INTRODUCTION
India holds a unique position by growing a number of fruits because of its diversified climatic conditions; fruits of different kinds are available throughout the year. The fruits are important source of vitamins, minerals, fibre, carbohydrate, etc. India with its current production of around 32 million MT of fruit, accounts for about 8 per cent and citrus fruits constitute around 20 per cent of world's total fruit production during 2008. The diverse agro-climatic zones the country makes it possible to grow almost all varieties of fresh fruits and vegetables in India (Post harvest India, 2008). India produces about 11mn tonnes of processed fruits and vegetables, fruit juices, pulp and concentrates (FICCI, 2006). There has been considerable increase in the consumption of fruit juice beverages in the world during the last few years. Fruit juice beverages are considered more as occasional drink in our country. Bottled squashes, nectar and other form of fruit based beverages are looked upon as an expensive indulgence.

Wood Apple is also known as Elephant Apple, Monkey fruit, Curd fruit, Kath Bel and other dialectal names in India. Wood Apple (*Feronia limonia* swingle (syns. *Feronia. elephantam correa; Limonia acidissima* L.; *Schinus limonia* L.) is a hardy fruit tree grown throughout the country for its edible sweet pulp. Wood Apple belongs to the family Rutaceae. It is a tropical deciduous species, native to India and Sri Lanka. It is commonly found in rural areas as a homestead tree. The name *Ferronia* is very ancient and has been derived after Roman God *Fero*.

There are two varieties of Wood Apple fruit, one with large sweetish fruit, one with small acid fruits. Wood Apple (*Feronia limonia* L.) is one of the fruits of this category and is available in abundance in winter and early summers all over India. In India, the fruit ripens from early October through March.

Wood Apple is a fruit crop of considerable importance in India. All parts of Wood Apple tree are useful. Wood Apple erect and slow growing tree bearing fruit is round to oval, 5-12.5 cm wide, with a hard, woody, grayish- white, scurfy rind about 0.5 cm thick. The pulp is brown, mealy, odorous, resinous, astringent, acid or
sweetish, with numerous small, white seeds scattered through it (Morton, 1987). It has several medicinal properties. It is antiscorbutic (prevent scurvy), a disease caused by lack of vitamin C (ascorbic acid). It is antidote for poison and also helps in curing sore throat (Rao, 2004).

The fruit has hard shell, sticky texture and numerous seeds, which makes it difficult to eat by hand. The scooped out pulp, though sticky, is eaten raw with or without sugar. It is blended with coconut milk and palm sugar syrup and used as a beverage, or frozen as an ice cream. It is also used in chutneys and for making jelly and jam. It plays important role in treatment of diarrhea and dysentery. The fruit are very rich in iron, protein and minerals, especially calcium and phosphorus (Rao et al., 1989). The flesh is refreshing and, aromatic and tastes sour-sweet. The excellent flavor, nutritive value and medicinal characteristics of fruit indicate its good potentiality for processing into valuable products. The pulp is edible and is frequently used in the Indian cookery. The pulp contains 3-5% pectin and forms an excellent material for jelly with agreeable flavor and consistency.

Srivastava and Vatsya (1986) investigated that the Wood Apple beverage produces cooling effect in the same way as Bael. However, Extraction of pulp is the major bottleneck in making of beverage from Wood Apple and that is mainly due to its compact, fibrous and mucilaginous flesh which also contains numerous seeds.

Wood Apple (Elephant apple) is used like Bael for therapeutic and nutritional point of view. The ripe fruit is employed in gum and throat infection. The leaves have an odor like anise and are carminative. Externally applied the pulp and dried rind are employed for the bites of poisonous insects. Thus, value added product if taken up in large scale manufacturing would also open new routes for utilization of this uncultivated and neglected fruit, Wood Apple.

Fruit bar (leather) is a dried-fruit treat, chewy, flavorful, nutritious and delicious confectionary product produced from pulpy fruits such as Mango, Banana, Papaya and guava etc. When water is removed from fruit pulp by drying, addition of sugar, acids, fiber and many vitamins and minerals become concentrated in the remaining solid part of the fruit thus bar/leather is obtained. Fruit bar or slab or leather is the term used for the products prepared by dehydration of fruit pulp with or without
acid and sugar. This makes dried fruits high in sugar and other nutrients too. Dried fruits provide a nutritious way to satisfy a sweet tooth. Fruit bars offer tremendous advantage owing to simplicity and lower inherent cost in production with better consumer appeal.

