2 SCOPE OF THE PRESENT STUDY

During the past several years, industrialization and urbanization have resulted in the use of various substances, to improve life. As a result, wide array of chemicals have been released into the environment at an alarming rate. Of the various chemicals, hormonally active compounds pose a major threat as they impair the endocrine functions of the body. Nonylphenol (NP), one of the potent environmental contaminants used in the manufacture of plastics, detergents and other products, is released into environment in vast quantities. NP has received much attention because the compound has been detected in urine, breast milk, amniotic fluid, saliva, other body fluids and tissues of various populations. Experimental evidence suggests that NP adversely affects male reproductive system at doses lower than the current no observed adverse effect level (NOAEL) and this has raised much scientific concern regarding the low dose effects of NP. Recently, NP has also been reported to cause hyperinsulinemia and is considered to be a potential diabetogenic agent. However, diabetogenic effect of low doses of NP in liver is not known.

Glucose homeostasis in the body is maintained through highly integrated interactions between multiple metabolic pathways. Liver is the major organ involved in regulating glucose homeostasis in the body. Several factors have been reported to be involved in maintaining glucose homeostasis in the body. Of the various factors, reactive oxygen species are implicated to be the key regulators of insulin signaling and glucose transport in various organs. However, increased generation of reactive oxygen species could negatively influence glucose homeostasis and activate apoptotic-signaling pathways in tissues.

In the present study experiments were designed to uncover the short-term and long-term effects of low doses of NP on insulin signaling and glucose transporter in liver and to see if oxidative stress has any mediating role to play. To get more insight into the mechanism(s) involved in the hepatic effects of NP, studies on various proteins involved in apoptotic pathways could be very useful.
In order to understand the molecular mechanism of action of NP on antioxidant enzymes, docking studies could be carried out. These studies would lead to identify whether NP can directly interact with antioxidant enzymes and inhibit their functions.