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Eco-Consciousness for Poisonous and Injurious Plants Among Urban Dwellers of Bhubaneswar, Orissa

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ABSTRACT A model survey was conducted in a cosmopolitan city, to evaluate the eco-consciousness for poisonous and injurious plants grown in courtyards; yielded poor response among urban dwellers. People have the opinion that house gardens are meant for aesthetic purpose; medicinal utility, pollution abatement, use of plant parts for worship and the adverse effect caused by plants (if any) has secondary importance. The paper records 20 poisonous plants from 10 families, commonly grown in house gardens of Bhubaneswar, Orissa, unknown to the people that they are poisonous.

INTRODUCTION

Ethnotoxicology, a branch of ethnobotany (Jain, 1987) deals with various toxic plants used as fish poison, arrow poison etc. (Schultes, 1970) and these studies are mostly concerned with tribal people. But, for a common man the scope of ethnotoxicology should be considered in much broader form, as day by day the knowledge for recognition of toxic plants depletes among them. Either due to our modern educational system or lack of interest in plant identification and conservation, the consciousness for either useful or harmful plants has gone down and this is more so among the urban dwellers compared to the rural people. It may so happen that many times we come in contact with a poisonous or injurious plant, get adversely affected by it; but, we are not conscious that the problem is due to the pretty plant which we have kept in our own garden. These poisonous plants contain powerful toxic ingredients (phyto-chemicals) which if introduced into the body of any animal system, may be of relatively smaller quantity, will affect deleteriously and may be fatal at times. These toxic substances injure the basic life principle i.e. the protoplasm and the harmful effects produced, may be immediate or accumulative, the later may appear after a period of time when the poison reaches up to a specific concentration due to repeated administration.

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The poisonous plants around us are not only the flowering plants, rather some of the cryptogams like algae, fungi, mushrooms, lichens, ferns are also poisonous. The flowering plants from toxicological point of view can be divided into two main groups: (1) Plants poisonous to man and livestock, (2) Plants poisonous to insects and fishes. The first group acts toxic when taken in small quantity as food and fodder for a longer time. The second group shows insecticidal, molluscidal properties along with fish poisoning. A broad spectrum of plants is discussed widely from forensic point of view (Morton, 1977).

HUMAN INTERACTION WITH POISONOUS PLANTS

Plants are indispensable in a biosphere and probably it is not necessary to explain their importance. Surely, plant consciousness is ever considered from beneficial point of view and a wishful thinker prefers to assume that all plants are good. But, a reasonable person should be prepared to face the reality that many plants contain potent substances which can affect human and animals adversely. However, the existence of such hazardous substances in plants, is a must which contributes to their survivability, provides resistance to diseases and insects and attack by birds and other predators. Some of the plants hazards are as follows (Morton, 1978).

- Some plants release airborne pollen grains to fertilise the neighbouring plants as well

some plants require insects to transport their pollen grains for which they release chemical attractants and this produce agreeable and / or disagreeable odours, may cause respiratory irritations.

- Many plants give up chemicals (osmyls) which acts as insect repellents and usually found to be respiratory irritants.
- The stinging hairs of some plants inject irritate material on contact and more over many plants are armed with trichomes, spines and thorns which are obviously hazardous.
- Certain group of plants are characterised by the presence of latex which may be toxic externally and / or internally.
- From modern scientific point of view, another category of plants are recognised which are carcinogenic (tumor inducer indicator, initiator) or co-carcinogenic (tumor promoters). Mostly, all the plants, which displayed significant anti tumor activity in scientific screening programme, have been shown to be carcinogenic
- Most of the foods and beverages, which are formally believed to be harmless, are found to be dangerous if taken in excess, frequently or over a long period of time. These are the plants with high phenolic content.
- A few number of plants and plant parts are poisonous, taken as food after careful detoxication; but, the detoxication process is never perfect which causes health hazards.
- Many plants have toxic property throughout, while others have only in certain portions as seeds, barks or roots. Even if, certain popular fruits including apples, peaches, cherries, tropical sugar apples, the flesh or pulp are edible; but, their seed kernels are poisonous. Obviously, there is every possibility of ingestion of the poisonous plant part along with the edible substances.
- Many other factors also control the toxic property of a plant, such as the stage of growth, soil conditions, climatic conditions etc.

