

Use of Expanded Polystyrene (EPS) Beads to Control Mosquito Breeding

To find a new technology for control of immature stages of mosquitoes, the expanded polystyrene (EPS) beads were evaluated in the laboratory for mosquito control (Sharma, 1994). The EPS beads are the expanded form of polystyrene granules which are produced indigenously and available commercially as hard translucent glass like beads with diameter ranging from 0.6 to 2.5 mm. The unexpanded beads contain an expanding agent. When exposed to super heated steam, they expand about 35 to 40 times of their original volume and are thus named as expanded polystyrene (EPS) beads. EPS beads are used to produce thermocol sheets for insulation, packaging of materials and ice boxes.

The EPS beads are light in weight, inert, nontoxic, non-wettable and resistant (do not interact with) to sea water, salt solutions, soap and wetting agents. Direct exposure to intense sunlight can turn them yellowish and brittle due to UV radiation. These are not acted upon by any micro-organisms, are nonbiodegradable and remain for years on the surface of water on a single application.



Application of EPS beads in unused cement tanks and wells

Being light in weight, the EPS beads when applied at the rate of 500g to 1 kg/m² in different habitats, float on the water surface in several layers. Since mosquitoes lay eggs only on the water surface, the physical barrier formed by the floating blanket of EPS beads prevents them in doing so. Further, the immature stages of mosquito trapped under the layer of the beads die of suffocation and no mosquitoes emerge from the treated habitats. The EPS beads have been extensively evaluated at the field stations of the Malaria Research Centre for control of mosquito breeding in habitats such as wells, overhead

tanks, underground tanks, sluice-valve chambers, chocked man-holes and tanks of biogas plants (Sharma *et al.*, 1985 & Chandrahas and Sharma, 1987). These studies showed that the EPS beads provided control of mosquito breeding on long-term.

For operational purposes the mosquito breeding habitats suitable for application of the EPS beads are confined and stagnant permanent/semipermanent water bodies, water collections that can not be drained off, water surfaces not subjected to wind currents (as slight breeze can drift them away exposing the water surface for mosquito oviposition), habitats not interfered by man or animals, deep quarry pits not exposed to wind, permanent underground water collections, temporary rainwater pools, cisterns and unused wells.

The raw material for EPS beads is easily available. The size of expanded beads generally suitable for application in mosquito breeding habitats is of 2 to 4



EPS beads making machine mounted on truck

mm in diameter. As the volume of expanded beads is enormous (1 kg of expanded beads equals to approximately 57–60 litres of water-volume), their transportation becomes a problem. The raw material is 35 to 50 times less voluminous than the expanded beads. To overcome the difficulty of transportation of large volumes of expanded beads, MRC designed and fabricated a machine mounted on a truck for on site expanding raw granules into EPS beads. n