

1.0 INTRODUCTION AND NOMENCLATURE OF INSECTICIDES

The world population reached 7.5 billion in 2017 and is estimated to reach 9.8 billion by the year 2050. To properly feed and clothe additional people, food crop yields need to be increased and more natural fiber should be produced. It is projected that global food demand will double in the next 50 years. Agricultural experts believe that these food and fiber needs can be met by increasing the use of pesticides for the control of pests.

Pesticides are the most important chemicals used for the controlling pests. Pesticide can be define as a pesticide is any substance or mixtures of substances used for preventing, destroying, repelling, or mitigating any pest (Environmental Protection Agency). Pesticides include insecticides, herbicides, fungicides, nematicides, and rodenticides.

Insecticide

Chemicals used to kill the insect pests.

Herbicide

Chemicals used to kill the weeds.

Fungicide

Chemicals used to kill the fungus.

Nematicide

Chemicals used to kill the nematodes.

Rodenticide

Chemicals used to kill the rodents.

They are largest group of poisonous substances that are widely broadcast today. There are approximately 1200 active ingredients approved for use by the EPA from which over 20000 pesticide products are formulated and are being marketed in the United State (Simon, 2014). The use of pesticides in Pakistan was started in 1954 and is currently on the rise. In Pakistan, the purchase of pesticides was estimated at Rs. 19.612 billion during 2003 (Khooharo et al., 2008). Among the pesticides, the insecticides are the largest group of chemicals, followed by herbicides, fungicides, acaricides, and fumigants. The insecticide groups are organochlorins, organophosphates, carbamates, pyrethroids, insect growth regulators, neonicotinoids, microbial insecticides and other miscellaneous insecticides. The share of insecticides, herbicides, fungicides, acaricides and fumigants is 74%, 14%, 9%, 2%, and 1%, respectively (Khooharo et al., 2008). A large percentage of pesticides are being applied in the Punjab, followed by Sindh, Khyber Pakhtoonkhaw and Balochistan. Pesticide are mostly applied on cotton crop (70–85 %) and on other crops (15-30 %) such as sugarcane, wheat, rice, maize, tobacco, and fruits vegetables (Shahid et al., 2016).

Increased use of pesticides has threatened human and environmental health. Therefore, the selective compounds with minimum effect on natural enemies and the environment should be used (Ishaaya et al., 2005). Reducing the risks linked with insect pest management strategies by using the selective pesticides along with their resistance management to maintain their efficacy for a prolonged period is of utmost agricultural importance.

1.1 Nomenclature of Insecticide

The formal process by which insecticides are named is called insecticide nomenclature (Pedigo & Rice, 2014). Insecticides are known by three names:

1.1.1 Common names

1.1.2 Trade names

1.1.3 Chemical names

1.1.1 Common names

The common names are also based on active ingredients. A common name for the insecticide is usually adopted by the national standards body of the country where it is used, and these names sometimes vary widely; the name adopted in one country may be a proprietary name for the pesticide in another country. International standard common names for pesticides are adopted by the International Organization for Standardization (ISO) (Simon, 2014). During the process of selecting acceptable common names, a search for possible conflicts between proposed names and trademarks in the international register is carried out by the World Intellectual Property Organization, while national standards bodies that are members of ISO, carry out similar searches in the trademark registers of their own countries. A proposed common name must receive the votes of at least 75% of the ISO member bodies before it can be adopted as an international standard common name (Lowe & Stiles, 1973).

1.1.2 Trade names

The trade name is also called as the proprietary name or brand name. The trade name has a registered trademark superscript ® or TM, indicating the patent right of that name and is protected by law. More than one manufacturers may hold patent rights to one compound. The state cooperative extension service may publish either trade names or common names, usually depending on the name most frequently used for a compound. For example, the emamectin benzoate insecticide is sold under the trade name of Proclaim^(R) by Syngenta Pak. Ltd.

1.1.3 Chemical names

The chemical name provides the description of the insecticide structure and is formed by following the agreements of the International Union of Pure and Applied Chemistry (IUPAC) or those of the 9th collective index period of the Chemical Abstracts Service (Simon, 2014). For example, the IUPAC name of fipronil is 5-amino-1-[2,6-dichloro-4-(trifluoromethyl) phenyl]-4-(trifluoromethylsulfinyl)-1H-pyrazole-3carbonitri.

References

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