INTRODUCTION

Man is continuously being exposed to innumerable biohazardous agents of the surrounding environment which can register their impacts at many different levels, viz. molecular, subcellular, cellular, tissue, organ and organism. These impacts in their turn can be registered as various biologically significant events including cytotoxic, mutagenic, carcinogenic and teratogenic manifestations. In fact, to quote McCann and Ames (1976), "We are living in a sea of chemicals that have not been tested for their ability to cause cancer or birth defects", is an all encompassing metaphor, expressed quite candidly.

The varying incidence of cancer, the killer disease from country to country and region to region suggests that environmental factors do play a considerable role in the etiology of cancer. Whether these factors in the environment moderate the effect of carcinogenic chemicals or whether they might themselves be carcinogenic is not known at the present time. What is known is that there are various chemicals, both naturally occurring and man-made, which can induce cancer in man.
No definitive data are available on the proportion of cancers in human beings which develop as a consequence of exposures to chemicals. However, it is now estimated that between 70 and 90 percent of all human cancers are environmental in origin (Weisburger, 1976). According to Dr. Higgison (1969), these environmental elements also acting as critical etiologic factors are closely related to the way or style by which one leads one's life, especially the food one takes. This is more so because it has been recognized by now that carcinogens which cause human cancer do exist in the daily life along with various other noncarcinogenic substances, since they occur in the natural environment as constituents of plants (Shimkin and Triolo, 1969).

Similarly, when we look towards birth defects that cause sufferings to the most innocent of the innocents, it appears probable that all kinds of abnormal development at birth, we come across have their causation from the environment. According to Wilson (1973), even the hereditary defects that can be traced back through several generations, presumably were initiated as mutations at some time in the past triggered by unidentifiable extrinsic factors, thereby suggesting that
most birth anomalies may be traceable to some adverse influences in the environment or other.

Various estimates as to the percent of malformations from teratologic agents have been made. This figure has been placed at 3 to 5 percent (Shepard, 1973; Wilson, 1973). Malformations related to known genetic transmission are estimated to produce 20 to 40 percent and chromosomal aberrations account for 3 to 5 percent of congenital malformations at the time of birth (Shepard et al., 1975).

Some of the environmental carcinogens as well as teratogens have already been established to be naturally occurring carcinogens or teratogens of plant origin (Green plants and Mycotoxins) and also the number of plant alkaloids with proved carcinogenic or teratogenic potential is increasing day by day. Besides this, some environmental carcinogens have been found to be teratogens as well or vice versa.

A high incidence of oral cancer has been recorded in Southeast Asian countries. Many investigators (Hirayama, 1966; Jussawala and Deshpande, 1971; Ramanathan and Lakshmi, 1976; Cooke, 1976) suggested that such high incidence of oral cancer is due to the
habit of chewing betel quid which contains betel nuts as one of its chief ingredients. Though carcinogenicity of betel nuts has not yet been completely proved, there are some contradictory reports both showing tumor induction and failure to produce any tumor in the laboratory animals by treating with betel nut extract or by giving betel nut diet (Muir and Kirk, 1960; Dunham and Herrold, 1962; Reddy and Anguli, 1967; Suri et al., 1971; Ranadive et al., 1976, 1979; Kapadia et al., 1978; Shivapurkar et al., 1978; Bhide et al., 1979; Mori et al., 1979; Umezawa et al., 1981). However, no substantial record of teratogenic action of betel nut is available so far.

Since betel chewing is not uncommon also among the pregnant women in those countries where the habit is widespread, a possible teratogenic risk is also there simultaneously with the carcinogenic risk from the betel nuts. Therefore, keeping in mind the socially and etiologically relevant need for the safety evaluation of this popularly chewed gift from the nature, an assessment study of both the carcinogenic and teratogenic potencies, suspected to be present in these nuts, by means of some detailed and systematic investigations, was undertaken as the present form of work.