FLOATING PESTICIDE DISPENSER

CROSS-REFERENCE

This application is a continuation-in-part of my co-pending application entitled "A Method and Composition for the Long Term Controlled Release of a Non-Persistent Organotin Pesticide from an Inert Monolithic Thermoplastic Dispenser" filed on Jan. 22, 1979 as Ser. No. 5,174, which in turn is a continuation-in-part of an application bearing the same title which was filed on June 19, 1978 as Ser. No. 916,570, now U.S. Pat. No. 4,166,111.

BACKGROUND OF THE INVENTION

The invention relates to the dispersement of a pesticide from a floating plastic matrix in a continuous and controlled manner into water infested with various aquatic pest and insect life. For example, mosquito larva develop through several morphogenetic stages in water, emerging in time as adults capable of transmitting dread diseases which include encephalitis, malaria, yellow fever, filiariasis, dengue fever, and the like, as well as creating a nuisance to man and man's domestic cattle by their proclivity towards biting and other annoyances. Similarly, other insecta, such as flies of the Simulium family, spend their larval stages in water, emerging as adults capable of transmitting onchocerciasis, a dreaded parasitic disease manifested as blindness in exposed human populaces. Snail hosts of parasitic trematodes, as well as the trematode larva, likewise, dwell in water and can similarly be controlled using the invention described in this specification.

The incidence of the above-mentioned various dreaded diseases are increasing in incidence throughout the world. Such increase arises from growing resistance to many insecticides, the ban on major inexpensive control agents such as DDT, and the economics of control and eradication. A significant contribution to increased incidence of such diseases is through lack of mosquito control. Mosquito breeding sites are of many kinds, some being easily amenable to treatment with insecticides and others being inherently difficult to treat or very expensive to so treat. In the latter category are storm or catch basins, containers used for portable water supplies, generally stagnant ponds, swamps, and the like. As described in the monumental text by Cardarelli, 1976, and is now well known to the pesticide formulation and used in the art, through the incorporation of select pesticides in select polymeric matrices, it is possible to cause a slow-long duration release of ultra-low concentrations of said pesticides in the pest-infected environment with efficacious benefit and much reduced environmental impact. When target organisms are continuously exposed to very low toxicant concentrations, such concentrations being far too small to materially affect insect control, the gradual accumulation of such agents in the pest body leads to a chronic manifestation of intoxication and eventual mortality.

Slow release toxicant compositions, such as those taught in U.S. Pat. Nos. 3,639,583 and 3,417,181, rely upon release being affected through the now well known and understood diffusion-dissolution mechanism. It is taught in said patents that release is critically dependent upon the binding polymeric matrix being a solute for the organotin classes used. The binder matrix is a vulcanized or a plurality vulcanized elastomer. However, it is well known that generally organotins totally lack solubility in thermoplastic materials and, thus, the diffusion-dissolution process cannot be established.

U.S. Pat. No. 4,012,221 relates to inorganic copper salts capable of releasing copper salts in water with the copper salts being dispersed in a moderate crosslinked elastomer in which the copper salts are insoluble.

In other inventions, it has been taught that the pesticidal agents such as oganophosphorus class insecticides will similarly release from solute matrices, especially from elastomers. U.S. Pat. No. 3,590,119 is an example of this teaching.

Many mosquito larvicides are known and used in both the conventional sense as well as in controlled release methodologies such as microencapsulation. Among others, Boike et al has shown in examining 23 different organotin formulations in solute elastomer formulations, that they are not effective against the mosquito under practical use situations due to the presence of natural organic substances common to water courses. Said organic materials rapidly absorb organotin molecules, essentially removing them from mosquito larva contact.

U.S. Pat. No. 3,705,938 teaches that several organophosphorus-type insect adulticides can be incorporated in a laminated polyvinyl chloride structure, wherein no agent solubility exists, and caused to move continuously through said plastic structure to said plastic surface through a volatility mechanism wherein the medium of release is air. Such constructions require the use of a third phase material such as a plasticizer to effect toxicant movement.

U.S. Pat. No. 4,012,347 relates to the antifouling performance of certain asymmetric triorganotin compounds which are incorporated into a coating composition a film-forming polymer, a rosin, a solvent, as well as a pigment. Although various film-forming polymers are disclosed including elastomers, the use of an ethylene-vinyl acetate copolymer is not taught. Moreover, the invention leaching rate is very dependent upon the ratio of the rosin to the various polymers.

U.S. Pat. No. 3,234,032 also relates to an antifouling marine coating composition wherein various organotin compounds are combined within the film-forming vehicles such as waxes, oils, or a paint having a synthetic polymeric material. Such synthetic materials are the vinyl polymers, the acrylic polymers and the alkyd polymers. Hence, no suggestion of applicant's specific copolymer or coleachant system is taught.

U.S. Pat. No. 3,236,793 relates to a bis(tributyltin)-adipate antifouling composition wherein the tin compound is dispersed in a substantially water-insoluble film-forming vehicle such as spar varnish, vinyl acetate - vinyl chloride copolymer-based paints, and the like. Obviously, this patent is unrelated in that it relates to a completely different type of organotin compound and lacks any suggestion of a coleachant system as well as an ethylene-vinyl acetate copolymer.

Yet another prior art vehicle is that appearing in CHEMICAL ABSTRACTS, 75:97577c (1971) wherein various non-organotin liquid pesticides are dispersed in various film-forming polymers. Once again, this prior art article is readily distinguished from the present invention in that it lacks at least applicant's specific copolymer, organotin compound, as well as the coleachant system.