POISONOUS PLANTS IN OUR COURTYARDS

House gardens are considered to be important agricultural or agro forestry systems and sometimes a source of subsistence and cash resource for the house holders. The inherent interest in man for the surrounding biota makes the house garden a site for many uncommon species and varieties of plant. In a current study on the house gardens of Assam (Borthakur *et al* 1998 & 1999) the authors have thoroughly reviewed the world wide status on house garden research in their papers. They have claimed that proper attention is yet to be paid to the study of house gardens pertaining to indigenous system of biodiversity management, conservation and knowledge among the ethnic society in Indian scenario.

In this context, gardening is in vogue among city dwellers and suburbanites. The city dwellers suffer from lack of space and time for the management of the garden. Their interest in plant system is mostly focussed on ornamental point of view. Their selection of plants is irrespective of any other quality other than the beauty of the system. Moreover, plants (with xerophytic nature), which require less care, are preferred in the house gardens as the owner is incapable of affording time to take care. Obviously, under such circumstances one gets little chance to make a proper selection of the plants he wants to put in his garden from poisonous and non-poisonous point of view.

Most house owners and gardeners are not aware that some of our common, most beautiful plants contain highly poisonous substances. In this regard, a common city dweller is also poorly educated concerned to the chemical background of the plant around him and there is little effort from government or any other organisation to make people conscious about the poisonous, as well non poisonous but injurious plants around him. An effort by the Department of Health and rehabilitative Services in Florida is noteworthy (Schoonover, 1973). The present project is aimed to survey the poisonous and injurious plants nourished in the courtyards of urban dwellers of Bhubaneswar, the capital of Orissa state, either knowingly or unknowingly, by the house owner and to evaluate public eco-consciousness towards these plants (Apollo, 2001).

METHODOLOGY

The Study Area

Bhubaneswar the capital city of Orissa is popularly known as temple city of India, with a

cluster of more than 500 magnificent temples (small or big). The city occupies one remarkable place in religio-cultural scenario of the state. Once, the capital of an ancient kingdom, the city still reverberates with the echoes of the past amidst its bustling modernity. Bhubaneswar is considered as a favourite resort of Lord *Siva* where He is worshipped as "Lingaraj" or "Tribhubaneswar" (Lord of three worlds) – the title from which the city derives its name.

Bhubaneswar is located in Khurdha district of Orissa between 20°-12' N to 20°-25' N latitude and 85°-55' E longitude, enjoys a salubrious and moderately equable humid tropical climate, receives about 120 cm of rainfall during the south west monsoon. May is the hottest month with average maximum temperature 38°C. December and January are the coolest with average minimum temperature of 16°C. The maximum and minimum temperatures ever recorded are 46°C and 8.6°C respectively. During monsoon months the humidity at Bhubaneswar varied between 75% and 85% and during pre-monsoon month it is between 50% to 60%. The population of Bhubaneswar was 16,512 in 1951, at present the population believed to be more than 7 lakhs. Since Bhubaneswar is recently established (in the year 1948) with its cosmopolitan integrity, the inhabitants being from different parts of Orissa and other Indian states and mostly their profession is Govt. service or business and suitably this city is chosen as the study area.

Survey

The city is divided into 31 wards. Some of the wards are considered to be thickly populated while others are the new developing areas in the outskirts of the city. In the present study, minimum two house gardens are randomly sampled from each ward with a total of 80 study spots. Of course, house gardens with poorly developed and limited number of plants are avoided and emphasis is laid on courtyards which are enriched with vegetation. Some of the areas are exhaustive from botanical point of view such as the research and academic complexes are also avoided in this study. It is deemed that such centres are enriched with plantation for academic interest and less relevance to common man's interaction.

With due permission from the owner of the courtyards the plants existing in the premises are surveyed. It is worthy to mention here that the flora of Bhubaneswar and adjoining region were extensively studied (Choudhury and Patnaik in 1975, 1980 and 1982). Concerned to this work, emphasis is given only on poisonous and injurious plants which were available in the courtyards of the house owners. The house owner and his family members are interviewed with a questionnaire presented both in English and Oriya language. The questionnaire is divided into four phases.

