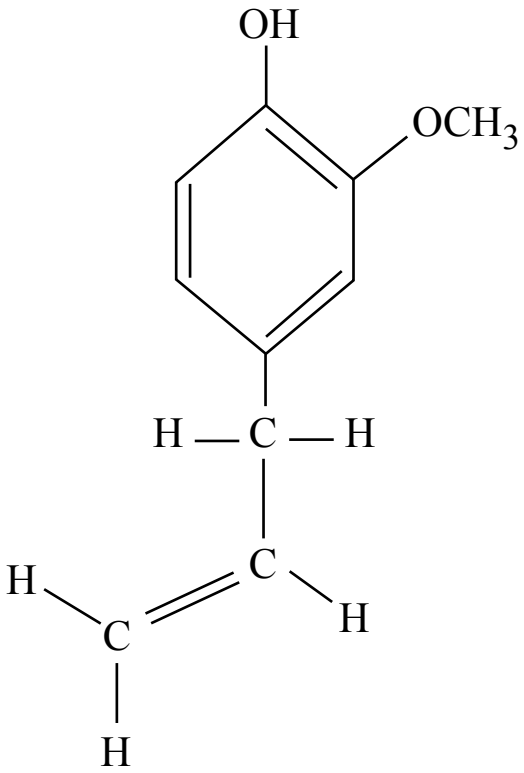
FIGURE 1



VANILLIC ALDEHYDE



GUAIACOL



EUGENOL

THE ENIGMA TRIAD OF ACTIVE ECOBALMING AGENTS

powder and the only precaution is a possible nuisance dust during manufacture. Environmental impact is very minimal with a half-life in air and sunlight of barely 4.7 hours. BOD values (biological oxygen demand) of 1.26 mg/mg and a COD (chemical oxygen demand) of 1.76 mg/mg are very reasonable and aerobic degradation occurs completely in 5 days. Anaerobic degradation is also relatively rapid. Even in trapped and depleted soil compartments degradation occurs in 28 days. Vanillic aldehyde then is an effective ecobalming agent, extremely safe to use and has little or no longterm environmental impact.

Guaiacol (2-methoxyphenol) is an additional phenolic precipitant/reactant in Enigma ecobalming formulations. Guaiacol is a yellow, aromatic oil extracted from the resin of the Guaiacum shrub/tree. Guaiacum is found in Florida and California and the Caribbean where it is the national tree of the Bahamas and the national flower of Jamaica. Guaiacum extract and resin has been used throughout the years as a medicinal treatment for coughs (cough drops), arthritis balms, an expectorant, and as an antiseptic/anesthetic. One early documented use even included treatment for syphilis. It is also made into a medicinal soap with a characteristic fragrance.

Eugenol (2-methoxy-4-(2-propenyl)phenol) completes the triad of active precipitant/reactants in the Enigma formulation. Eugenol is the principal essential oil from cloves and is also found in nutmeg, cinnamon and bay leaf. It is a clear, oily liquid with the characteristic, spicy scent of concentrated clove oil. It has many uses in perfumes, flavorings, essential oil mixtures, and medicinal uses as a local antiseptic/anesthetic, especially in dentistry. Eugenol combined with zinc oxide has uses in prosthodontic dentistry. Eugenol is an active, substituted protein precipitant/reactant that complements vanillic aldehyde and guaiacol as active ingredients in Enigma ecobalming applications.

Guaiacol and Eugenol have very similar parameters of safety, exposure and environmental impact. In general, water solubility is slight to moderate and typically have logK o/w values of .5-1.5. Both chemicals are very limited in biomagnification or bioaccumulation and their average half-lifes in the environment is hours to a matter of a few days at maximum. These numbers are predicated on studied environmental compartments that involved dissolved and partriculate organic matter that was suspended or deposited in sediment. Guaiacol, Eugenol and similar chemicals derived from paper mill effluent are readily degraded by aerobic biological treatment with removal efficiencies from 29% - 100%. The theoretical BOD (after 5 days) for guaiacol is 57%, an additional verification of good biodegradability. In conclusion, both chemicals, in general, characteristically degrade relatively rapidly in all environmental compartments and would present a minimal enviro-impact from Ecobalming usage.

Propylene glycol as solvent/carrier allows maximum concentration and effectiveness of active ingredients in a near-anhydrous delivery vehicle that maximizes overall Ecobalming results. There is no water to interfere with protein precipitant reaction, unwanted resolubilizations of precipitants/coagulants, or result in the needless and deleterious water-logging effects of traditional formaldehyde/water-based dilution embalming. Water has always been a problematic dilution requirement in any type of embalming and should be avoided. Propylene glycol is a very safe glycol that has many food, cosmetic and drug uses and has a minimal environmental impact when used in moderation. I have discussed propylene

glycol in a previous publication (as the carrier chemical of Plasma, Champion's Millenium New Era near-anhydrous water substitute for arterial embalming), and invite you to examine it for more detailed facts and information. Propylene glycol readily degrades in soil, air and water compartments with half-lifes varying from hours to 1-10 days as typical maximums. Typical half-lifes in soil compartments are from 1 to 5 days, and 1-4 days in aerobic waters and 3-5 days in anaerobic waters. Aerobic biodegradation of 91.2%+ occurs in 25 days while anaerobic degradation in activated sludge is 85%+ in barely 14 days. Biodegradation is rapid with single order kinetics. The only isolated problem that has ever been encountered with propylene glycol has been a short term negative bio-impact from massive dumping in lakes, streams or rivers and uncontrolled runoff of large quantities from aircraft-deicing operations at airports. Bio-remediation and biodegradation occurs vigorously and results in oxygen depletion from the high rates of COD/BOD loads.

