Introduction

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During the course of their lives, all multicellular organisms and their organs and tissues reach a peak in terms of their physiological function and then they decline until they die. This process of decline, leading to death has been termed senescence. The work for last four decades has revealed that senescence is not a chaotic breakdown of biochemical systems but a programmed event. Further this process has been found to be a genetically programmed and environmentally modulated. Among the various plant organs, the senescence of leaves has been widely investigated. Crop yields and vegetation productivity depend to a very large degree on the interception of light by the leaf surface. Besides this process leaves are also involved in nitrogen assimilation. Due to association of process of transpiration with stomata, leaves also play a pivotal role in determining water relations of the plants. Thus, leaves represent the major metabolic centres in a plant. Hence, understanding of the generation of leaves, their persistence and eventual senescence and their physiological processes are of paramount importance in the quest for increasing productivity. The observations that delaying of leaf senescence in some crop species like wheat can lead to increase in yield. Hardy et al., (1977) have added a new dimension to leaf senescence studies. In view of Lloyd (1982) the studies of biochemical changes in the detached leaf are important when considering dry matter and crude protein losses encountered during cutting and conserving of grass crops either as hay or silage.

Review of literature on leaf senescence indicates that the studies have been mainly performed in case of crops like oat, barley, rice, bean and tomato. Since the senescence is one of the important factor regulating source sink relationship in crop species, it is now very well realised that this process must also be studied in other crop species. Groundnut represents one of the major oil seed legume in this country. The underground development of the pods in this plant has made the source-sink relationships in this crop very complex. It has been reported that under natural conditions, unlike other legumes the proportion of senescent leaves at the harvest stage is very low in case of groundnut (Narayanan and Chand,1986). Thus, it is apparent that the physiological processes during leaf development in groundnut merit special attention. Apart from some enzymatic studies by Mishra and coworkers not much work has been performed in this direction. This situation has prompted us to investigate physiological changes during leaf development and induced leaf senescence in groundnut. For this purpose two popular cultivars of groundnut namely JL-24 and TMV-10 were selected. Since decline in chlorophyll content represent one of the important criteria of leaf senescence, changes in chlorophylls during the course of leaf development and induced senescence were monitored. The accessory pigments, carotenoids play a secondary and protective role in photosynthesis. Hence, fate of these pigments was also investigated. Carbohydrates are the major products of photosynthesis and their status in leaf tissue also gives idea about

respiratory turnover. Hence, their levels during different stages of leaf development and induced leaf senescence were determined. The organic acid level gives a broad idea about respiratory reactions since all TCA intermediates form major pools of organic acids in plants. So titratable acidity status of the leaf tissue at different stages of leaf development and during induced senescence of detached leaf segments was assessed. The polyphenols represent secondary products of plant metabolism and their level gives idea about intensity of such secondary metabolic reactions. Hence, an attempt is also made to trace the fate of these compounds. Since, both catalse and peroxidase are involved in large number of oxidative and peroxidative reactions and in regulation of level of a harmful photorespiratory metabolite H_2O_2, the investigation was further extended to the study of activities of these two ensyme systems. Mineral redistribution marks one of the major biochemical process during the leaf senescence. In order to see whether similar process operates during leaf aging in groundnut an attempt was also made to study changes in levels of important elements like K, Ca and P during leaf development.

It must be admitted here that the studies carried out in the present investigation are of a preliminary nature. At the same time, it should be pointed out that they can give a general idea of metabolism during groundnut leaf development. Detailed biochemical study of each physiological parameter is highly essential to understand the exact nature of leaf development and regulation of senescence in this crop. Such studies will be undertaken in future.