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CARRIER AND FILLER MATERIAL

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This invention relates to a more or less finely divided solid organic material which is suitable for use for a variety of purposes, for instance, as a carrier or diluent for parasitocides, rodenticides, fertilizers, livestock remedies and the like and as a filler for compositions such as plastic molding compositions.

A variety of organic carrier and filler materials such as wood flour, nut shell flour and tobacco dust are in common use. Such materials generally are selected for use with reference to cost, density, chemical inertness, absorptiveness, tendency to pack or cake and the like properties. Some of them, such as nut shell flour which is especially well adapted for use as a carrier for insecticides, are quite expensive.

An object of the present invention is to provide a material which is suitable for use as a carrier and filler and which has a combination of desirable characteristics including sterility, light weight, low cost, combustability, low ash content, chemical inertness, non-hygroscopicity, flowability and absorbtivity.

We have found that such a carrier and filler material readily may be prepared from tobacco plant material, i. e. the stalk, stems, leaves, or any mixture thereof.

Any part of the tobacco plant and any kind of tobacco plant and either green or cured tobacco may be used but economic considerations favor the use of the less costly tobacco materials such as low grade cured leaf, scrap, siftings, etc., and more particularly tobacco stems, i. e. the midribs of the leaves of cured tobacco, tobacco which has been specially grown as a source of nicotine, and the so-called "rustica tobacco," etc.

Whatever tobacco material is selected for use, it generally is advisable to subject it to a treatment for the removal of sand and grit. For this purpose tobacco stems containing up to, say, 20% of moisture may be broken to lengths of from about one-half to two or three inches and passed over a shaking screen of about 20 mesh. Or, the broken stems may be dried to 3 to 5% moisture and then passed over a shaking screen to separate the sand. The broken and desanded stems either dried or undried may then be subjected directly to extraction with water, for example, by utilizing a sugar beet diffusion battery. Or, the broken and desanded stems may be coarsely ground in a suitable mill and then extracted with water by percolation. In the case of freshly cut green tobacco it is passed over shaking screens and, if necessary, sprayed with water to free it of sand and grit and is then disintegrated to a sort of

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mush or pulp by, for instance, passing it through a wet grinding mill. The extraction of this wet material is accomplished by draining off any free liquid and then heating the wet residue to the temperature of boiling water to render the cell walls permeable and then percolating it with water. Or, the wet material may be dried, coarsely ground and percolated with water in the same way as the stem material.

All of the above procedures result in a wet desanded, subdivided and extracted tobacco material which is treated as follows: It is pressed or centrifuged and the resulting liquid withdrawn, leaving a residue containing 65 to 75% of moisture. This residue is then heated in such a way as to dry, sterilize and dehydrate it and render it non-hygroscopic and friable. This step apparently involves a coagulation of protein-like constituents of the tobacco and is accomplished by heating the tobacco material to a temperature well above 100° C., preferably to a temperature of at least about 115° C. The drying and heating advantageously are carried out by passing the wet tobacco material through a rotary high pressure steam tube dryer at such a rate that it is dried and dehydrated to a moisture content of less than 1%.

The dried material, preferably containing not more than 1% by weight, dry weight, of inorganic gritty material, is then subdivided to the desired particle size, for instance, to 200 mesh or finer and is ready for use.

The extraction and separation of water soluble constituents of the tobacco material is one of the important and critical features of our invention. Tobacco material normally contains 40 to 50% of water soluble constituents including nicotine, gums, sugars and salts of sodium, potassium, ammonium, calcium and magnesium. These constituents must be partly but not completely extracted in order to give a carrier and filler material having the desired properties. We have found that the water soluble constituents of the tobacco material must be extracted to the extent of from about 70% to about 95%; that is, the resulting extracted tobacco material contains from about 23% to 3% of water soluble constituents, basis dry weight. If the water soluble constituents are not extracted to this extent the resulting finely divided carrier and filler material will have a tendency to cake and to be not free flowing. The water soluble constituents, if not sufficiently completely removed, may be objectionable also in that they may damage foliage when applied with an insecticide or they may be

incompatible with parasiticides or harmful to animals when the tobacco material is used as a carrier for livestock or poultry medicines. On the other hand, if the water soluble constituents are too completely extracted the resulting tobacco material will be difficult to wet and to disperse in water. The residual water soluble content of the tobacco material facilitates the fine grinding thereof.

The dehydration of the tobacco material, i. e. the heating to coagulate the protein-like constituents of the tobacco is equally important for the production of a free flowing product which does not cake and is non-hygroscopic.