Phase-I: Consciousness about plants in general.
Phase-II: Consciousness about medicinal plants.
Phase-III: Consciousness about poisonous & injurious plants.
Phase-IV: Consciousness about ecology / pollution control

The poisonous plants so recorded are analysed from taxonomic and toxicity point of view from the available literature. The eco-conscious view points are extrapolated from the questionnaires which are presented graphically. The enumerations of the plants are presented alphabetically in the succeeding pages.

RESULTS AND DISCUSSIONS

During the survey conducted in the courtyards of urban dwellers of Bhubaneswar city, the following poisonous plants are reported (Table 1).

These plants can not be claimed as deadly poisonous but their direct and indirect adverse effect can not be denied. Nevertheless, such injurious plants are also not available outside the courtyards; but, interest in such plants is not within the scope of this project. However, in a cosmopolitan city seldom one gets open space where natural bio-diversity can grow.

The term poisonous plants specify the species which cause allergies, skin irritation and contact dermatitis (Fig. 1) and few are most poisonous and fatal when taken internally. The common dwellers are not aware that some of our common, most beautiful plants (Fig. 2) contain highly poisonous substances, which are preferred from aesthetic points of view and are cultivated because they can grow in places and conditions with less effort, where other plants can not survive. Many of the ornamental plants are introduced from other countries where their poisonous properties are well known, while such literatures are not available to the host countries.

One can not be an extremist to suggest for

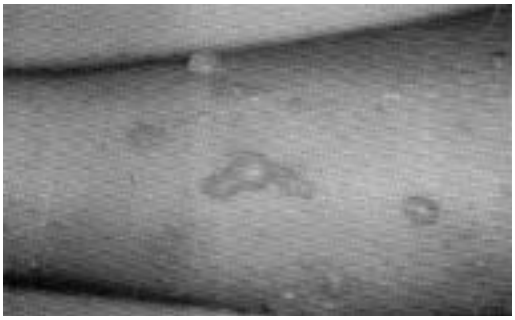

Fig. 1. Acute allergic contact dermatitis due to poison ivy - adopted from Morton, 1978.

Fig. 2(i). *Euphorbia pulcherrima*

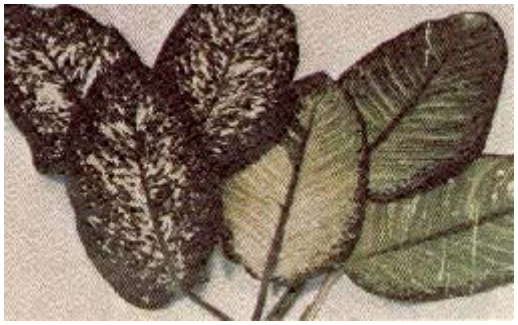

Fig. 2(ii). *Dieffenbachia maculate*

Fig. 2(iii). *Alocasia macrorrhiza*

Fig. 2(iv). *Allamanda cathartica*

Fig. 2(v). *Alocasia macrorrhiza*

Fig. 2(vi). *Nerium oleander*

Fig. 2 (i to vi) Few popular garden plants

Fig. 3. Coconut plants, in front of a house at Bhubaneswar, Orissa

Table 1: Poisonous and injurious plants identified in the courtyards of Bhubaneswar, the capital city of Orissa state.

