

# Studies on Uterotrophic Assay in Albino Mice Exposed to Actara 25 Wg

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**Abstract** – The extensive use of insecticides has been criticized in recent years due to their persistence in environment and their accumulation in the living tissues of organism. Recently published studies have indicated that pesticides toxicity may be associated with the enhance production of reactive oxygen species (ROS) which could explain the multiple types of toxic responses observed. The production of ROS is caused by a mechanism in which toxicants and pathological conditions may produce oxygen stress and induce damage to the liver, kidney and brain tissue (yu *et al.*, 2008; El-gendy *et. al.* 2010) Damage to membrane lipids, protein and DNA is considered the end biomarker of oxidative stress inducing effect of peptides (Tuzmen *et. al.* 2008). The evolution of insecticide, which started with laboratory and large scale field trails, was completed in 2007. Some researchers have earlier demonstrated the effects of Actara 25 WG on some clinical, hematological and biochemical in mice. Therefore, the aim of the study is to evaluate the effects of Actara 25WG on clinical, histological changes in albino mice.

**Keywords** – Actara, ROS, Histological, Albino Mice.

## I. INTRODUCTION

Now days more than 1400 different pesticide formulations are being used in the environment, mostly in agriculture. Insecticides have a pivotal role in our lives, not only for crop protection but also to avoid the spreading of harmful pest causing human disease such as malaria (Lopez et al., 2005). Neonicotinoids the most important new class of synthetic insecticides of past three decades, are used to control sucking insects both on plants and on companion animals (Tomizawa and Casida, 2005). Neonicotinoids act selectively on insect nicotinic acetylcholine receptors, according at least in part for selective toxicity to insect over vertebrates (Tomizawa et al., 2003; Shimomura et al. 2006).

Toxicity of insecticides used compounds against human and animals were always evaluated by assessment of such biochemical parameters alterations and histopathological changes in tissues and organ (Ghanem et al. 2006).

Pesticides are designed to kill insect pest and because their mode of action is not specific to one species, they often kill or harm organism other than pests, including humans. The world health organization estimates that there are 3 million cases of pesticides poisoning each year and up to 220,000 deaths, primarily in developing countries. Actara is a novel neonicotinoid insecticides belonging to sub class of nicotinyl compounds and it is systemic insecticide for soil and foliar applications (Tomizawa and Casida, 2005). Its mode of action was with contact stomach and systemic activity (Anikwe et al., 2009).

Albino mice, belong to kingdom: Animalia, phylum: chordate, class: Mammalia, order: Rodentia, Family: Muridac, Sub family: Murinac, genus: Mus, Species: Musculus. It is most useful in research and diagnosis of infectious diseases. Mice have been used in biomedical research since the 16<sup>th</sup> century when William Horvey used them for his studies on reproduction and blood circulation and Robert hooke used them to investigate the biological consequences of an increase in air pressure. The mouse has since been used extensively as a model or-

-ganism and associate with many biological discoveries of 20<sup>th</sup> an 21<sup>st</sup> centuries.

## II. MATERIALS AND METHODS

### *Experimental Animals*

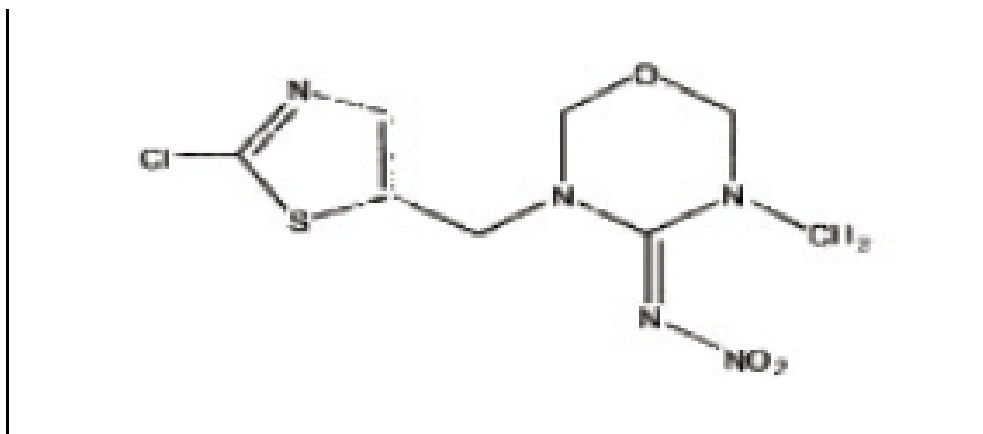
All animal experiments were conducted as per the research protocols approved by Guwahati University institutional animal Ethics committee. Female mice of 3-4 month old of 30-35 g body weight were selected and used for experiment. The animals were house in polypropylene cages and provided with standard pelleted feed. Food and water were provided ad libitum.

