Introduction
Arachis hypogaea L. is one of the important oil producing food legumes in India. India is leading in groundnut production and cultivation (8.4 million hectares). It is cultivated all around the world in tropical, sub-tropical and warm temperate climates. In terms of production, India and China are leading countries. The average yields are increased from 0.93 million tonnes per hectare in the 1970s, to 1.15 million tonnes per hectare in the 1990s (Carley and Fletcher, 1995). In India, it is mainly grown in the states of Andhra Pradesh, Gujarat, Tamilnadu, Maharashtra and Karnataka.

Andhra Pradesh, occupies the first place in area of about 18.8 lakh hectares, and production of about 12 lakh tonnes. The major groundnut growing districts are Anantapur, Chittoor, Kurnool, Cuddapah (together called Rayalaseema region), Mahaboobnagar, Nalgonda (in the Telangana region), Srikakulam, Visakhapatnam and Vijayanagaram (in coastal Andhra Pradesh) (Reddy, 1998). Thus, about 60% of the area and 72% of the production of groundnut are in Rayalaseema region.

GROUNDNUT - ANANTAPUR

Although Anantapur is a drought area it stands first in the cultivation and production of groundnut per acre. Low rainfall, meagre availability of surface water, absence of perennial rivers and very high wind velocity contribute to the vast stretches of barren and rocky areas or degraded soils. The average rainfall of Anantapur district is 521mm, the lowest among all districts, and play a vital role in the districts economy. It is grown in about 8.0 lakh hectares in Anantapur district out of the 18.8 lakh hectares grown through out the state.
Groundnut is essentially a tropical plant and it requires long and warm growing season. Groundnut grown both under rainfed and irrigated condition.

**PHYTOHORMONES**

Multicellular plants are complex organisms and their orderly development requires an extraordinary measure of coordination between cells. In order to coordinate their activities cells must be able to communicate with each other, often at some distance. The principal means of intercellular communication are the hormones, chemical messengers that carry information between cells and thus coordinate their growth and development. Plant hormones have been the subject of intensive investigation and frequent controversy since their discovery three-quarters of a century ago (Davies *et al.*, 1995).

According to current usage, hormones are naturally occurring, organic substances that, at low concentration, exert a profound influence on physiological processes. Like animal hormones, plant hormones are naturally occurring organic substances that profoundly influence physiological processes at low concentration.

The phytohormones play a very significant role in plant's metabolism, growth, and development. Growth regulators are known to regulate the uptake of nutrients food materials, mineral ions. The well known phytohormones are auxins, gibberillins, cytokinins, ethylene and abscisic acid. Recently jasmonic acid, brassinosteroids, salicylic acid, peptides are also considered as phytohormones, because they are also showing the control over plant's metabolism, and growth. The jasmonic acid, brassinosteroids and salicylic acid-hormones are mainly involved in the defense
mechanism of the plant, when the plant is mechanically disturbed by wounding, pathogen attack or by any abiotic stresses like water, salt, cold etc. (Creelman and Mullet, 1997).

These hormones induce resistance to the plant to tolerate against unfavourable conditions. Among them, abscisic acid (ABA) and jasmonic acid (JA) are very crucial, which are active during stress conditions (Moons et al., 1997).

**JASMONIC ACID**

The plant growth regulator JA and its methyl ester MeJA are ubiquitously present in plants (Meyer et al., 1984). They were first identified as odorant compounds in the essential oil of jasminum and their chemical structures were subsequently determined (Demole et al., 1962).

JA and MeJA are linoleic acid (LA) derived cyclopentanone based compounds which are widely distributed in plant kingdom (Meyer et al., 1984). Methyl jasmonate is the principal constituent of the essential oil jasminum and high concentrations of jasmonic acid have been isolated from fungal culture filtrates and also found as an essential oil in jasminum species ex. *Jasminum grandiflorum* (Demole et al., 1962). Further studies proved the presence of jasmonates in angiosperms, gymnosperms and algae playing an important role in plant physiology.

Earlier it was showed that exogenous application of JA or MeJA promote senescence and acts as a growth regulator i.e ABA (Moons et al., 1997).

There are several reports that supported the involvement of JA or MeJA in herbivory (Bennett and Wallsgrove, 1994). Subsequently, it was showed that JA
specifically alters gene expression as a signal molecule (Smith et al., 1996). The wound and elicitors has been known to cause JA, MeJA accumulation in plants, these results implicated a role for jasmonate in plant defenses during biotic stress (Creelman and Mullet 1995). On the basis of recent experiments, jasmonates especially jasmonic acid and its methyl ester (methyl jasmonate), mediate insect and disease resistance (Creelman and Mullet, 1997; Wasternack et al., 1998). Creelman and Mullet (1995) have found high levels of JA in the hypocotyl hook, soybean seedlings, a zone of cell division, and young plumules compared to the zone of cell elongation and more mature regions of the stem, older leaves, and roots. High levels of JA is also found in flowers and pericarp tissues of developing reproductive structures (Lopez et al., 1987).

