

# Wyscin™ And Other Raw Food Safety Innovations At Wysong

## Introduction:

The importance of raw, natural, fresh foods in the diet is self-evident. It is the form of food all creatures on planet Earth are genetically adapted to. The benefits are myriad and the dangers from not following the genetic pattern are manifest today in a host of degenerative diseases plaguing both humans and the pets in their care. No living organism, other than humans, heat processes their food. If given a choice as to whether to believe nature's pattern or that created by humans, nature should always win.

But as population swells, the problems of food production and distribution become enormous. Since fresh, raw foods spoil easily, it is much better from a commercial standpoint to make them inert by heat processing them. This helps reduce the risk of food-borne pathogens (foods are heat sterilized), extends shelf life and facilitates ease of handling. But the trade-off is nutritional value since it can be argued that the nutritional value of a food is directly proportional to its rate of spoilage.

Although some heat-processed foods can be rotated into the diet with benefit, humans and pets need raw foods as the mainstay of diet if health is the objective. Although fresh whole meats from the grocer are relatively safe, if they are to be eaten raw they should either be quickly seared to decrease surface bacterial contamination (Fig. 1) or washed with Wysong Citrox™, a natural food-grade antimicrobial.

Another option is the use of Wyscin™, which has been developed through Wysong research to increase the safety of raw foods, particularly meats. Its proprietary blend of multi-synergistic natural ingredients addresses issues of bacterial pathogens, parasites, molds and toxins.

Raw packaged pet foods such as Wysong Archetype™ and Wysong Veterinary Rx™ Diets consist of a mix of meat and organ ingredients which are properly frozen (time and temperature are critical), mixed with Wyscin™ and dried. Wyscin is also provided in supplemental form in Call Of the Wild™.

We do not recommend the various commercial frozen pet foods for a variety of safety reasons, not the least of which is the fact that none of the producers to our knowledge address these safety issues with competent technology. (See *The Case Against Raw Frozen Pet Foods*, Wysong Institute.)

## The Bad Guys

Food-borne pathogens for humans and pets take many forms. For example, Listeriosis is a major problem because of its high mortality, particularly in neonates and the elderly. Listeria species are known to thrive in diverse sources such as soil, decaying vegetable matter, silage, sewage, water, animal feed, fresh and processed meats, raw milk, cheese, slaughterhouse waste, and asymptomatic human and animal carriers. This translates to a high risk of Listeria species entering the food production and processing environments. The psychrotrophic nature of *L. monocytogenes*, allows it not only to proliferate at refrigeration temperatures but also at acid pH as low as 4.4. Hence, simply refrigeration or freezing and acid pH found in many types of meats, cannot ensure a listeria free product. Similar stories could be told about other pathogens such as *E. coli*, *Salmonella*, *Campylobacter*, *Vibrio*, *Clostridia* and *Shigella*. In addition, foods are subject to toxic mold growth and may contain infective eggs and larvae of parasites such as *Trichinella*, *Ascarid*, *Taenia* and *Echinococcus*.

## Freezing For Safety

Not all freezing is the same with respect to protecting raw foods. Time and temperature are critical. Bacteria can proliferate while a food appears frozen and parasites can remain viable. Wysong research has found that by coordinating very low temperatures with appropriate time not only is bacterial growth impeded but *Trichinella* and other encysted larvae and parasitic eggs in infected meat can be destroyed.

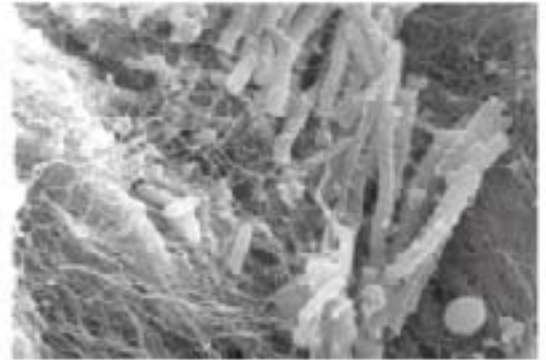


Fig. 1 Attachment of *E. coli* O157:H7 to collagen fibrils in beef tissue.