1. *Abrus precatorius Linn.*
Family: Fabaceae ; Local Name: Kaaincha (Oriya)
A slender, high-climbing vine with feathery, licorice-flavored leaves about 4 inch long and pea like, white to pinkish flowers borne in clusters in the fall. Seed pod is produced in bunches of a few to more than 20 in early winter. Pods ripen and dry, burst open and the seeds brilliant-red, black at one end, hard. Seeds sometimes used in necklaces.
Toxicity: Seeds are exceedingly dangerous, containing the very toxic protein abrin, a delayed action poison and outward signs of illness may not occur for several hours to two or three days. Seeds if thoroughly chewed the results could be fatal, otherwise unbroken seeds if swallowed will pass through the system without harm. Abrin poison causes severe and prolonged vomiting and diarrhoea, cold perspiration, and rectal bleeding. In fatal cases, acute gastroenteritis may prevail for several days before death.
2. *Allamanda cathartica* Linn**.**
Family: Apocynaceae; Local Name: Yellow allamanda (English); Katikee, kaniaree (Oriya)
A climbing shrub with evergreen, elliptic leaves arranged in whorls of 3 or 4 spaced along the stems. Conspicuous and profuse bell shaped yellow flowers, 3 to 5 inch wide, present from spring to late fall and yellow Allamanda, one of the most popular ornamentals.
Toxicity*:* All parts of the plant are reported poisonous. The milky sap can cause dermatitis on susceptible people. The plant's sap cause mild and occasional reactions such as oral irritation and slight nausea from prolonged sucking of cut stems, rash from wiping the sap on sensitive skin. The plant has been given a bad reputation because of the drastic consequences of ingesting a quantity of the sap as a purgative.
3. *Aloe barbadensis* Mill.
Family: Liliaceae; Local Name: Ghreetakumari (Sanskrit); Gheen kuaree (Oriya)
Plants herbaceous, xerophytic with succulent leaves. Leaves enriched with gelatinous substances, spinous. Spots present on fleshy leaves.
Toxicity: Most of the plants are poisonous if eaten. Care should be taken that bulbs are never left where children have access to them. The rootstock of this family contains a strong purgative agent and some people may develop a skin rash from handling the roots or other parts of the plant.
4. *Alocasia macrorrhiza* (Linn.) Schott
Family: Araceae; Local Name: Giant Elephants Ear (English); Maana Saaru (Oriya)
Plants with more rounded leaf blades pointing upward and often blotched with white, common in house gardens but nevertheless a source of injury.
Toxicity: The sap and the rhizome are very acrid, enriched with raphides (Ca-oxalate crystals) along with unknown toxic ingredient. Causes itching rash from contact with the watery juice.
5. *Anacardium occidentale* Linn.
Family: Anacardiaceae; Local Name: Cashew nut (English); Kaaju/Lankaamba (Oriya)
Bushy, spreading trees to 35 or 40 ft. in height and width, with ever green, leathery leaves upto 8 inch long, small fragrant, yellow-pink flowers in loose terminal sprays. The conspicuous false fruit or 'Cashew apple' pear-shaped fleshy thalamus bearing true fruits (nuts) at tips.
Toxicity: The fruit contains phenolic compounds cardol, anacardic acid and an ether soluble substances to which cantharidin - like effects of oil are attributed. The juice from pericarp and trunk is very caustic and produce blisters. The nuts within which is the kernel must be roasted to get rid of poisonous substances. The fumes arising during roasting are very irritating. Plant decoction: markedly reduce diabetes and hypoglycaemic, essential oil inhibit spontaneous motor activity, potentiated pentobarbitone induced hypnosis in rats and dose related analgesic effect, tannin from bark in low dose intra venous administration or high dose oral administration acts anti-inflammatory; fruits inhibit tyrosinage activity; cardol pronounced antifilarial; anacardic acid, cardol and methyl cardol exhibit cytotoxic against carcinoma cells.
6. *Capsicum fruitescence* Linn.
Family: Solanaceae; Local Name: Chilli pepper (English); Kaashmiree maricha (Oriya)
Herbs, perennial shrub like upto 5 feet; leaves upto 4 inches long. Flowers, yellowish green 3/8 inch wide. Fruits variable in form and size ranges from round or ovate to oblong and pointed yellow, orange or red, they may turn from green to purple, then yellow and finally red when ripe; seeds many, small and flat, flavour highly pungent.
Toxicity: The active principle is capsaicin which is a gastric and skin irritant.
7. *Cestrum nocturnum* Linn.
Family: Solanaceae; Local Name: Henna (Oriya)
Sprawling shrubs grow upto twelve feet tall with glossy, ever green leaves approximately eight inches across. Greenish white flowers, tubular. Fruits in from of small white berries.
Toxicity: The far reaching fragrance of flowers can cause severe headache, nausea, depression, difficulty in breathing, dizziness, uneasiness and respiratory irritation to sensitive person. The fruit is said to be poisonous.
8. *Datura stramonium* Linn.
Family: Solanaceae; Local Name: Thorn apple (Eng.), Dudura (Oriya)
Large annual weeds growing upto 5 feet tall with wide spread branches and smooth light green leaves upto 8 inches long. The erect, short stalked funnel shaped flowers flare out into five pointed stars. Fruits dry, hard capsules covered with hard prickles. The plant grows wild on road sides. Flowers have religious importance for *Siva Puja.*
Toxicity: All parts of the plant particularly seeds are poisonous. Children have been poisoned by eating the fruit or

Table 1: Contd...

sucking the flowers.