In an Ecobalming situation, such as natural/green burial, residual quantities of propylene glycol delivered to the burial site from the decomposing remains in time/concentration ratios would not be significant and the relatively rapid ongoing biodegradative action would render the soil impact minimal. Total residence times in soils would be measured in days with biodegradation occurring rapidly. Even in highly impacted soil concentration tests where quantities exceeded 5300 mg/kg, biodegradation was uninhibited and occurred rapidly with first order kinetics driving the biodegradation. To even approach these values would require a dump of 50-60 lbs. of pure propylene glycol into a typical grave site which would be close to impossible and still rapid biodegradation and elimination would occur. Burials involving Ecobalming with Enigma products, then, would be a fraction of these values and close to a non-event. Propylene glycol, therefore, more than fulfills the requirements of an ecobalming solvent/carrier in results, overall safety and minimal enviro-impact.

In addition to the active ingredients listed above, in Enigma Solid Absorption Factor, you will find granulated corn cob grit as the safe and natural carrier/absorbent for Enigma Ecobalming Solid Compound. The granular size of the corn cob grit allows good absorption while being coarse enough of a mesh size to preclude any nuisance dust hazard during use. Corn cob grit is a naturally derived, safe agricultural product and rapidly biodegrades in the environment with no impact. If cremation is desired, this product generates a minimum of ash residue. Finally, Enigma arterial also contains a trace amount of FD&C Red 40, as a cosmetic dye colorant. Red 40 is prolifically used in the food industry to safely color many foods, candies, confections and beverages, in particular several very popular sports drinks. The trace amount of Red 40 that is used in Enigma arterial fluid is very negligible (less than the amount in the sports drink dumped on a college football coach after winning the bowl game) and in no way impacts any of the enviro-safe parameters of Enigma arterial. Red 40 is readily bio-degraded by bacterial bio-pathways both aerobically and anaerobically. In addition, in our latest formulations, FD&C Red 3 supplements/replaces Red 40 as an enhanced cosmetic colorant in arterial injection. FD&C Red 3 is a certified/approved food

dye that can typically be found in candies, popsicles and cake frostings. It is biodegradable particularly by aerobic microbial bio-pathways and does not persist or accumulate in either soil or water environmental partitions. As with Red 40, the trace amounts of FD&C Red 3 that would be delivered to the soil in an natural/green burial is miniscule (in the parts-per-billion range) and is close to a non-event. Thus, in keeping with our basic principles, the formulations of the Enigma line of Ecobalming chemicals are fully disclosed and demonstrated to be a clean-sheet MSDS formulation with no reportable toxic or hazardous chemicals or toxic-releaser substances whatsoever with an absolute /temporary/minimal to no environmental impact. Enigma, Champion's Fourth Generation Ecobalming products, then, truly redefines embalming for the 21st century.

The Enigma Line of Ecobalming chemicals, specifically, is manifested by four variant products: a concentrated, near-anhydrous cavity fluid (Chemostasis Infusion Factor) in a standard 16 ounce bottle, a premixed, near-anhydrous arterial fluid (Chemostasis Injection Factor) in a gallon container, a nearanhydrous topical application (Chemostasis Surface Factor) for surface contact use and a Solid Absorbent Compound (Chemostasis Absorption Factor) to be used as a compound/absorbent.

Concentrations of active ingredients are high for all Enigma products to enhance ecobalming action, clearing, penetration, deep tissue saturation, and longevity of reaction. Enigma Cavity delivers 60% active ecobalming agents while Enigma Arterial strength is at 5-6% and is easily increased by adding Enigma Cavity as a power booster for enhanced ecobalming action. Enigma Topical and Enigma Solid Absorbent both deliver 8% concentrations of active ecobalming agents upon use. Any modern embalmer can instantly adopt/utilize the Enigma Line of Ecobalming chemicals and implement their use with standard embalming procedures and methodologies. The Champion principles of embalming, advocated by us over the years will consistently yield the most superior results. These include the undiluted use of all the Enigma chemicals and compounds, the avoidance of water dilution in any form, slow and careful injection of Enigma arterial at multiple sites (if necessary), intermittent/restricted drainage, injection of at least 2 ½ - 3 gallons of Enigma arterial, use of at least 2 bottles of Enigma cavity after thorough aspiration with reaspiration and reapplication of Enigma cavity (if conditions warrant), and liberal use of Enigma spray and Enigma solid/absorbent as contact/topical/absorptive agents. In addition, Enigma Cavity can be added as a power-booster to Enigma Arterial in difficult or compromised bodies and in cases of delayed embalming to enhance Ecobalming action.

SUMMARY: In summary, the funeral industry must walk away from the toxic, dangerous and needless formaldehyde based embalming practices of the past. They are archaic, obsolete, self-defeating and held in disdain by modern society. Instead, we must embrace the future and redefine what embalming is by following what I believe the new Modern Tenets of Embalming should be by the implementation of Ecobalming principles, chemicals, products and practices. Dare to enter the 21st century by embracing change and the paradigm shift in the embalming/funeral industry. Failure to do so, will lead only to extinction, as the 21st century will proceed with or without us.

As always, I have full documentation to support my article, including Champion's full disclosure MSDS's of the Enigma chemicals, the scientific literature is voluminous and precise concerning all the chemicals discussed and their physical parameters, safety considerations, chemical industry uses, biofates and environmental impacts. The findings are all there for your perusal and further investigation. As an aside, classic grave displacements were estimated by the 3-7-77 Rule (with all due apologies to the Montana Highway Patrol).

In conclusion, as always, embalm smart, embalm safe. Or, should I now say, as always, Be smart, Be safe, Ecobalm.