# CONTROLLED RELEASE AGGLOMERATED CARRIER

## BACKGROUND OF THE INVENTION

The effectiveness of solid form pesticides is dependent not only upon the active ingredient but also upon the inert ingredient used as the carrier for the active. The inert carrier acts as the transfer mechanism for the active ingredient. If the carrier does not effectively release the active, the active will never reach its intended target. Thus, the development of an effective carrier is an essential step in the development of a successful pesticide.

To be of optimum effectiveness, a carrier must release its active in sufficient quantities such that the environment of the targeted site maintains the minimum concentration level needed for the active's intended use. If the concentration of the active falls below this minimum, it will cease to be effective. If the carrier releases the active too quickly, several problems can occur. First, the concentration level in the surrounding environment can exceed certain minimum safety standards. When this happens, unacceptable hazards can arise. Secondly, if the carrier releases the active ingredient in amounts in excess of what is needed, the carrier will deplete itself in a shorter amount of time. In addition, some actives break down and become inactive in a relatively short period of time when subjected to hydrolysis and photolysis and therefore should not be released too quickly. As a result, there can be an overall reduction in the effective life of the pesticide, which in turn, means more frequent applications.

Some carriers currently exhibit quick release characteristics but do not supply long-term control. Conversely, other carriers which provide long-term control are not capable of producing an initial quick response. Thus, the only way to vary the control of the product is to vary the application rate. For example, to achieve a quick response with a slow release product involves increasing the initial application rate, which in turn actually wastes the active ingredient since the long-term effect will be extended beyond the initially desired period of control.

To help reduce these problems, the Applicant has invented an improved carrier which allows for controlled release of the active ingredient in a desired pattern. This is achieved by combining preselected quantities and sizes of varying corncob fractions which exhibit different release rates. By combining cob fractions in a preselected manner, a carrier can be designed which can have a slow release rate, a fast release rate or a combination of the two.

Dow Chemical previously produced a product known as Dursban 10CR which allowed the controlled release of an active by impregnating a plastic pellet with the active. One of the drawbacks to this prior art product was that the pellet was not quickly biodegradable and would therefore remain in the environment for quite some time. This product is no longer marketed.

It is an object of the present invention to provide a carrier which, when treated with a particular active ingredient, will provide an effective mechanism for releasing the active ingredient in a predetermined and desired pattern. It is also an object of the present invention to provide such a carrier which allows controlled variations in the slow and quick release concentrations of the active ingredient. It is a further object of the present invention to provide such a carrier which has an organic composition which will act as a bait when exposed to certain target organisms and which biodegrades.

Other objects and advantages of the present invention will be apparent from a review of the following specification, tables and graphs.

## SUMMARY OF THE INVENTION

The present invention consists of an inert carrier for chemicals and the like which has improved and controlled release characteristics. The present invention also has proven bait like properties for certain insects, notably mosquito larvae. The carrier is comprised of selected sizes and fractions of ground corncobs which, when combined, yield a product with a planned and desirable release of the chemical and/or an attracting capability for the targeted organism.

A corncob consists of four principle parts which are arranged concentrically about one another. The center portion of a corncob is a very low density material called the pith core. Surrounding this is a very hard section called the woody ring which is in turn surrounded by the coarse chaff portion and the fine chaff portions, respectively. The coarse and fine chaff portions form the sockets for anchoring the corn kernals to the corncob. The normal methods of grinding the corncobs produces a mixture of all four of the above-mentioned portions. It is possible, however, to separate the denser woody ring material from the lighter pith and chaff portions of the cob.

The release of chemicals from a particular size and fraction of ground corncob will vary depending upon the individual characteristics of that chemical, however, it will be shown that predictable patterns exist and are utilized in the invention. In general, if a slower release is required, the use of a larger particle size of the same fraction will produce the desired result. In addition, the release rate is also dependent upon the type of cob fraction being used. The release is slower from an equivalent or larger size woody ring particle when compared to fine and coarse chaff and pith.

If a faster release is desirable, the reverse of the above should be followed that is, the substitution of a smaller particle size of the same fraction and/or the substitution of pith and fine and coarse chaff for woody ring.

The length of residual activity can be extended or the period of rapidly increasing chemical concentration can be shortened for a given amount of chemical by adjusting the relative concentration of chemical on the individual component carriers and the ratios of the various component carriers to each other.

Having the ability to control the slow and quick release characteristics of the carrier in turn allows precise adaptation of the carrier to the particular active being used. By having a carrier with controllable characteristics, it can also be adapted to the particular environment in which it will be used.

The attraction, foraging and feeding behavior of certain organisms, notably mosquito larvae, towards the invention is likewise controllable. Actual ingestion of particulate matter by larvae can be controlled by selecting the particular type and limiting the amount of the particular component within the invention which is of the size preferred by the targeted species (for mosquito larvae the size range is generally 20–500 microns) or the