JAs are known to be involved in morphological, biochemical and physiological changes in plants. In addition, jasmonic acids or methyl jasmonates are known to play an important role in vegetative development, fruit development, promotion of leaf senescence as characterized by chlorophyll degradation and increase in respiration, protease, peroxidase activities, reduction in photosynthetic activity and pollen viability in several plant species (Parthier, 1991). First JA effect described was the inhibition of seedling growth of both monocot and dicot plant species (Meyer et al., 1984).

Jasmonates were also recognised for their ability to promote senescence of detached barley leaf segments, but a role in disease resistance was suggested when phytoalexin synthesis in cell cultures was linked to jasmonic acid content. It was
known that jasmonic acid accumulates in wounded plants and in plants treated with elicitors (Farmer and Ryan 1991; Parthier et al., 1991). Jasmonic acid also activates a number of genes encoding proteins with anti fungal properties (Parthier, 1991; Wasternack et al., 1998; Gundlach et al., 1992).

There are some similarities in the action of salicylic acid and jasmonates with respect to insect and disease resistance, but there are also some important distinctions. JA showed synergistic effects with ABA in stress tolerance, senescence, abscission but shows antagonistic effects like lateral root induction, PR-1, COI-1 synthesis, ABA, ethylene (Parthier, 1991).

Jasmonates have been studied extensively only in the last decade and little is known about how they regulate gene expression. However, jasmonic acid is synthesized from unsaturated fatty acid, linoleic acid, which has led to the proposal that jasmonic acid functions as a type of secondary messenger (Creelman and Mullet, 1997). Plant membranes are a rich source of linoleic acid in the form of phospholipids. It is thought that elicitors might bind with a receptor in the plasma membrane. Then, in a manner similar to that proposed for auxins, the elicitor - receptor complex activates a membrane - bound phospholipase that releases linoleic acid. The linoleic acid is oxidized to jasmonic acid, which in turn acts to modulate gene expression.

Another interesting aspect of jasmonates is that their action is not limited to insect and disease resistance. In addition to their effect on gene expression, jasmonates also modulate a number of other physiological processes. (Creelman and
Mullet, 1997; Parthier 1991) such as seed and pollen viability, (Feys et al., 1994; McConn and Browse, 1996), vegetative protein storage, (Bell and Mullet 1993; Berger et al., 1995; Bunker et al., 1995; Feussner et al., 1995; Franceschi et al., 1983; Grimes et al., 1992; Huang et al., 1991; Kato et al., 1993; Mason et al., 1992; Mason et al., 1990; Pena-Cortes et al., 1992) root development, (Benedetti et al., 1995; Berger et al., 1996; Staswick et al., 1992) fruit ripening, pigments (Czapski et al., 1992; Lopez et al., 1987) seed development (Staswick et al., 1989; Wilen et al., 1991) insect resistance (Doares et al., 1995; Farmer et al., 1990; Farmer et al., 1992; Farmer et al., 1994; Franceschi et al., 1991; Johnson et al., 1989) disease resistance (Becker et al., 1992; Xu.Chang et al., 1994; Choi et al., 1994; Cohen et al., 1993; Creelman et al., 1992; Franceschi et al., 1991; Nojiri et al., 1996; Penninckx et al., 1996) and tendril coiling (Ehret et al., 1994; Falkenstein et al., 1991; Weiler et al., 1993). In most of these effects, the jasmonates appeared to work in concert with ethylene. This breadth of jasmonate effects has led some to suggest that jasmonates might play important roles in plant metabolism as other growth regulators like ABA.

Although there are some reports on jasmonic acid effects on plants, little is known about the mechanism of action of JA in plant metabolism. Therefore, the present investigation was aimed to study the effects of JA on certain selected physiological parameters such as total protein levels and peroxidase isoforms in groundnut cultivar variety JL-24 during early seedling growth.
The main objectives of this study are:

(1) To study the jasmonic acid induced polypeptide pattern.

(2) To study the jasmonic acid induced peroxidase isozyme pattern.

(3) To study the jasmonic acid induced changes in cell membrane stability, chlorophyll stability index, proline content and lipid peroxidation.