### *Experimental Design*

Female mice with body weight ranging from 30-35 g were selected and divided into 2 groups. They were housed on a 12 h light/dark cycle. Animal of control group were fed normal food with distilled water. The treated group received the test chemical at the dose of 2mg/kg for 14 days.

### *Test Chemicals*

Actara 25 WG is used as test chemicals. Its code number is CG A293343; design code A9584C; molecular weight is 291.7 having  $C_8H_{10}ClN_5O_3S$  as its empirical formula, while is structural formula is given below



### *Histological Analysis*

For light microscopic examination, the uteri of the dissected animals were cleared from adhering tissues and fixed in 4% formalin for 24 hrs and processed for paraffin embedding. After routine processing, dehydration in several baths of ethanol in increasing degrees, paraffin sections of each tissue were cut at a thickness of 5 $\mu$ m and stained with hematoxylin and eosin for microscopic examination.

## III. RESULT

The uterus is located within the pelvic region immediately behind and almost overlying the bladder. A typical adult uterus weight about 60 gm. The uterus has mainly three layers endometrium, myometrium and perimetrium. Endometrium is inner epithelial layer alone with its mucosa membrane.it has basal layer and functional layer. Uterus mostly consis of smooth muscle known as myometrium. The innermost layer myometrium is known as junctional zone. The outer surface of uterus consis of serous layer of visceral peritoneum known as perimetrium. The uterus is supplied by arterial blood both from uterine artery and ovarian artery. Exposure to Actara could

result in adverse effect on development of reproductive organ when compared with control animals. Striking morphological change were observed in the uterine epithelium *in utero* Actara treated animals. Stricking morphologic changes in differentiation and stratification of uterine epithelium were observed when compared with the control group. In uterus of treated group hyperplasia of myometrium epithelium (FIG: 5) enlargement of endometrium gland (FIG: 6) largement of uterine lumen (FIG: 7) (FIG: 8), disrupted epithelial lining of endometrium were significant finding of present study. Endometrial hyperplasia is a condition of excessive proliferation of cell of endometrium of uterus. It is a significant risk factors for development or even co-existence of endometrial cancer, where as hyperthophic is an increase in cell size. Hyperplasia may be due to chronic inflammatory response, hormonal dysfunctions or compenset for damage or disease (Porth, 2011).We hypothesise, therefore that in uterus exposer to pesticide with estrogenic compound might have a major impact on the uterus leading to long term deleterious effects. In summary, this results clearly indicate that Actara promote uterine disruption by striking morphology change of the uterine epithelium which influence development growth and function of uterus.

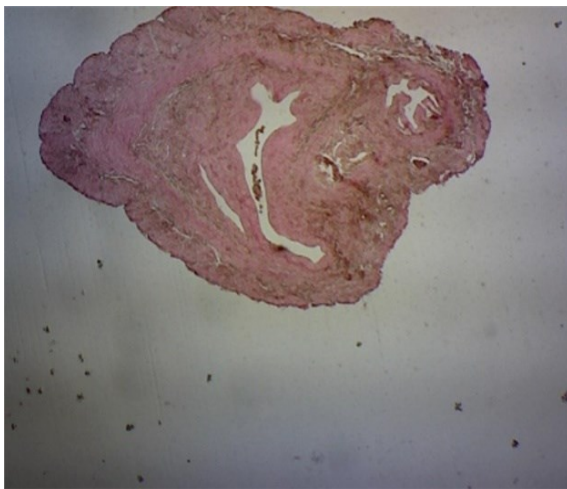


Fig. 1. Section of uterus of normal mice showing different parts of uterus (4X).

