FireIce
GelTech Solutions, Inc.

Environmental and Toxicological Data

FireIce from GelTech Solutions, Inc. is a superabsorbent polyacrylate polymer which meets the highest environmental and Toxicological standards ensuring there is no exposure risk to the environment, including human, terrestrial or aquatic animal species.

There are no risks of acute toxic effects for aquatic wildlife in streams receiving runoff from land where FireIce is applied to fuels (vegetation) at any coverage level (application rate) during fire-fighting activities, or where planned aquatic releases in normal operating dilutions such as those of the residual FireIce in the tank of amphibious aircraft during or after water scooping operations; or issues associated with the wash-down or clean-up of mixing facilities (airtanker bases) where mixing into storm water run-off infrastructure is planned to occur. Although it is recommended that proper spill retention practices be employed, there are no negative environmental effects from properly mixed or diluted FireIce products entering storm water drainages in residual amounts as defined by the United States Environmental Protection Agency (EPA) and is deemed safe for ingestion by animals or to be in contact with food for human consumption as outlined in Sec 177.1211 cross-linked polyacrylate copolymers.

The fish toxicity tests have been completed on FireIce, in accordance with USDA Forest Service Specification 5100-306a. The fish toxicity test is performed as described in OPPTS 850.1075 on rainbow trout (approximately 60-days post hatch) in ASTM soft water. There is a requirement that the 96-hr. LC50 must be ≥10 mg/L. The report states, "The preliminary results indicate your product had an LC50 = 348 mg/L. These results are acceptable."

It is important to understand that the tested ratio is that of a product which contains 4x the amount of FireIce concentrate used in Aerial firefighting applications and still exceeds all LC requirements for firefighting agents, rendering the product environmentally benign by USDA and Labatt Anderson environmental risk definitions.

Superabsorbent polymers are used primarily as intermediate and raw materials in a variety of Consumer and industrial products, including treatment of municipal waste water. The testing and approval process includes: the Occupational Safety and Health Agency (OSHA), US Food and Drug Administration (FDA), United States Department of Agriculture (USDA), Mine Safety and Health Administration (MSHA) as well as recognized third party laboratories and testing facilities. The product has been tested as a food additive and carries approvals to be in contact with food for human consumption. Although best practices should be maintained when working with all products, the product poses no exposure risks as defined by the FDA.

The following are complete government verified data sets showing the results of the provided health and environmental information:

Acute oral toxicity

Up to 5 % mixed solution applied as gel in saline was applied once with a stomach tube to 5 male and 5 female rats each. No abnormal findings were evident at any time point during examinations over 14 days. Bodyweight development was normal; necropsy revealed no visible organ alterations. The LD50 was> 5,000 mg/kg body weight. Application of an aqueous extract of the SAP to 6 male and 6 female rats with the drinking water for 1 day led to no adverse effects. Deaths did not occur and no visible organ changes were detected. Neither the polymer nor the mixed solution is of acute toxicity after oral administration.

Subacute oral toxicity

The oral toxicity of mixed gel, administered daily to 10 male and 10 female rats per group via the diet over consecutive weeks at concentrations of up to 5 % was investigated. No toxicologically significant changes were induced. The differences observed between treated and control animals were modifications in urinary ion excretion in the treated animals. Both findings were considered to be related to the relatively high concentration of sodium in the test substance and therefore of no toxicological relevance.

HET-CAM-Test

The hen's egg test is an alternative test method to the Draize rabbit eye test. For this test 200 mg of dry product, the swollen gel or an extract were applied onto the sensitive chorioallantoic membrane (CAM) of the developing chicken egg. There were only slight irritative effects leading to vascular injection but no adverse effects with respect to hemorrhaging, or coagulation. Thus the potential of the product to cause adverse effects on membranes seems to be very low.

Cytotoxicity in vitro

The product was examined regarding its influence on mammalian cells in a cell culture system using 3T3 fibroblasts of mice. The cells were incubated for 24 hours with an extract of the product in concentrations up to 1.5 % (v/v) in cell culture medium. No adverse effects on the morphology or viability of the cells were observed. Extraction of product with cell culture medium (10 g/medium) led to a concentration dependent decrease in cell viability due to

complex formation (binding) of essential cations in the medium. Following supplementation of the bound cations, adverse effects were not observed any longer. Further cell toxicity tests were executed using the agar diffusion cell culture technique, which is appropriate for solid specimens as well. The product was applied as dry granulate and as a suspension (30 g/l saline). There was no indication of cytotoxic effects.

Intravenous and intra peritoneal application

Intravenous and intra peritoneal compatibility of SAP was tested after systemic injection in mice. Following intra peritoneal application of 50 ml/kg extract in sesame oil or 10 g/kg extract in polyethylene glycol no toxic reactions of the animals were observed within 72 hours.

Intravenous instillation of a gel extract (15 g/l saline) produced systemic effects and mortality in dose levels greater than40 ml/kg. Histopathological examination revealed dose dependent toxic alterations of liver and spleen. The no observed effect level (NOEL) was less than 10 ml/kg, a dose which led only to minimal hepatic effects.

Subcutaneous and intramuscular implantation

Subcutaneous and intramuscular compatibility of a gel and the granulate of product was tested in rabbits after implantation. Histopathology revealed no abnormal reactions in the surrounding tissue. Furthermore, there were no significant deviations from normal values in hematology, clinical chemistry, and other standard toxicological parameters. No signs of toxicity were observed.

Escherichia coli reverse mutation assay

Extracts of the product were tested in tryptophan requiring strains of Escherichia coli for their ability to induce point mutations in the absence or presence of a metabolic activation system. In concentrations of up to 5,000 µg/plate no mutagenic events could be observed. Furthermore, no cytotoxicity was detected.

UDS in rat hepatocytes in vitro

The product was tested for its ability to induce unscheduled DNA synthesis (UDS) in isolated rat hepatocytes in vitro. Treatment with up to 1,500 µg/ml of equivalent extracted material in saline with 10 % (v/v) ethanol did not produce a mean net grain count greater than zero (0), nor were

20 % or more cells to be found in repair. The test substance therefore showed no genotoxic activity.

Teratogenicity

Pregnant female rats were exposed in a teratology study to respirable levels (particle size< 10 μm) of product at 0.3, 1.0and 10 mg/m³ for 6 hours/day from day 6 to day 15 of gestation. On day 20 of gestation the rats were necropsied and examined for the number of implantations, early and late resorptions, live and dead fetuses and number of corporalutea. The fetuses were observed for weight, external, soft tissue and skeletal alterations. No effects were detected: The highest test concentration is the no observed effect level (NOEL).