Preparation of fruit leather from a variety of fruits such as Chiku, Jackfruit and apple has been reported by Cheman and Taufir, (1995); Summers, (1994). Variety of Mango and consistency of the puree had an effect on the quality of bar and pulpy varieties were better suited for its preparation (Nanjundaswamy et al., 1976).

Mango is utilized in the production of a wide range of preserved products. Dried Mango pulp or Mango sheet /leather, popularly called “AMPAPAR”, “TANDRA”.

Fruit beverages are becoming increasingly popular in comparison to the synthetic drinks because of their taste, flavour and nutritive value. Beverages are an integral part of human diet. The cycle starts with the infant formulas—highly complex drink, rich in many key nutrients. As human ages and their nutritional requirements changes, product designer keeps pace by developing new and innovative beverages to meet these needs. In India, traditional cuisine includes drinks, which were developed primarily to provide aesthetic appeal, though they also contain certain components having nutritional and therapeutic values. In the course of time these traditional health drinks vanished and for a long period the Indian beverage industry was dominated by aerated synthetic drinks. However, the situation has changed dramatically, the aerated soft drinks, which had registered a whopping 20 per cent growth during late 90’s, could manage its present share in market against possible slide. In contrary to this last few years have witnessed a significant development in fruit based beverages. Newly introduced fruit beverages fall into the category of functional foods or nutraceuticals. Energy drinks, isotonic (sport) beverages, herbal and green teas, fortified water, caffeinated drinks and recreational soft drinks are some of the functional beverages, which have gained popularity in recent years.

Fruit juices are excellent sources of carbohydrate, vitamins and minerals but they lack in certain nutrients like proteins and quality fats. Hence, they are not considered as nutritionally rich and have to compete with others as thirst quencher in
the market. Growing health consciousness among the consumer, availability of new
flavours and blends, innovation into packaging and other technological developments
are expected to push up the per capita consumption of fruit based beverages (Epeson
and Bhowmik, 1992).

The blending of fruit drinks could be an economic requisite to utilize
profitably some fruit varieties for processing. It is reported that blending of fruit juices
help in improving nutrients in the blends and lead to new product development (Kalra
et al., 1981). Efforts have been made to prepare blended products from Mango and
Pineapple (Begum et al., 1983), Mango and Papaya (Kalra et al., 1991), Guava and
Papaya (Tiwari, 2000) and some other fruits.

Various workers (Tripathi et al., 1992, Attri et al., 1998) have reported that
two or more fruit juice/pulp may be blended in various proportions for the preparation
of more palatable and nutritious nectar, RTS beverages, etc. Moreover, there is always
a demand from the consumer all over the world for new products, which should be
nutritious and delicately flavoured. The objective of blending may include increase in
acceptability of product by providing good taste and flavour and up gradation of
nutritional quality. A number of fruits like Aonla pulp, Watermelon, Guava, Pear,
etc., that are otherwise little utilized for preparation of beverages, after mixing with
other fruit in appropriate proportions provide acceptable drinks. Blending of different
fruit pulp/ juice is an important device to increase the palatability or improve the
quality of the product.

Wood Apple pulp was also used for the preparation of powder. It is the
dehydrated product and had very long shelf life without any appreciable change. With
the addition of Ginger and Aonla powder, the nutritive value also increased.

The scope of the present investigation is to develop new types of fruit bars
fortified with other pulp (Mango pulp, Papaya pulp and Ginger pulp). The
fortification of pulp improves the sensory quality of the product and also the
nutritional quality.
Keeping in the view the above, the present investigation entitled “Oleoresin Extraction and Product Development from Wood Apple (Feronia limonia Swingle)” was undertaken with the following objectives.

1. Extraction of pulp from Wood Apple fruit.
2. Extraction of oleoresin.
3. Preparation of fruit juice from extracted pulp (with the help of Enzyme also).
4. Preparation of fruit bar with combination of other fruits (Mango, Papaya and Ginger).
5. Development of fruit nectar
6. Development of blended beverage (cocktail) by mixing of Wood Apple pulp with Mango pulp, Ginger pulp and flavour (cola and orange flavour)
8. Preparation of powder with Ginger and Aonla powder.
9. Storage study of the product or 90 days at room temperature.
10. Analysis of proximate composition, minerals, vitamins etc. at 0, 15, 30, 45, 60, 75 and 90 days.
11. Microbiological study for Total plate count, Yeast and Mold count.
12. Sensory analysis and overall acceptability of the products developed.
13. Their quality, sensory, textural and microbial analysis.