

The miraculous fly as a beneficial insect

The fly is a common pest that comes in contact with humans' daily activities. In the human habitation environment, flies visit and breed in wastes of people, livestock and poultries (Fig. 1), and other decaying matters and waste materials. People detest flies as they are known to mechanically transmit disease organisms (such as *Musca domestica*).

However, developments in modern science and technology have recently transformed flies into becoming beneficial insects. Through a series of scientific research and development, there have been some remarkable achievements on the benefits of flies in terms of agriculture, livestock, forensic investigation, medicinal use, and aviation science and technology.

Benefits from flies

1. Pollination
Pollination of mango mainly depends on flies.
2. Monitoring of pesticide residues
Taking advantage of the fly's sensitivity to pesticides, scientists feed fly with fruit or vegetable juice, and monitor the deadly effect on the insect. Pesticide residues that remain in the fruit or vegetable are judged based on the effect on the fly.
3. Fodder and nutritional use
Some advanced countries have worked together to use flies in managing wastes in space stations, and to convert the body of the insects into astronaut's food. The flies' larvae have also been used recently



Fig. 1. Fly larvae breeding on pig's hair



Fig. 2. The fly's chrysalis

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as fish baits. The dry larva of fly has been found to contain more crude protein (60-66%) than other sources.

4. Crime inquisition and forensic investigation
scientists discovered that in a crime scene, the stages of insect development give an indication of the time and location of a victim's death. This, and other scientific findings and discoveries on the use of insects in crime inquisition, have led to a new field of science called forensic entomology.
5. Maggot therapy
In terms of therapy application, *Lucilia sericata* was found to have a potential wound healing treatment, especially for chronic wounds. The ancient practice of applying *L. sericata* maggots to heal recalcitrant wounds is now being investigated further.

6. Chitin source

The fly's chrysalis (Fig. 2) is a good source of chitin. A great deal of the fly's chrysalis can be extracted and purified to attain 80% chitin (Fig. 3).

7. Active antibiotic albumin

The fly's body can secrete active antibiotic albumin and active anticancer albumin. Scientists predict that in the 21st century, the fly will be a champion in the field of biological medicines, providing great profit and values for human medication.

8. The development of a gyroscope

Based on the navigational principle of the fly's sense of equilibrium, scientists researched and produced a gyroscope suitable for aircrafts flying at high speed.



Fig. 3. Skin products consisting of chitin