OBJECTIVES AND EXECUTIVE SUMMARY UGC MAJOR RESEARCH PROJECT (XI PLAN)

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Period of report: From **13/10/12 to 31/08/14**

Project Title

"An investigation on the Endocrine activities of effluent and sludge's of Numaligarh Refinery Limited (NRL) with special reference to the reproductive health status of the population in and around the refinery,Golaghat District, Assam"

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The specific objectives of the project were :

1. Identification and assessment of different types of reproductive anomalies in occupationally exposed industry workers and the people living within the NRL campus and in the surrounding areas.

2. Bioassay test to evaluate the toxicity of these industrial substances.

3. Investigation on the *in vivo* effects of sludge and effluents on the reproductive system using laboratory mice and fish.

4. Routine haematoxylene–eosin stained section of the liver, uterus and ovary.

5. Investigation on the Protein profile of the uterus using SDS-PAGE.

6. Effects of these industrial chemicals on certain aspects of male reproduction.

Executive summary and conclusion:

During the population survey different reproductive disorders including menstrual irregularitie and abortion cases have been reported. Evaluation of the biochemical and histopathological effects of exposure to refinery biosludge and effluent in laboratory animal model (Albino mice and *Clarias batrachus*) revealed marked alteration in liver, ovary, testis cervix and uterus. Exposure to sludge and effluent influenced the ovary testis and liver weight significantly. Histological observations of the liver have shown pathological lesions leading to necrosis or dissociation of the hepatocytes, Karyorrexehis karyomegaly and Karyopycnosis. Semen analysis and histological observation of the testis reveals the possibility that there might be a potential link between the exposure of these industrial chemical and their effects on the pituitary gonadal axis to decrease the principal hormone of spermatogenesis. Disruption and alteration in the estrous cycle and the different phases of the cycle indicate adverse effects on the hypothalamo-pituitary gonadal axis which regulate the cycle. Biochemical estimation of the total testicular and uterine protein revealed marked reduction in all the experimental animals. The protein profiles studied by single dimensional SDS-PAGE of ovary of *Clarius batracus* expressed in the form of bands has been found covering a wide range of molecular weight compared with known molecular weight protein markers. There is currently much concern about the possible adverse consequences arising out from the release of many man-made chemicals into the environment and many other substances with endocrine activities. The majority of human population wildlife and domestic animals are exposed to a variety of environmental and /or occupational toxicants. Thus the findings of the present investigation is a step towards evaluating such adverse effects on a variety of reproductive aspects and may serve as baseline data for the toxic manifestations or the potential effects of the exposure of humans and other animals to these chemicals in the environment.

The findings of the present study will certainly contribute to the knowledge of health risk assessment and its interference with the activity of body's endogenous hormone using albino mice as animal model. The research findings and recommendations arising from this studies will certainly provide a foundation and helpful in evaluating environmental threats to human reproductive health, and will enable researchers to focus on substances that, which are likely to pose reproductive health hazards in human population. There is urgent need to know about issues with a potential for substantial public health ramifications; sensible voices on both sides of this debate acknowledge the need for additional research and risk assessment, clear priorities for dealing with documented risks and dissemination of verifiable information that can help individuals make informed health decisions. It will also help to identify possible health risk factors and to develop some awareness among the people living in and around the refinery. The present *in vivo* studies using Albino mice also highlighted the potential biologic activities of these industrial chemicals.