Summary
Under the light of this study, it is summarized that organo phosphate insecticide chlorpyrifos (CPF) is responsible for toxic damage of reproductive system in male rats. It has an adverse affect on the male reproductive system. Simultaneously herbal product *Emblica officinalis* (Garten) have a potential to ameliorate this toxic damage. We investigate the induction of oxidative stress in the male reproductive system of adult rats (Wister Strain) by organophosphate pesticide chlorpyrifos, and tried to establish the ameliorative property of *Emblica officinalis*. During this experiment rats were divided in to two groups, 15 days experimental group and 30 days experimental group. The two groups were divided in to six groups, here one group was conceded for control and another five groups (G1 to G5) were documented for treated group in each study period. Group G1 received 7 mg CPF/kg/d, G2 received 12 mg CPF /kg/d, G3 received 20 mg amla /kg/d, G4 received 7 mg CPF with 20 mg amla /kg/d , G5 received 12 mg CPF with 20 mg amla /kg/d through oral intubations and the control group however received 10μ of water for both 15 and 30 days study periods.

The present study indicated that the chlorpyrifos exposur alter body and organ weight, testicular sperm count, sperm morphology, sperm mortality, sperm density, histological abnormality of testis epididymis and seminal vesicle, total protein content (testis epididymis and seminal vesicle), acid phosphates enzymatic activity (testis epididymis and seminal vesicle), alkaline phosphates enzymatic activity (testis epididymis and seminal vesicle), uric acid level, testosterone concentration of serum and testis, sperm comet assay, heavy metal deposition of Cu, Pb, Cr, Cd and Ni in testis epididymis and seminal vesicle for 15 and 30 days exposure. When subject were treated with amla in conjugation with CPF, those parameters are recovered and when treated with amla alone, these parameters are more or less near to the control group. This highlights the debilitating effect of chlorpyrifops and scavenging property of *Emblica officinalis*. Summary of this work are as follows.

1. Body weight, Organ weight (testis epididymis and seminal vesicle), sperm count, sperm morphology and sperm motility has been changed due to the treatment of 7 and 12 mg chlorpyrifos /kg/d for 15 and 30 days exposure. Both the parameters decreased due to the chlorpyrifos treatment. Maximum decrease was found in 12 mg CEP exposure.

It was found that chlorpyrifos with amla recovers the body weight, organ weight (testis epididymis and seminal vesicle), sperm count, sperm morphology and
sperm motility for 15 and 30 days of experiment. In combination of both doses of CPF with 20 mg amla/kg/d normalized those parameter which are altered by the chlorpyrifos.

When amla was singly fed for 15 and 30 days, body weight, all parameters are more or less similar to the control value. During 30 days treatment body weight increases in singly amla treated group.

2. The total protein concentration, acid and alkaline phosphates activity of testis, epididymis and seminal vesicle, uric acid level and testosterone concentration in testis and serum are changed due to the 7 and 12 mg chlorpyrifos exposure for 15 and 30 days. The uric acid level and total protein concentration of testis, epididymis and seminal vesicle are increase in both CPF treated group for 15 and 30 days treatment. Amla with combination of CPF (7 and 12 mg), decreased the total protein and uric acid level than the CPF treated rats.

Pesticides exposure decreases the acid phosphates enzyme activity and testosterone level of testis and serum for 15 and 30 days exposure. When amla with both doses of pesticides were used, the acid phosphates enzyme activity (testis, seminal vesicle and epididymis) and testosterone level increases than the CPF treated group. Similarly, the alkaline phosphates activity of testis and seminal vesicle decreases due to the CPF treatment. However, alkaline phosphates enzyme activity increases in epididymis during both doses of CPF treatment for 15 and 30 days exposure. Both the parameter was recovered in CPF with combination of amla treated group.

When amla was singly fed for 15 and 30 days, except total protein level of seminal vesicle and epididymis and testosterone level, all other parameters are more or less similar to the control value during 15 and 30 days exposure.

3. Chlorpyrifos exposure increases the heavy metal (Cu, Pb, Cr, Cd and Ni) deposition and sperm comet length for 15 and 30 days of experiment. Amla with combination of CPF (both the doses) decreases the heavy metal deposition and Sperm comet length than the CPF treated group.

4. Histopathological observation of 20 mg *Emblica* /kg/d treated rats shows a normal cellular architecture in testis, epididymis and seminal vesicle for 15 days and 30 days of treatment. However 7 mg and 12 mg CPF/kg/d treated rats shows cellular abnormalities (fused inter epithelial cells, diffused stereocilia, inter tubular stroma disrupted, necrosis in seminiferous tubule, edema in interstitial tissue of testis, smaller
number of epithelial folds and degeneration of normal epithelial architecture) in testis, epididymis and seminal vesicle for 30 days of treatment. Simultaneously, 7 mg and 12 mg CPF with 20 mg Emblica /kg/d treated rats’ shows some cellular reconstruction in testis, epididymis and seminal vesicle during 30 days of exposure.

However 7 mg and 12 mg CPF /kg/d treated rats shows some cellular anomalous structure (minimized epithelial folds, vacuolization, fused stereocelia) in testis, seminal vesicle and epididymis for 15 days of exposure. Simultaneously, 7 mg and 12 mg CPF with 20 mg Emblica /kg/d treated rats’ shows some cellular architectural recovery in testis, epididymis and seminal vesicle during 15 days treatment.