The product is, as stated, as a result of the heating to which it has been subjected, sterile and will not therefore carry disease to plants or animals to which it is applied and it will not deteriorate in suitable storage. It consists essentially of non-toxic inert organic material and may be fed to animals as so much roughage. It has a light and unobjectionable color and readily may be dyed to any desired color. Being quite inert, it is not harmful to plants and may be mixed with many chemicals without objectionable reaction. It is combustible and leaves much less ash or residue than does the original tobacco material. It is non-corroding and non-abrasive to machinery. It need not be protected from the atmosphere and may therefore be packaged in ordinary containers such as paper bags. It is highly porous and absorptive due to its highly cellular structure which is improved by the extraction of water soluble constituents and it presents a large surface and therefore has a high carrying capacity. It may be impregnated or coated with a variety of organic and inorganic liquids or mixed with solids in finely divided form. Illustrative examples of such materials are nicotine sulfate, nicotine oxalate, petroleum oils, D. D. T., liquid phosphoric acid, benzene hexachloride, and sodium nitrate. It is effective as a dispersing agent for finely divided solids and also when mixed with difficultly wettable materials. For example, a product made by fusing D. D. T. with talc is difficult to wet and disperse in water but a similar product made by melting D. D. T. with our tobacco material disperses readily in water. It is readily ground to a fine powder but is not objectionably fragile.

Its utility as a dispersing agent for finely divided water insoluble materials may be attributed to its water soluble content and to its ability to swell by the absorption of water; and the water insoluble solid apparently is dispersed in part at least as a result of fine particles thereof being dislodged from the carrier as it swells upon being wetted.

It should be noted that the extent of extraction of the water soluble constituents of the tobacco material is within the limits of commercial practice and does not involve any unusual procedure or expense. The extract contains nitrogen compounds, potassium compounds, nicotine, and organic matter some of which may be recovered for use as fertilizer, insecticide and other purposes.

The following examples illustrate a few of the uses of the carrier and filler material.

Example 1.—85 parts by weight of our carrier material—200 mesh—are mixed with 15 parts by weight of nicotine sulfate solution containing 40% of nicotine and passed through a blending mill. The product is a high grade, 6%,

nicotine insecticide dust suitable for distribution by airplane.

Example 2.—75 parts by weight of 200 mesh carrier and 25 parts by weight of technical grade D. D. T. are mixed and heated with stirring to a temperature slightly above the melting point of D. D. T. (about 95° C.). The mixture is cooled and ground giving a 25% D. D. T. product suitable for use as an agricultural insecticide.

Example 3.—48 parts by weight of 30 mesh carrier are mixed with 12 parts by weight of ground potassium chloride, 22 parts by weight of 35% nitrogen liquor are stirred in and the resulting material is mixed with 18 parts by weight of 70% liquid phosphoric acid. The resulting mixture is passed through a blending mill and the result is a high strength clean, free flowing fertilizer.

Example 4.—49.5 parts by weight of phenol-formaldehyde resin, 0.5 part by weight of zinc stearate and 50 parts by weight of 100 mesh filler material are mixed together and the mixture is suitable for molding by standard procedure.

Example 5.—4 parts by weight of pulverized gentian, 1 part by weight of pulverized ginger, 1 part by weight of pulverized salt petre, 2 parts by weight of pulverized iron sulfate, one part by weight of pulverized nux vomica and 9 parts by weight of 200 mesh carrier are passed through a blending mill. The product is a poultry tonic and may be fed at the rate of one part by weight mixed with 99 parts by weight of dry poultry mash.

We claim:

1. Process for the production of a product which is suitable for use as a carrier and filler material which comprises subjecting tobacco material which in the dry state contains considerably more than 23 percent by weight of water extractable constituents to an extraction treatment with water in quantity sufficient to yield a product containing from 3% to 23 percent by weight of water soluble constituents, separating the extracted residue from the resulting solution and drying the extracted residue to a moisture content of not more than 1 percent by weight and heating the same to a temperature of at least 100° C. for a time sufficient to substantially sterilize the same but insufficient to carbonize it.
2. Process as defined in claim 1 in which the tobacco material is heated to a temperature of at least 115° C.

3. Process as defined in claim 1 in which the tobacco material containing not more than 20 percent of moisture is subjected to a screening treatment to separate sand prior to the extraction treatment.

4. Process as defined in claim 1 in which the tobacco material in the green state is washed with water to separate sand therefrom prior to the extraction treatment.

5. Process as defined in claim 1 in which the wet extracted tobacco material is dried, sterilized and dehydrated by heating to a temperature of at least 100° C. but insufficient to carbonize it.

6. As a new product tobacco material not containing more than 1% by weight of inorganic gritty material and not containing more than 1% by weight of moisture and containing from 3% to 23% by weight of the water extractable constituents of the tobacco.

7. A product as defined in claim 6 in which the protein content of the tobacco material is in the coagulated state.

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8. A product as defined in claim 7 which is sterile and non-hygroscopic.

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