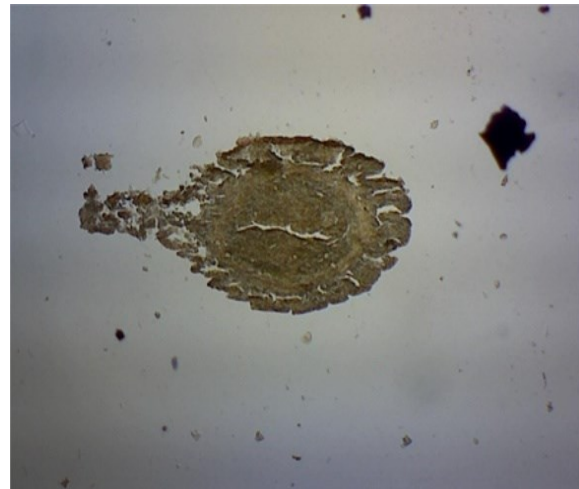
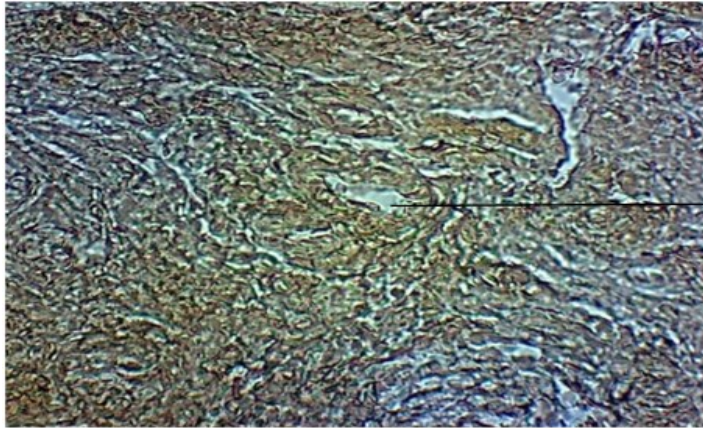


Fig. 2. Section of uterus of control mice (4X).

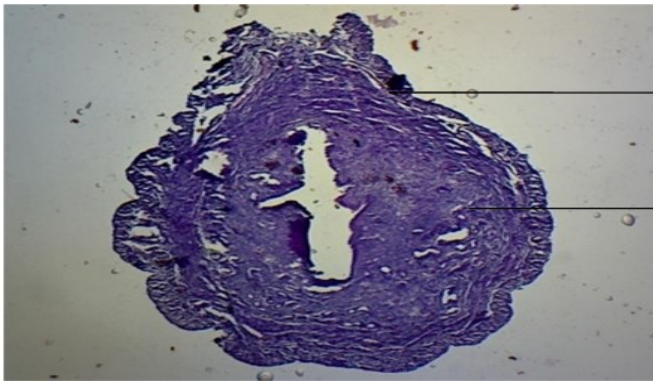


Fig. 3. Section of uterus of control mice (10X).



Uterine gland

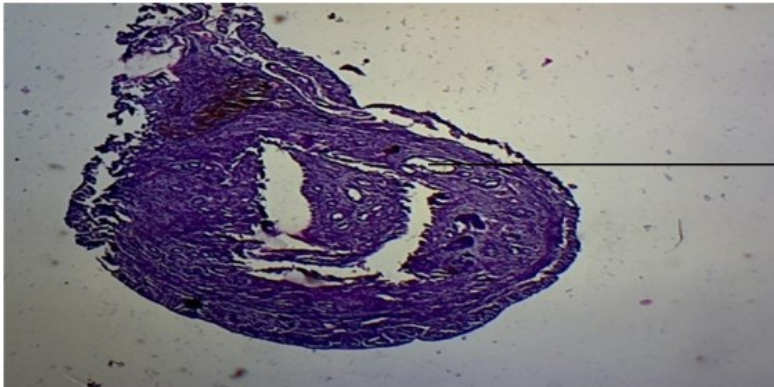
Fig. 4. Section of uterus of control mice showing uterine Gland (40X).



