



## **BioRefinex Corporation** “*a thermal hydrolysis technology for safely processing infectious and high risk organic material into valuable outputs*”

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### **Company Profile**

BioRefinex is an advanced technology and development company headquartered in Calgary, Alberta with offices in Toronto and Severna Park, Maryland. The company was formed in 2001 to commercialize a proprietary bio-refining technology that safely processes infectious and high risk organic material and converts this material into a high-nutrient organic fertilizer or feedstocks for the production of biogas or syngas which can be converted into thermal and/or electrical energy.

### **Thermal Hydrolysis Technology**

BioRefinex's technology processes material at 180 deg C under 12 atmosphere of pressure for 40 minutes. Material is processed in a batch form in sealed vessels to insure that all input material is subject to the high temperatures and pressures and to insure public health safety and traceability.

At these high temperatures and pressures, the phenomenon of thermal hydrolysis occurs. Thermal hydrolysis has been shown to fracture long chain molecules and reduce complex proteins into amino acids and peptides resulting in the destruction of all viruses, bacteria and microorganisms. Thermal hydrolysis also is capable of inactivating prions, the agents believed responsible for transmissible spongiform encephalopathy (TSE) diseases such as bovine spongiform encephalopathy (BSE) in cattle, scrapie in sheep, chronic wasting disease (CWD) in elk and sheep and Creutzfeld-Jakob disease (CJD) in humans.

### **Exceeds Current Processing Standards**

The BioRefinex process exceeds all present temperature and pressure standards currently employed commercially in North America and Europe and by infectious disease laboratories for the destruction of biological material. The technology also exceeds the standards established by the new European Union regulations for processing of animal byproducts

### **Efficacy of the Process**

BioRefinex has completed a series of microbiological tests to confirm the effectiveness of its thermal hydrolysis technology. All tests were completed by independent and government certified laboratories. Protocols were developed and followed to test that all viable microorganisms, including heat-resistant spores and sulpa-based drug residues, were destroyed and that there was a complete reduction of viable microorganism counts. The overall laboratory analysis of the BioRefinex output and condensate indicated that the process was efficient in destroying microorganisms and the final product is safe to use as an organic fertilizer or feedstock for the production of biogas or syngas.

Thermal hydrolysis has also been found to reduce TSE-infectivity and validation testing of the BioRefinex process is being undertaken by the Institute for Animal Health in Edinburgh in 2003. This work is being funded by the UK government and BioRefinex is providing the research vessel for the tests. Final test results will be

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presented to the European Commission's Scientific Steering Committee for assessment. Dr. David Taylor, former Principle Scientist at the Institute for Animal Health is advising BioRefinex in this regard.

### **Processing Capacities**

A standard two-vessel BioRefinex configuration can process between 15,000 - 27,500 tons per year of animal carcasses and by-products depending on how the output will be used.



The BioRefinex technology can process whole animal carcasses up to 2,500 lbs without the need for pre-butchered or breaking and can process mixed loads of material including animal bedding, meat and bone meal, other animal by-products, poultry and other organic wastes at the same time. This attribute was developed to minimize handling of high-risk material.



*Photos courtesy of College of Veterinary Medicine, Virginia Tech, Blacksburg, Virginia*

### **Advantages**

The technology offers a number of significant advantages over traditional methods of processing high-risk organic material. These advantages include:

- Proven destruction of a wide range of pathogens and drug residues and converts infectious and high risk material into valuable output material that can be safely landfilled or used as a fertilizer or feedstock for production of biogas or syngas;
- Ability to safely process high risk animal by-products or specified risk material as well as deadstock or fallen animals, poultry, road kill, zoo and pet animals, wild animals, bedding and other suspected material;
- Exceeds new European Union regulations for processing of animal by-products;
- No noxious odors, air emissions or effluents associated with other processing technologies – only process output is sterile, non-potable water, hot air and the denatured and dehydrated input material;
- Ease of environmental permitting, siting and regulatory approval;
- Sealed batch process allows in-situ monitoring, uniformity of results and traceability;
- Short processing time (1 to 4 hours per cycle) depending of type of input material and use and desired moisture content of output;
- Process improves suitability of output as a feedstock for biogas and improves the efficiency of anaerobic digesters for the generation of thermal and/or electrical energy;
- Results in the reduction of greenhouse gases emissions compared to alternative processing methods.

### **Contact Information**

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