

EFFECT OF GIBBERELIC ACID (GA₃) LEAF CONTENT IN INTACT AND EXCISED LEAF OF *ROSA INDICA*

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Abstract: Senescence is considered as a genetically programmed process with culminates the development and differentiations of plant structure and which serve to specific function in the plant. Physiological senescence is definitely followed by death while non-physiological not be followed. It is due to deficiency of any essential mineral. The senescence process allows for the termination of cells, tissues, organs or even organisms in a controlled process. Senescence is age dependent and under the control by hormonal, molecular, and genetical processes. It is controlled by several factors, hormones are one of them. The hormonal regulation is an important aspect of the mechanism of the senescence but not an isolated aspect. Hormones act by controlling the development of the senescence programme. Gibberellins delay the senescence. Gibberellin is a powerful retardant.

Keywords: Senescence, Gibberellins, Rose, Protein, Chlorophyll

INTRODUCTION

The term ageing is used with different significances. Senescence is a puzzling process it always differs from ageing. It may or not be led to death. Senescence involves deteriorative change of mature cells which leads them death. It not only supports the degradation process but also promote the growth of new plant parts. Senescence is a biological process. During the development phase plant undergoes several processes, senescence is one of them. It is not simply concerned with death but represent the phase in the life of Annual, Biennial and perennial plant. It is a genetically programmed sequence of bio- chemical and physiological changes. However its regulation is subjected to many environmental and autonomous factors. Perennial plant shows gradual or deciduous senescence i.e. polycarpic senescence. Senescence process affect plant structure under different circumstances.

MATERIAL AND METHOD

five disc of 15 mm² were punched from the healthy leaves and transferred to pretreated sterilized petridishes contain 10 ml fresh water and freshly prepared hormonal solution of each concentration respectively. The beginning of yellowing is noted as onset of senescence and completely yellow as completion of senescence. Bio-chemical contents of leaves and leaf dishes were measured and compared with control. Bio-chemicals analysis for chlorophylls and proteins (Sharma and Tomer, 2009) were done by followed method.

OBSERVATION

It was observed that each leaf and leaf disc follows same external and internal changes as indicated by gradual loss of colour, leaf pigment and Protein etc. Change in colour or yellowing also observed in both excised and intact leaf. Loss of chlorophyll 'a', chlorophyll 'b' and protein were measured in control & treated leaves in intact and excised condition.

Table 1. Study of leaf senescence (in days)

Leaf No.	Control	GA ₃			
		10ppm	20ppm	50ppm	100ppm

1	4	8	9	14	12
2	6	9	10	15	15
3	7	12	12	15	16
4	8	14	15	18	18
5	10	15	20	21	20
6	11	18	25	24	23
7	12	20	27	27	26
8	14	21	28	30	28
9	15	23	30	33	29
10	16	24	30	34	30

Table 2. Study of senescence (in days) in excised leaf disc

Condition	Control	GA ₃			
		10ppm	20ppm	50ppm	100ppm
Onset	8	13	16	18	17
Completion	14	21	24	24	23

Table 3. Ammount of cholorophyll “a” (in mg/gm fresh weight) in GA₃ treated senescised leaves

Condition	Control	GA ₃			
		10ppm	20ppm	50ppm	100ppm
In-Vitro	2.08	2.59	2.61	2.76	2.71
In-Vivo	1.03	1.49	1.53	1.65	1.58

Table 4. Ammount of cholorophyll “b” (in mg/gm fresh weight) in GA₃ treated senescised leaves

Condition	Control	GA ₃			
		10ppm	20ppm	50ppm	100ppm
In-Vitro	0.43	0.69	0.76	0.83	0.82
In-Vivo	0.32	0.52	0.52	0.59	0.54

Table 5. Ammount of protein (in mg/gm fresh weight) in GA₃ treated senescised leaves

Condition	Control	GA ₃			
		10ppm	20ppm	50ppm	100ppm
In-Vitro	2.04	6.00	6.80	10.00	6.40
In-Vivo	2.35	2.04	4.60	6.20	3.00

RESULT AND DISCUSSION

Affect of foliar application of gibberellins in -vivo and in-vitro rose leaves support the earlier reports. Gibberellin is used in 10ppm, 20ppm, 50ppm and 100ppm concentration. Both in-vivo and in-vitro condition 50 ppm of gibberellins show maximum delay (Table.1). High concentration of gibberellins i.e. 100 ppm or more become non significant and non physiological. Degradation of chloro.'a', chloro.'b' and protein also delayed. In-vitro condition both chloro.'a' and 'b' decreased. The loss of leaves content mainly chloro.'a'. chloro.'b' and protein also decrease by application of 10 ppm, 20 ppm, and 50 ppm of gibberellins as compared to control as well as 100 ppm of gibberellins. The maximum delayed in the loss of leaf contents namely chlorophyll "a", chlorophyll "b" and protein are observed under the application of 50ppm of GA₃.

Rosa indica exhibits an interesting mechanism of senescence in both intact and excised leaf. In addition to changes in cell structure major metabolic changes occur during leaf cell senescence; the normal processes that occur in the leaf involving carbon assimilation are stopped, and new metabolic processes that involve the catabolism of proteins, chlorophyll, and lipids occurs. This allows the nutrients of the leaf to be broke down and exported out of the leaf and used to further the development of the plant in other areas in the sense of gradual loss of colour, chlorophyll 'a', chlorophyll 'b' and protein . Makino. *et al.* (1983) and Kura Hotta. *et al.* (1987) also explored the loss of leaf contents. The loss in chlorophyll is one of the most important and conspicuous aspect of senescence also considered by Nooden. *et al.* (1977), Proietti (1998) reported the chlorophyll a/b ratio and also total leaf content decline during senescence and support the present finding A.A. Hassanein and Emam (19998) suggested that there was a close parallelism between changes in protein and chlorophyll leaves during

growth Wittenbach (1982) and Dwivedi *et al* (1979) observed that senescence promote the degradation process in macromolecules, carbohydrate, proteins, Vitamins, pigments etc. DNA that leads to realized micro molecule like amino acid, nucleotide, nitrogen and other minerals. The last stage in leaf development is senescence; this involves both leaf decay and a removal of the nutrients that are stored in the leaves to other parts of the plant. Although it may look like leaf senescence just happens and has little regulation it is a controlled altruistic process that requires changes in gene expression, metabolism and ultimately cell structure.

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