Hyperplasia of myometrium

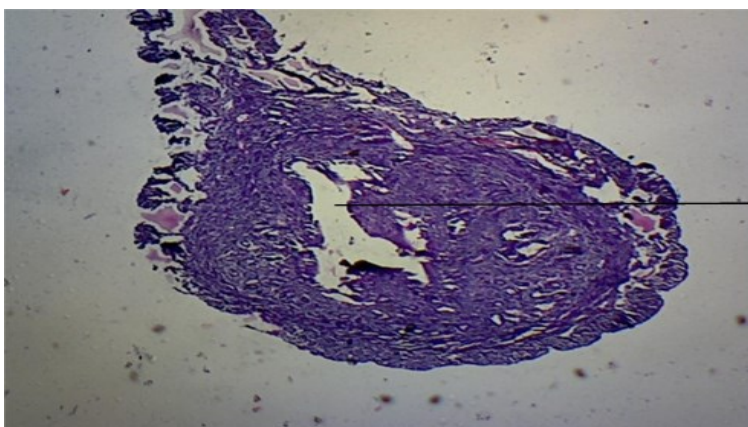
Myometrial cell enlarged

Fig. 5. Section of uterus of treated mice showing hyperplasia of Myometrium (4x).



Myometrial cell enlarged

Fig. 6. Section of uterus of treated mice showing histopathological change on myometrium (10X).



Uterine lumen enlarged

Fig. 7. Section of uterus of treated mice showing enlarged lumen (10X).

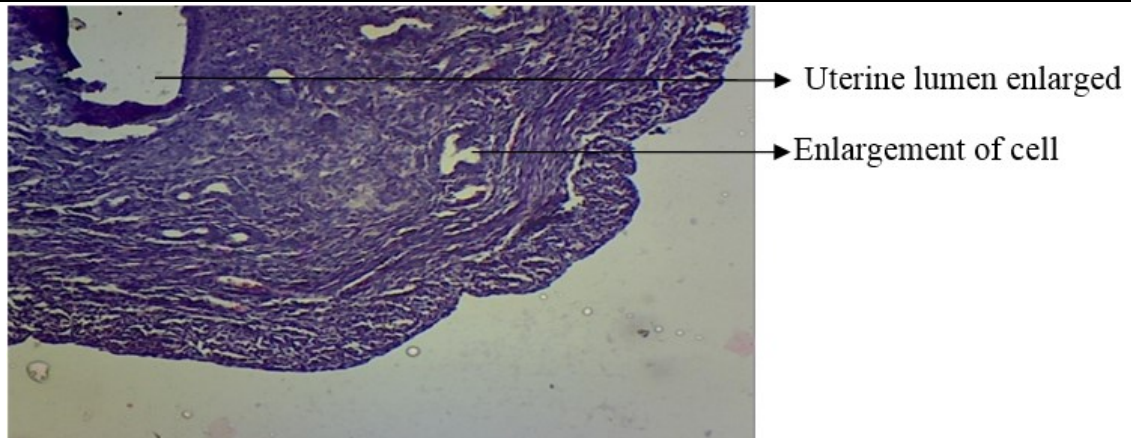


Fig. 8. Section of uterus of treated mice showing enlargement of myometrial cell (10X).