9. *Diffenbachia seguine* Schutt & Schutt
Family: Araceae; Local Name: Dumbcane (Eng.)
Shrubs with green fleshy stems, grows upto 4 feet tall. Leaves on stalks upto 6 inches long are variously moulted, spotted or streaked with white flowers - inconspicuous. Mostly a house plant and may be planted outdoors.
Toxicity: Leaves and stems contain poison which may cause intense irritation of mouth and throat with salivation, swelling of throat and temporary loss of speech. If swallowed intense inflammation of stomach and intestines may occur.

10. *Euphorbia pulcherrima* Willd.
Family: Euphorbiacaeae, Local Name: Poinsettia (English) - Christmas Plant (Oriya)
Shrubs grow upto 10 feet tall. Leaves lanceolate, alternating on nodes. Coloured leaves (bracts) form the showy part of the plant. Flowers in cyathium, small greenish with yellow glands.
Toxicity: The milky sap can cause dermatitis and blisters on sensitive skin. Taken internally the poison can cause inflammation of the lining of the stomach and intestines. Children have been killed by eating stems or leaves of this plant.

11. *Euphorbia tirucalli* Linn.
Family: Euphorbiaceae, Local Name: Pencil Tree (English); Khaadi Siju (Oriya)
Shrubs which grow upto 20 feet high with milky sap. Small green leaves, inconspicuous at the end of branches and usually fall off as new branches are formed. Flowers in small clusters. Sap flows freely from cut plant.
Toxicity: The milky sap and all parts of the plant are toxic. The milky sap is very irritating to the skin and eyes. It is poisonous if taken internally.

12. *Jatropha curcas* Linn.
Family: Euopherbiaceae, Local Name: Barbados nut (English); Dhoba lankaakaala (Oriya)
Small trees grows upto 15 feet high. Leaves on smooth stems upto six inches across with three to five lobes. Tiny yellow flowers produce yellow fruits which contain three seeds.
Toxicity: The seeds are poisonous, evident form cases of poisoning have occurred. Seeds are highly carcinogenic. Yellow sap of the tree can cause skin and eye inflammation and toxic internally.

13. *Jatropha gossypifolia* Linn.
Family: Euphorbiaceae; Local Name: Bellyache bush (English); Lankaakaala/ Baaigaba (Oriya)
This shrub grows to 4 feet tall. Leaves dark purple when young and three lobed, petioles long and with glandular hairs. Flowers dioecious red, producing fruit about one-half inch long which contains three seeds.
Toxicity: The seeds are poisonous and violent vomiting and purging (or diarrhoea) may begin from few minutes to several hours after seeds are eaten.

14. *Lantana camara* Linn.
Family: Verbenaceae; Local Name: Lantana (English); Bhutiaari kantaa (Oriya)
Herb like shrubs, grows upto 5 feet tall. Stems green to brown and squared and at times armed with weak spines. Leaves serrately toothed, usually opposite and three inches long. Flowers white, yellow or pink changing to orange or scarlet. Fruit turns from green to dark blue.
Toxicity: The raw berries and leaves contain poison which causes pupils of the eyes to pin point. It ensures diarrhoea, vomiting, extreme muscular weakness and comma may follow.

15. *Melia azederach* Linn.
Family: Meliaceae; Local Name: Chinaberry (English); Mahaalimba (Oriya)
A spreading symmetrical tree with a dense crown, which grows upto 40 feet tall. It losses its leaves in cooler months. Leaves pinnate. Young leaves are toothed. Purplish flowers fragrant and produce yellow fruit with one seed.
Toxicity: All fruit, bark and flowers are poisonous especially the fruit pulp. The poison attacks the central nervous system (CNS) and causes death by paralysis. Patients may become unconscious, pale, cold and clammy and have symptoms of suffocation. Oil causes abortion; fruit extract stimulates CNS; causes convulsion; increases motor activity; contracts intestinal smooth muscles; Leaf extract induces hypnosis, CNS depression; Cytotoxic to tumor cell.

