United States Patent Office 3,248,287 Patented Apr. 26, 1966

3,248,287

DDVP-FORTIFIED PYRETHRUM MARC BASE MOSQUITO REPELLENT SMOKE COIL

Jack Sonbert, 1001 Oriental Blvd., Brooklyn, N.Y.

No Drawing. Filed Aug. 17, 1964, Ser. No. 390,234
4 Claims. (Cl. 167—40)

This invention relates to smoke coils, and more particularly, concerns coils which exhibit insecticidal as well as repellent properties in respect to mosquitos and the like.

Smoke coils having a base of pyrethrum are in common use, particularly in tropical areas where mosquito screening is not readily available or expedient. It is estimated that in Japan alone, over two hundred and fifty million coils are used per annum and over fifty million coils per annum are exported from that country.

In the United States, smoke coils have a rather limited use, and are primarily used in connection with outdoor activities, such as in camping, hunting, fishing areas. Such known smoke coils are primarily regarded as having only insect repelling properties rather than a positive insecticidal action.

No serious attempt has been made heretofore, to fortify pyrethrum smoke coils, so as to make the same insecticidal as well as repellent, since the amount of added chemical toxicant effective for the purpose, would be too great for safety in use. Also, a non-volatile insecticide would not disperse as a vapor in the smoke generated from the coil, while a volatile type of insecticide would have a poor shelf life and would be dissipated before the coil had been totally consumed in normal usage.

In addition, many added insecticides would detrimentally affect the normal combustion properties of the coil and adversely affect the smoke production from modified coils. Furthermore, the combustion products of the added insecticide may cause unpleasant odors or even toxic conditions.

Accordingly, an object of this invention is to provide an improved pyrethrum based smoke coil which is fortified to give the same insecticidal, as well as repellent properties, such coil retaining both properties over extended storage periods, providing normal combustion and smoke conditions, and being free of noxious or unpleasant odors on combustion.

Thus, it has been found that dimethyl dichloro vinyl phosphate (DDVP) may be added in amounts of from 0.05% to 0.5% by weight to conventional mosquito repellent smoke coils having a pyrethrum marc base so that the DDVP is restrained against loss due to volatility. Such DDVP fortified coils may be exposed to strong currents of air at room or elevated temperatures with little loss of DDVP content.

Smoke coils fortified with DDVP were found to produce a smoke which had insecticidal as well as repellent properties. The DDVP content of the smoke was as low as 12–15 p.p.m., which concentration is accepted as well below safe tolerances. DDVP per se is well metabolized by the human system and in 0.5% concentrations is approved for aerosol use.

The high volatility of DDVP makes it readily available once the heat from the glowing tip of the burning coil liberates the same, together with accompanying steam and smoke. Studies of the combustion area of the coil shows the smoke-steam combination originates just below the glowing zone and the DDVP is volatilized and liberated before it is ignited.

The smoke from a burning DDVP fortified coil was collected and analysed by vapor chromatography. It was found that no decomposed DDVP was present inasmuch as no phosphate decomposition products were found and the amount of DDVP corresponded to the content of that material in the coil.

It was found that the use of added binders such as resin, wax or the like, to retain the DDVP in the coil body, gave rise to bad odors, poor combustion, degradation products and other adverse conditions.

On the other hand, it was found that pyrethrum marc has a peculiar affinity for DDVP. If the smoke coil is made up of at least 25% by weight of pyrethrum marc, then the balance of such coil composition may comprise coconut shell flour, walnut shell flour, wood flour, leaves and other fillers; with good retention of the volatile DDVP on the coil body or the pyrethrum marc portion thereof.

When DDVP was applied to absorbent bases such as sawdust, activated charcoal, or diatomaceous earth and air at 100° F. was blown over such impregnated bases, the volatile DDVP left the bases within a few days. On the other hand, DDVP applied to a base of pyrethrum marc and treated with air at 100° F. showed almost complete retention of the volatile agent even after 90 days of such treatment. The DDVP separates from pyrethrum marc base only at very high temperatures and by the steam distillation effect of water derived from combustion of the coil.

Example I

Conventional pyrethrum base mosquito repellent coils were dipped into a 12% solution by weight of DDVP in methylene chloride, until the coils were saturated. The impregnated coils were set on a rack to dry. The coils, having an average weight of 7–13 grams each, showed an average increase in weight of about 35 mgm. Thus, the DDVP absorbed amounts to about 0.25% to 0.30%. Such coils when ignited, burned evenly for 7 hours and and the smoke had excellent insecticidal properties.

It has been found that with smoke coils having a base containing at least 25% by weight of pyrethrum marc, such coils may be impregnated with DDVP in amounts ranging from 0.05% to 0.50% by weight, and such fortified coils will show insecticidal properties when the coils are ignited.

The DDVP may be carried in an inert solvent such as chloroform, methylene chloride or the like. The base of the smoke coil so impregnated should have a pH of between about 6.0 to 8.0.

As various changes might be made in the embodiment of the invention herein disclosed without departing from the spirit thereof, it is understood that all matter herein shown or described shall be deemed illustrative and not by way of limitation except as set forth in the appended claims.

What is claimed is:

1. An insecticidal body comprising ignitable material adapted to provide smoke upon ignition which has insecticidal and repellent properties, said body comprising pyrethrum marc in an amount of at least 25% by weight of said body, said body having distributed therethrough a small amount of dimethyl dichloro vinyl phosphate.

2. An insecticidal body as in claim 1 wherein said dimethyl dichloro vinyl phosphate amounts to from about 0.05% to 0.50% by weight of the body.

3. The method of fortifying an ignitable body comprising at least 25% by weight of pyrethrum marc, comprising impregnating said body with a solution of dimethyl dichloro vinyl phosphate, in a volatile organic solvent, and drying the impregnated body.

4. An insecticidal body comprising ignitable material adapted to provide smoke upon ignition which has insecticidal and repellent properties, said body comprising a substantial proportion of pyrethrum marc and from about 0.25 to about 0.30% by weight of dimethyl dichloro vinyl phosphate distributed through said body.

(References on following page)

References Cited by the Examiner

UNITED STATES PATENTS

232,695	9/1880	Detwiller	167—40
424,590	4/1890	Atkinson	167—41
593,990	11/1897	Deming	167—40
1,207,766	12/1916	Katzenberger	167—40
1,595,261	8/1926	Sy	167—24
1,786,967	12/1930	Trevillian	260—468
2,521,941	9/1950	Pearsall	21—111
2,765,579	10/1956	Gordon	43—127
2,968,591	1/1961	Tracy	167—22
3,116,201	12/1963	Whetstone et al.	167—22

LEWIS GOTTS, *Primary Examiner.*

S. K. ROSE, *Assistant Examiner.*