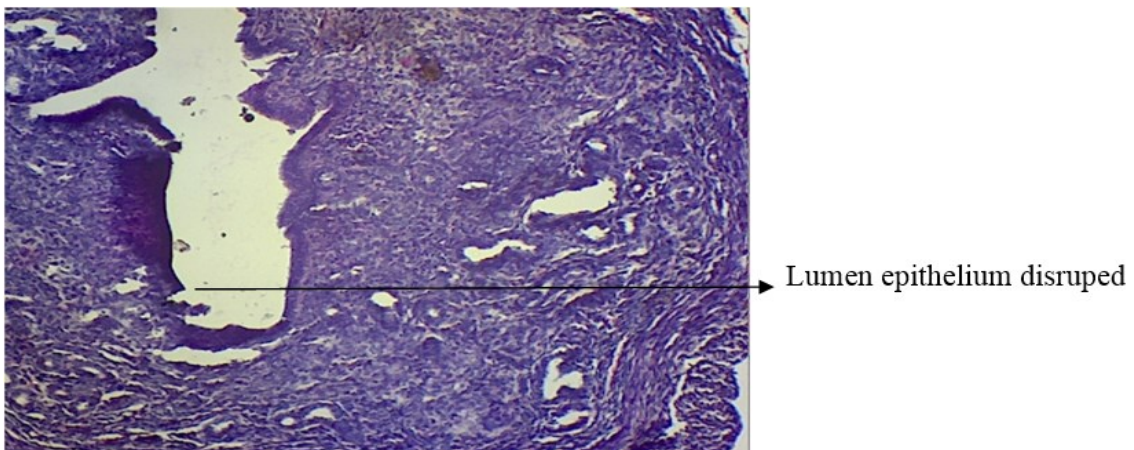


Fig. 9. Uterine section of treated mice showing lumen epithelial disrupted (10x).

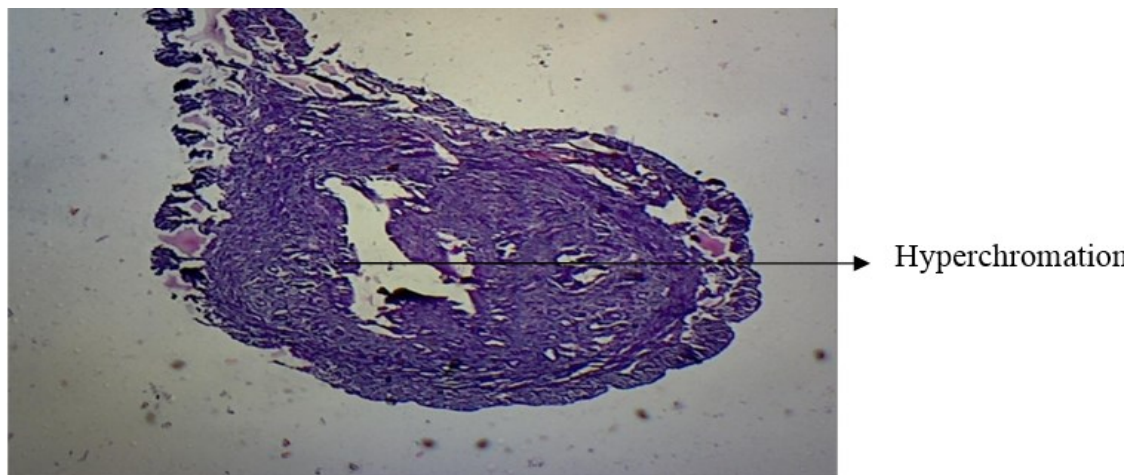


Fig. 10. Uterine section of treated mice showing hyperchromation (10x).

Public concern about potential health effect exposure to environmental chemicals with endocrine or estrogenic activity often referred to as environmental estrogen has created pressure for scientist to make prediction about the significance about of current exposure to environmental estrogen .Current methodologist for assessing human and wild life health effect in accordance with testing guideline developed by the U.S. environmental protection assency (USEPA) are generally target at detecting effects rather than mechanisms during critical development periods when the endocrine system plays a key role in regulating essential physiological and morphological process (USEPA,1994). The results of present study have confirm the uterotrophic of mice uterus which could elicit many

adverse histopathological alternation of reproductive organ. Uterotrophic assay has been used as a sensitive parameter for evaluating estrogenic activity (Branham *et al.*, 1988). Therefore pesticide of toxic they are also potentially hazardous to human, animals, other organisms and the environment. Therefore people who use pesticide or regularly come in contact with them must understand toxicity, potential health effect and preventative measures to reduce exposure to the chemicals

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