### Wysong Non-Thermal Processing (NTP)

Coupling the above freezing technology with high vacuum permits the preparation of raw foods minus moisture. By taking a raw frozen food directly to the low water activity state (a range in which no microbial proliferation occurs) without transitional thawing, the safety of the frozen food is transferred to a room temperature dried food such as Wysong Archetype™. By combining Wyscin™ with the ingredients and then using NTP, the ideal shelf stable raw food is created, far superior to mixed meal frozen products. (See *The Case Against Raw Frozen Pet Foods.*)

### Wyscin™ Phytochemicals

Many natural compounds found in dietary plants, such as extracts of spices (garlic, cloves, mustard, cinnamon, etc.), herbs (basil, rosemary, oregano, coriander, etc.) and fruit extracts (cranberry, blueberry, prune, plum, etc.) have proven to possess antimicrobial activities against food-borne bacterial pathogens. These compounds within plants are not just fortuitous but are used by the plants to protect themselves against microbial attack. Active biochemicals include, for example, Thymol and Carvacrol. A unique feature of Wyscin™ natural phenolic phytochemical compounds is their ability to be active where it counts in meat tissue. Because meat has both lipid and water characteristics, a compound must be able to not only “attach” to the lipid (hydrophobic) portions but also “attach” to the water (hydrophilic) portions where bacterial contamination is most probable. Further select fractions contained within Wyscin™ have also been shown to effectively inhibit formation of polar and non-polar heterocyclic amines (HA) in cooked meats. Despite their occurrence only at only low levels of parts per billion in cooked muscle meats, long-term exposure to HAs have been categorized as typical carcinogens and mutagens in humans.

### Wyscin™ Organic Acids

Short-chain organic acids in Wyscin™ result in lowering of pH, partial dehydration and microbial death. The presence of the phytochemicals mentioned above along with lowered pH is the key to microbial death. Appropriate combinations of organic acids cause sub-lethal injury to bacterial cell membranes, causing disruption of the proton motive force, owing to loss of H<sup>+</sup> ATPase. This in effect “conditions” bacteria to the lethal effect of the natural phytochemicals.

### Wysong Natural Form Fatty Acids (NFFA)

Specialized NFFA and their salts are most effective in the inhibition of yeasts and molds, although various Gram positive/negative, catalase positive/negative, aerobes, anaerobes, thermophilic, mesophilic and psychotropic bacteria have all shown sensitivity. These salts have proven to be effective against mesophilic bacteria, psychotrophic aerobes, staphylococci and coliforms. They inhibit spore-forming bacteria by acting on various stages of the life cycle, including spore germination, outgrowth and vegetative cell division. Various theories exist for their antimicrobial action including, (i) amino acid uptake inhibition resulting in the destruction and/or disruption of the cell membrane, (ii) the accumulation of unsaturated fatty acids preventing the function of dehydrogenase, thus inhibiting metabolism and growth, and (iii) the potential inhibition of respiration by competitive action with acetate in acetyl coenzyme-A formation. In the case of the deadly spore formers, these salts have been shown to inhibit germination of *B. cereus T* and *Clostridium botulinum 62A* spores, and prevent the loss of spore heat resistance. This mode of action owes to the competitive inhibition of germination induced by L-alanine and other germinants.

### Wysong Colostrum Fractions

Certain colostrum fractions contain active peptides (CAP). The antimicrobial activity of one such peptide in Wyscin™ is due to its ribbon-like structure (Fig. 2). This three dimensional configuration contains four active sites; two bind Fe<sub>3+</sub> ions and