16. *Nerium oleander* Linn.
Family: Apocynaceae; Local Name: Oleander (Eng.), Karibara (Sanskrit); Karabira (Oriya)
Shrubs grows upto 20 feet tall with heavy, green stems. Leaves are stiff and pointed in whorls of three and upto eight inches long. Single or double flowers may be red, white, yellow or pink. The blossoms of three inches across.
Toxicity: All parts are poisonous. People have been poisoned by using branches to skewer meat or stir food. Symptoms are nausea, vomiting, colic or dizziness, drowsiness and deceased pulse rate. The poison may cause respiratory paralysis and death. Contact with plants can cause dermatitis. The smoke of burning oleander is also poisonous.

17. *Pedilanthus tithymaloides* Linn.
Family: Euphorbicaceae Local Name: Slipper flower (English); Ladakaa (Oriya)
Shrubs with smooth green fleshy stems which grow upto six feet tall with milky sap. Leaves upto four inches long, pointed at outer ends and alternate on stem. Red flowers clustered at the end of branches look like little red birds. Plants produce fruit with seeds.
Toxicity: All parts are poisonous. The sap can cause severe dermatitis and eating seeds can cause violent vomiting.

18. (*Rhos toxicodendon) Toxicodendron radicans* (L.), Kuntze.
Family: Anacardiaceae; Local Name: Poison Ivy (English)
Plants of vine or low bush with toothed leaves in groups of three. Flowers are small, greenish-white. White fruits waxy and round, growing in clusters. A good motto, “Leaves three, leave it be.”. One should also be wary of any plant or vine having

Table 1: Contd...

white berries.
Toxicity: A poisonous substance is found in all portions of the plant, especially the sap. It causes an itching or burning sensation which may occur in a few hours or upto five days after touching the vine. Severe exposure may produce abscesses, enlarged glands and fever.

19. *Ricinus communis* Linn.
Family: Euphorbiaceae Local Name: Castor bean (English); Gaba/Jadaa (Oriya)
This annual herb grows upto 10 feet tall. Large, star shaped leaves 4 to 24 inches across and fine-toothed along the edges. Small seeds mottled, others black.
Toxicity: Eating the seeds may cause vomiting, diarrhoea, abdominal pain, drowsiness, blue appearance of skin and unconsciousness. Death may occur. Ingestion of one seed has been reported to cause fatal poisoning when thoroughly chewed. Increase in volume of bile due to cholretic and anticholestatic activities; Induces increased intraluminal release of acid phosphatase in intestinal parts.

20. *Cascabela thevetia* (Linn) Lipp. (=*Thevetia peruviana*)
Family: Apocynaceae Local Name: Yellow oleander (English); Kaniaaree/Sunaapaani (Oriya)
Small trees with short trunk and dense crown. Leaves dark green, glossy upto one half inch wide and six inch long. Pink yellow tubular flowers grow upto three inches long. Green, fleshy fruit turns yellow when ripe and then black, seeds brown.
Toxicity: All parts of the plant contains two deadly heart poison. Contact with any part of the plant can cause severe dermatitis to some people. If eaten, it may cause vomiting, cold clammy skin, feable pulse, convulsions and possible death. Cardioactive peuvoside evoke vomiting, i.e. emesis that leads to heart failure; Shows positive inotropic effect on hypodynamic myocardium followed by cardiac arrest.

the destruction of all plants identified in the present project as injurious and poisonous. Moreover, the survey says that people are not ready for this. The principal hazard is not so much in the plants, but in people unfamiliarity with them which is a prevailing feature in the present context. Mostly, the children are the victims to plant hazards as they are unable to distinguish between dangerous and harmless ones and play with them. Usually, who knowingly sets out poisonous plants around his surrounding is expected to be aware of their hazards, is not a fact in the present study. People are tempted to purchase beautiful plants and put in their garden without knowing what type of plants they use.

