chemically inclined please try analyzing for it, and synthesizing it as the basis for a biting fly repellent that really works?

*References*

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## AN EFFECTIVE FILTER FOR ULV APPLICATION OF MALATHION [1]

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The use of the Beecomist spray head (Model 275) presented a serious problem in experimental ULV malathion applications in New Jersey in the fall of 1970 and the summer of 1971. The greatest amount of material that could be applied before either the aircraft's filter (100 mesh) or the sintered metal sleeve (20 microns) of the Beecomists clogged up was approximately 25 gallons. This blockage was apparently caused by water-soluble salts in the malathion, and even material which had been filtered through a 5-micron element by American Cyanamid could not be utilized since it had been pumped back into the original drums in which there were enough residual salts to contaminate the filtered material. Thus, in order to eliminate any chance of contamination, we would have to pump the filtered malathion directly into the containers in the aircraft, an operation which indicated a portable unit.

For the design of the filtration system (Fig. 1), we established four criteria: (1) ease of operation in changing filter elements and in directing the flow of liquid, (2) cleanliness in operation, (3) variability in degrees of filtering efficiency, and (4) compactness for ease of moving. For pumping the malathion, we already had experience with the Hypro roller pump (Rupp, 1970), and this unit plus a ⅓-hp electric motor provided a compact system (Cardinal 1/3MSN 4100C) for moving the material from the drum to the plane. The use of a small motor generator takes this unit from the hangar to the field for servicing aircraft. Initially we installed a 100-mesh line strainer as protection for the nylon pump rollers; however, the salts clogged this strainer so frequently that we spent more time washing it out than changing filter elements. For field loading of aircraft, this was unacceptable; the strainer was removed.

Since we were not concerned about corrosion, we used ¾-inch galvanized pipe with brass valves (Consolidated Brass, "Apollo"TM 70-104-01) and fittings. For the hoses between the drum and the pump and the filters and the containers in the aircraft, we employed clear vinyl tubing so that we could tell when the hoses were completely drained.

Having determined that our operation required a portable field unit, a further consideration became evident; we would need two filters in the unit so that delays for changing filters while servicing the aircraft could be avoided. The first of the two filters we tried was a Purolator PR81-5. This was a duplex filter with one degree of filtration, 5 microns. Although it was a self-contained unit, which meant less plumbing, removal of the element was not as simple as could be desired, an important factor especially when the element had to be changed after filtering each drum of malathion.

The second filter, a Purolator P192-01, was a single unit and required more plumbing than the PR81-5 to make up into the desired 2-filter unit. Elements for this filter are available in 4 degrees of filtration—2, 5, 10, and 25 microns—and are more easily changed than those of the PR81-5. We modified this filter by replacing the original drain plug with a pipe shut-off (Weatherhead 6825) and a 2-inch nipple for more sanitary draining of the filter when changing elements. Another alteration of the original filter involved replacing the standard 15/20 psi relief valves (63176) with 45/55 psi valves (64552) from a higher pressure (400 psi) filter in the same series. This change was made necessary because the lower pressure relief valve opened before the filter element had been fully utilized.

To accurately monitor the condition of the element in the filter, we installed a pressure gauge in the line between the pump and the filters. Experience has indicated that when the pressure reaches 35 psi, the element is so loaded that it no longer operates efficiently. Generally, elements had to be replaced after one drum had been filtered; however, this number was subject to variation. Also the degree of filtration governed the frequency of element changing, a 2-micron element lasting only half as long as the 5-micron size.

Since initiating direct filtering, we have applied over 700 gallons of malathion without any blockage of the aircraft insecticide dispersal system, neither the line strainer nor the Beecomist. The aircraft operators are pleased because effective

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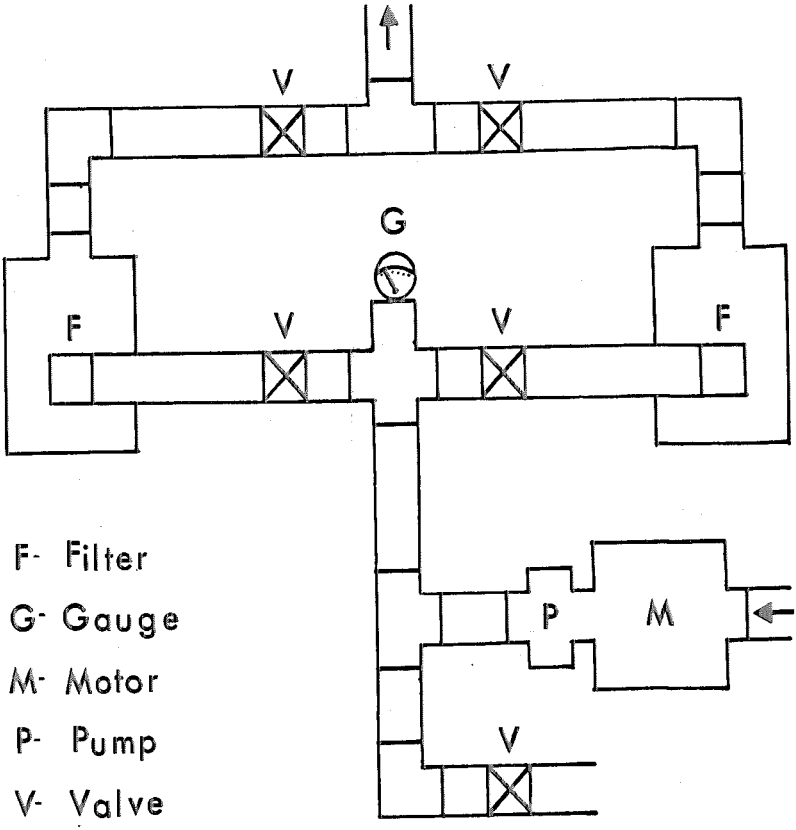


FIG. 1.—Malathion filter.

filtration has eliminated down time caused by blockage, and we of the airspray group are satisfied because it gives us the opportunity of evaluating the Beecomist, or any other system, under optimum operating conditions.

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