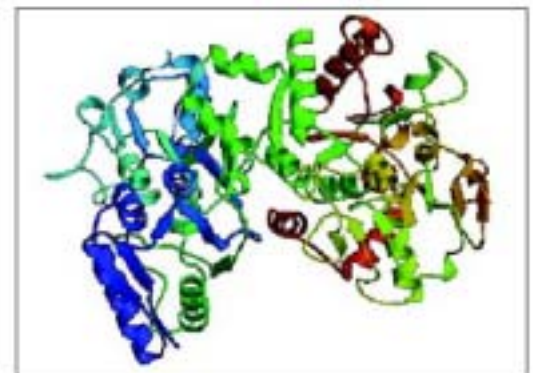


Fig. 2. Three-dimensional ribbon structure of the lactoferrin molecule. The N-terminus is the straight blue line between the blue coil and the green coil at lower left. The gray sphere just above the green coil is iron.

the other two bind HCO<sub>3</sub><sup>-</sup> ions. In turn, certain Gram-positive/negative bacteria have sites on their surface that are specifically attracted to these iron and carbonate sites. When bacteria attach to these areas they are immobilized and thus inactivated. The high-affinity interaction of these colostrum fractions with pore-forming outer membrane proteins of Gram-negative enterics, including *E. coli*, is critical for their antimicrobial outcome.

CAP-mediated outer membrane damage in Gram-negative bacteria and the CAP-induced antibiotic potentiation by altered permeation are examples of such antimicrobial outcomes. Another vital fraction is a multi-component biochemical system that inactivates or kills a broad spectrum of microorganisms through an enzymatic reaction. This involves two co-factors, hydrogen peroxide and thiocyanate ions, which, together with lactoperoxidase can inhibit certain Gram-negative bacteria (including *E. Coli*, and some strains of *Salmonella*) and is bacteriostatic against Gram-positive bacteria.

### **Wysong Bioactive Fruit Purees**

Extracts from certain fruits possess antimicrobial properties. For example, some fruits of the Rosaceae family have exhibited bacteriostasis against various pathogens including *S. typhimurium*, *L. monocytogenes*, *E. coli O157:H7*, *S. aureus*, and *Y. enterocolitica*. The liquid media of these fruit purees and juices causes a minimum 2.5 log total count reduction of *S. typhimurium*, *L. monocytogenes*, *E. coli O157:H7*, *S. aureus*, and *Y. enterocolitica*. In *E. coli* inoculated raw, ground beef samples containing specific Rosaceae fruits, a very high lethal rate of 99.7% was observed with respect to the control. Similar antimicrobial effects against four food-borne pathogens, *E. coli O157:H7*, *S. enteritidis*, *L. monocytogenes*, and *S. aureus* using certain Wysong fruit extracts have shown 3-4 log reductions.

### **Wysong Dessicated Sea Plankton and Special Clays**

Raw or undercooked meat (especially pork products) contains encysted *Trichinella* larvae and infective eggs of *Ascarid* spp. in the striated muscle tissue. These parasites can be controlled using precise clay minerals. These highly active clays are fossilized deposits of microscopic shells created by single-celled plankton. Their proven mode of action for insect and parasite control is strictly mechanical and not only contributes no toxic chemicals to food but actually supplies important nutritional minerals. The sharp microscopic edges of these clays pierce the protective coating of parasites, cysts and eggs causing dehydration and death. Larvae are affected similarly. Upon ingestion, certain weathered volcanic clays absorb water and swell to reveal a structured porous network. Electrical attraction of parasites to the toxins rapidly draws them into these spaces. Numerous studies have shown the ability to bind and remove pathogenic viruses, mycotoxins, pesticides and herbicides including paraquat and Roundup®. The ingested Wysong clay is eventually eliminated from the body with the toxins bound inertly to its multiple surfaces.

### **Conclusion**

As is apparent from this brief discussion, the challenge of raw food safety is no simple matter. Yet in our review of commercial products, not a single manufacturer of raw pet foods addresses these issues with use or even knowledge of the above technologies. Nevertheless, raw foods for pets is as critical to their health as it is for humans. The burden is therefore on the consumer to become informed and demand of product purveyors that they prove their competence in not only nutrition and health, but in food safety. If raw food meals are going to be prepared at home then safe handling practices need to be employed and Wyscin™ technology (Call of the Wild™; Archetype™ products for packaged raw meal alternatives) should be used to help insure wholesomeness and health.

### **References:**

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\* Further scientific references available by request.