The Cactus plants poisonous or not, are certainly significant for the possession of spines, as an ecological modification in xerophytic habitat. The Bhubaneswar people are the lovers of cactus plants because of the introduction of various varieties by Regional Plant Resource Centre (RPRC), which maintains and markets about 1050 varieties. In this context, Cactus plants being very common in every house garden, we have avoided to reflect those in this project. Moreover, different zygantic Cactus grows outside in the natural habitats are best used for green fencing in the outskirts of the city.

Bhubaneswar comes under the coastal area of Bay of Bengal has better climatic condition for the growth of the coconut plants. The coconut research centre is just 40 kms away from the city at Sakhigopal (Puri). The coconut plant being economically very viable and suitable from climatic point of view, is widely planted in the courtyards. A single well grown plant almost supplies one coconut per day if taken care properly. Bhubaneswar, being the temple city of India, and the inhabitants being mostly religious, the attraction for having a coconut plant in the courtyard to have a fruit for worship cannot be avoided (Fig. 3).

We do not claim that the coconut plant is poisonous but it cannot be denied that it is not injurious. The huge leaves weighing about 25 kgs (approx) and the individual fruit, green or dry about 7 kgs. can fall down after the senescence or ripening respectively and there is no specific time for their shedding down. In a courtyard it is not possible for some one to be conscious about the falling of the leaves or fruits from the plant and the trespassers gets hurt. Very often such news are flashed in daily news papers. Interestingly, during our questionnaire survey when people are made conscious about it they laughed and were not ready to accept any injury from the coconut plant, even if the apprehensions are more. Coincidently, a recent view on human faith and interaction with nature by Columnist Karmayogi in this regard is interesting (Box-1), based on ethical conservation of Bio-diversity (Dash and Padhy, 1998; Padhy et al., 1998 and Padhy, 1999) and one step ahead to realise the non-violence reaction of plants.

He who runs through his work, living in

BOX-1
Coconut Never Falls on a Man
By Karmayogi, 2003

…… Harvested coconuts fall from the crown of the trees. The probability of men being hit by those nuts is great. It is the experience in coconut gardens that nuts do not fall on the men who tend the trees. Not even the heavy leaves of the trees hurt men living there. It is a rule of life. Objects are alive. They receive the attention of the men who water the fields, use the tools, clean the weeds, etc. Material objects are grateful to the attention they receive and take care NOT to hurt the men… ..… Material objects do not hurt us if we do not hurt them….

harmony with his environment will not suffer from it. The environment offends, when man disturbs its equilibrium Similarly, *Magnifera indica* (Mango) is widely planted in the courtyards. Probably no Hindu puja or ritual can be expected without the leaves or twigs of *Magnifera indica*. The plant has lot of medicinal value in addition to its aesthetic beauty, food value, and ecological importance in cooling the surroundings. The leaves and twigs are used as toothbrush with a religious belief along with medicinal value. However, the saps from the fruits are toxic and can cause blisters on the lips. Such victims due to sap injury of *Magnifera*, especially children are obviously found during the fruiting season also in conformity with literature. (Morton, 1978).

PUBLIC REACTIONS TO THE QUESTIONNAIRE

As reflected in the methodology section, the owners of the courtyard as well as other public people those who have cooperated were interviewed with a questionnaire. The questionnaire is aimed to evaluate the overall consciousness of the urban dwellers towards the plants in general with special emphasis on medicinal plants, poisonous and injurious plants as well public eco-consciousness of pollution.

In the phase-I study when the subjects are asked "why you have a garden?", the prompt answer was for aesthetic value (Fig. 4). Most of the people have admitted that they have purchased

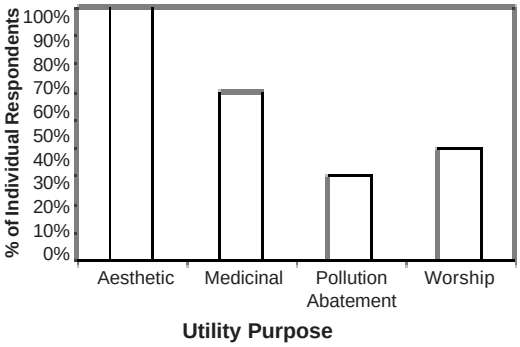

Fig. 4. Views expressed by the inhabitants of Bhubaneswar, Orissa for the utility purpose of a garden in the courtyard

the plants from the market (Horticultural garden of Govt. of Orissa) or have availed through friendly exchanges. The later activity has social significance to develop friendship through plants. More than ninety percent of the house owners personally take care of their plants and seldom there are '*Maali*' (garden care takers) are appointed unless otherwise it is a government post amenable for ministers and executives.

