ENHANCEMENT OF ULTRA VIOLET LIGHT AS AN INSECT ATTRACTANT BY THE ADDITION OF A SECONDARY ATTRACTANT WAVELENGTH OF LIGHT

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It has been known for many years that Ultra-violet (UV) with a wavelength of between 350 and 370 nm is an attractant to many species of insect. The electric fly killer industry has produced fly killers with U.V. light as an attractant for over 30 years and these have been installed in many food industry installations in the U.K. and Europe.

A study of the scientific literature indicates that many insects are also attracted to wavelengths of light of between 500 and 550 nm, in the green of the visible spectrum. Electroretinogram (ERG) studies in many insect species has shown that many possess green light sensitive receptors with a wavelength maximum at 520 nm. ERG studies on species of Diptera, particularly *Drosophila* spp and *Calliphora* spp have found that there is usually a secondary peak at between 497 and 517 nm. Receptors maximally sensitive to green wavelengths are most often found in the ventral and frontal portion of the insect eye, those most sensitive to UV wavelengths are most often found in the dorsal region of the eye. Behavioral studies by Weiss (1943) show peak response in *Drosophila* and the Coleoptera species studied in UV, with a secondary peak in response of between 492 and 546 nm (blue/green – green region).

A review of the literature concerning the response of stored product insects to various wavelengths of light concluded that most stored product insects, especially Lepidoptera, are attracted to green rather than UV wavelengths. There are conflicting reports concerning the relative attractiveness of green and UV, but it was concluded that this was due to differences in the intensity of light sources and variations in the physiological condition of the insects.

A fly killer unit (Insect-o-cutor) has been developed which incorporates lamps containing other phosphors which emit light in the green region with a wave length of between 500 and 530 nm as well as in the UV region. Preliminary results from field surveys in chocolate refineries with infestations of cocoa moth (*Ephestia elutella*) suggest that units containing lamps emitting green and UVA wavelengths attract a greater number of moths than those emitting UVA alone.

We have carried out laboratory studies to investigate the response of *Musca domestica*, *Calliphora erythrocephala* and *Lucilla sericata* to lamps emitting green and UVA wavelengths compared to the response to conventional lamps (emitting blue and UVA wavelengths) installed in Insect-o-cutor units.

Two identical Insect-o-cutor units were situated at opposite ends of a darkened test room. All the tests were carried out over a period of 2 hours and the numbers of insects killed were recorded. The results of these experiments show that these species appear to be attracted to the units containing lamps emitting green and UVA wavelengths to a greater extent than those containing conventional lamps emitting blue and UVA wavelengths.

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