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INSECTICIDE AND FUNGICIDE

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This invention relates to insecticides and fungicides and more particularly to a product of this character particularly useful in connection with sap sucking and other insects. Heretofore, nicotine generally in the form of nicotine sulfate, has been employed as such an insecticide. The sulfate is emulsified in a soap solution to produce a nicotine soap emulsion containing about .08 per cent nicotine, and is then sprayed on the plants which suffer with aphids and other insects.

In distilling shale oil from certain shales, such as those of Colorado and Utah, there is obtained an oil which is rich in nitrogen bases. These nitrogen bases may be extracted from the oil by washing with dilute hydrochloric, sulfuric, or similar acids and then working up the solution obtained to recover the free bases.

I have found that these bases, particularly the ones distilling between 150 and 300° C. may be employed as insecticides in substantially the same manner that nicotine is used. These bases are largely derivatives of pyridine, typical derivatives being trimethyl pyridine and 2, 6 methyl, 4 allyl pyridine. In some instances, there are perhaps quinoline bases present, but the principal ones are, as stated, pyridine derivatives.

While it is somewhat difficult to emulsify these bases in an ordinary soap solution, I have found that this can be readily accomplished if mixed with oil, and particularly an oil carrying a high percentage, say 50–70 per cent of unsaturated hydrocarbon, such as ordinary shale oil. In order to simplify the preparation of the solution, the kerosene fraction of the crude shale oil may be distilled off and without purification employed in the soap solution, giving the proper proportion of nitrogen bases and the proper type of hydrocarbon oil to cause the nitrogen bases to emulsify readily in the soap solution. This solution is sprayed onto the plant in the manner heretofore employed in connection with nicotine solutions. In obtaining the desired fraction of shale oil, the oil distilling over 150 to 300° C. is preferably employed.

In tests conducted with an emulsion prepared from shale oil high in nitrogen bases and with emulsions prepared by adding the nitrogen bases to an unsaturated hydrocarbon and then emulsifying in the soap solution, results obtained when a 0.5 per cent concentration of combined oil and base in the emulsion is employed, show destruction of approximately 90 per cent of the aphids, When a similar fraction of ordinary petroleum saturated hydrocarbon distilling over in the so-called kerosene fraction is employed without the nitrogen bases in the same concentrations, the emulsion has a very slight toxic effect on the insects. Moreover, when the saturated hydrocarbons of the kerosene fraction of ordinary well peroleum are sprayed onto a plant, at those concentrations necessary to prove toxic to the insect, they will "burn" or injure many plants whereas the crude shale oil kerosene fraction carrying the nitrogen bases and the unsaturated hydrocarbons have, at those concentrations necessary to prove toxic to the insect, practically no tendency to injure the plants.

While I prefer to employ the fraction of shale oil boiling between 150° C. and 300° C., other fractions distilling above or below this fraction may be employed in its stead. The fraction of crude shale oil carrying the nitrogen bases and unsaturated hydrocarbons and distilling between 150° and 300° C. may be designated as the kerosene fraction of crude shale oil.

As stated, crude shale oil is very much more readily emulsified than corresponding distillates of ordinary well petroleum, as the latter consists largely of saturated hydrocarbons. Similarly, this ease of emulsification and permanency of the resulting emulsion in a soap solution applies as well to the unsaturated portion of shale oil when taken by itself. The proper fractions of crude shale oil may be emulsified in a hot soap solution and this, on cooling, forms a semi-solid, pasty mass. This product may be sold and shipped in this condition. By adding hot water and stirring, the material is ready to be used in spraying plants or trees infested with aphids, San José scale or other insects.

When the product is to be employed as a fungicide for the purpose of impregnating

railroad ties and the like, the material to be impregnated may be immersed in the material for a sufficient length of time to thoroughly fill the pores of the wood and then removed. Preferably such impregnation would be carried out hot and under pressure, as is the method well known in the wood preservation industry.

While I have described in detail the preferred practice of my process, it is to be understood that the details of procedure may be widely varied without departing from the spirit of the invention or the scope of the subjoined claims.

I claim:

1. An insecticide comprising a distillate fraction of shale oil distilling between approximately 150° and 300° C.

2. A liquid insecticide comprising the 150°–300° C. distillate fraction of crude shale oil.

3. An insecticide comprising a soap emulsion of a distillate fraction of shale oil distilling between approximately 150° and 300° C.

4. An insecticide comprising nitrogen bases of shale oil distilling between approximately 150° and 300° C.

5. An insecticide comprising nitrogen bases of shale oil distilling between approximately 150° and 300° C. in a soap emulsion containing as an emulsifying agent an oil containing approximately from 50 to 70 per cent of unsaturated olefinic hydrocarbons.

6. An insecticide comprising a distillate fraction of shale oil distilling between approximately 150° and 300° C. and containing nitrogen bases, unsaturated hydrocarbons and saturated hydrocarbons.

In testimony whereof, I affix my signature.

RALPH H. McKEE.