Almost every one is conscious regarding the medicinal value of plants (phase-II) but reluctant to use the raw plants as medicine. This is due to either ignorance or lack of self confidence. In some cases people have expressed that they purchase cough syrup from the market which is a mixture of the juice of *Ocimum sanctum* (*Tulasi*) and honey. This shows to what extent our indigenous knowledge on medicines have depleted. Moreover, in a fast moving world people prefer to use the allopathic medicines or readymade Ayurvedic formulations which are expected to be sure shot in curing diseases in spite of their side effects. They feel it as foolishness to struggle with the indigenous Ayurvedic combination at the juncture of suffering and quick relief, as explained by one of the subjects.

The phase III of the questionnaire is focussed on consciousness of poisonous plants and surprisingly the response of people is almost blank in this regard. Most of the subjects expressed their inability regarding the consciousness of poisonous plants growing in their own courtyard. They are not ready to accept the fact also, even if made conscious, irrespective of their educational status. The beauty of the plants have influenced so much that in spite of

their negative significance they were used for indoor decoration in pots. None of the subjects have expressed their intension to throw out the poisonous plants from the garden even after they are made conscious about them. Very few subjects could identify species like *Euphorbia tirucalli*, *Alocasia macrorrhiza*, *Thevetia peruviana* and to some extent *Datura stramonium* as poisonous.

The last phase of the questionnaire was aimed to survey the pollution and eco-consciousness of public (Fig. 5). Unequivocally, every one agreed that plants play a major role for control of pollution and most of them have attributed to the exchange of gases and release of oxygen by plants. People are aware that Government as well as non-Government organisations work for pollution control and creating eco-friendly atmosphere. Mostly, a good percentage have recognised the existence of the Pollution Control Board in the state. It has been emphasized that every individual has a responsibility towards the abatement of pollution. Many subjects are not happy with the stature of plantation programmes spread up throughout the state, which yields little and more a show with political interactions for publicity. Plantation requires whole heartedness, love for biota and mostly after care is essential, as expressed.

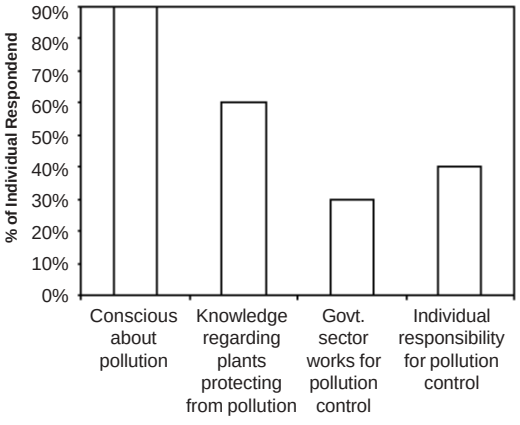

Fig. 5. Pollution consciousness among the inhabitants of Bhubneswar, Orissa.

Out of the work carried out in this project some significant cautions are realised which are focussed herewith.

- The poisonous and hazardous property of plants should be focussed through media for more public consciousness.
- Children should be trained properly to deal with the plants in the surrounding.
- As plants are bought from the local market, the seller and buyer should have the minimum chemical knowledge of the plants and interact accordingly.
- For unknown allergies and skin irritations, or for any symptom for plant poison, there should be knowledge for first aid measures, followed by the victim to consult a physician.
- As far as practicable, poisonous plants should be avoided for indoor decoration.
- On transferring the ownership of the house through Govt. allotment or by purchasing or selling, the predecessors and the successors should make conscious of each other regarding the plants in the surroundings.

The whole work is a model survey in a cosmopolitan city which has significance for implementation in other crowded locality and was an attempt to make public consciousness about poisonous plants through media by the authors (Watch Out, plants can hurt too – *The New Indian Express*, 26 June 2001).

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