EFFECT OF EXOGENOUS APPLICATION OF REGULATOR ON BIOCHEMICAL CONTENT OF LEAF IN *ROSA INDICA*

Manoj Kumar Sharma and Y.S. Tomar

Department of Botany, J.V.College, Baraut

Abstract: Bio-chemical contents of leaf viz. chlorophyll a, chlorophyll b, reducing & non reducing sugar and protein reduced during the course of development. Exogenous application of Indole acetic acid (IAA), Gibberellic acid (GA_3), Cytokinens (KN) reduced the reduction of this content in attached and deattached condition while Abscisic acid (ABA) and Etheophon (ETH) enhance the reduction. Out of GA_3, IAA & KN, kinetin is the most effective retardant, while ETH, is highest promoter of applied regulator during the developement, the reduction is either due to mobilization of these content to younger ones, reproductive parts or degradation by hydrolytic enzyme. Perhaps, KN, GA_3 and IAA delay the production of hydrolytic enzyme, where as ABA and ETH not only promote the production of hydrolytic enzyme but also reduced the production of growth promoter.

Key words: Abscission, Growth regulator, Rose, Senescence.

INTRODUCTION

The reduction of bio-chemical content in plant part, especially in leaves is referred to as senescence. Senescence is the most puzzling events in the development of plant. From seed germination to maturity plant undergoes to several physiological changes. Physiological changes may be temporary or permanent. Such permanent changes are considered as senescence. Temporary changes is due to deficiency of any essential component and regarded as non–physiological senescence , it may be overcome by any mechanism it is development phenomenon.

MATERIAL AND METHODS

Healthy plants of *Rosa indica* are selected for experiment. Plants of same external morphology are transplanted and allowed to develop in uniform environmental conditions. Regular vigil is kept on the plant to note any kind of visible change. The growth regulators selected for the present investigations are applied in the concentrations as 20 ppm, 50 ppm for GA_3 , KN , ETH and ABA, while 200 ppm and 400 ppm for IAA. The concentrations are higher in case of IAA as no visible changes in symptoms of senescence are noted below 100 ppm. Bio-chemical content is analyzed Sharma & Tomar (2008).

RESULT AND DISCUSSION

The senescence is observed by Yellowing. Yellowing is the first and primitives symptoms of senescence. Effect of growth regulator on senescence is observed in term of bio chemical content. Exogenous applications of regulator either delay or enhance the degradation.

In-vitro condition chlorophyll ‘a’ degrades by more the 94% after the treatment of ABA, which is maximum, whereas KN shows least degradation about 79%. Other regulators also show synergistic effect. Chlorophyll ‘b’ delayed by 96 and only 70% by the treatment of 50 ppm of ABA and 50 ppm of ABA and 50 ppm of KN respectively. Reducing and non reducing sugar degrade up to 99% and 62% only by the treatment of 450 ppm of ETH and 400 ppm of IAA respectively.

In vivo also, observed same fashion of degradation. Chlorophyll ‘a’ loss up to 94% and only 80% by the treatment of ABA and KN of 50 ppm. However chlorophyll ‘b’ degrades 99% by 50 ppm of ABA. Reducing and non-reducing sugar also loss 32% by the 400 ppm of IAA and up to 99% by the 50 ppm of ABA.

Rose exhibits an interesting mechanism of senescence in both vivo and vitro condition. The discoloration is generally characterized due to fall in leaf content such as chlorophyll ‘a’, chlorophyll ‘b’ reducing sugar, non-reducing sugar etc. The loss of chlorophyll is one of the most important and conspicuous aspect of senescence. There is a rapid solubilization of carbohydrate in the leaves during flowering that leads to mobility of reducing sugar from the leaves to developing flowers, as also suggested by Singh. *et al*. (1998). However, the loss of all these contents is higher in vitro condition as compared to the vivo. Although, there are no developing organs for deriving these.

The experiments in hand conducted with vitro and vivo conditions evince that all the growth promoter i.e. IAA, GA_3 and KN, more or less delay the degradation of leaf content. Such delay in degradation is also correlated with concentration. The favorable reports (Hassanein *et al*., 1999), who explored the possible role of the above growth regulators, the studies also indicate that senescence is definitely under the control of growth regulators as expressed in the present investigation.

Table-1: Different contents of leaf on treatment of growth promoters

Contents	**IAA** (In ppm)				**GA_3** (In ppm)				**KN** (In ppm)			
	Vivo		**In-vitro**		**Vivo**		**In-vitro**		**Vivo**		**In-vitro**	
	200	**400**	**200**	**400**	**50**	**100**	**50**	**100**	**50**	**100**	**50**	**100**
Chlorophyll a	2.08	2.08	2.64	2.63	2.06	2.07	2.60	2.81	2.59	2.43	2.68	2.43
Chlorophyll b	0.89	0.98	0.64	0.69	0.80	0.80	0.76	0.82	1.01	0.94	0.52	0.52
Protein	4.20	2.80	6.80	6.00	6.20	6.20	4.60	3.00	4.00	3.00	8.40	5.60
N-reducing sugar	0.40	0.80	0.20	0.70	0.80	0.80	0.20	0.10	0.70	0.30	0.10	0.07
Reducing sugar	1.50	1.55	6.60	5.60	3.60	3.60	2.60	2.30	2.80	1.80	0.60	0.52

Table-2: Different contents of leaf on treatment of growth retardants

Contents	**ETH** (In ppm)				**ABA** (In ppm)			
	Vivo		**In-vitro**		**Vivo**		**In-vitro**	
	50	**100**	**50**	**100**	**50**	**100**	**50**	**100**
Chlorophyll a	0.97	0.92	0.90	0.79	1.00	0.96	0.96	0.92
Chlorophyll b	0.24	0.21	0.24	0.18	0.69	0.63	0.59	0.48
Protein	0.20	0.20	0.30	0.10	0.34	0.20	0.30	0.20
N-reducing sugar	0.15	0.00	0.10	0.07	7.50	5.60	0.10	0.10
Reducing sugar	0.14	0.00	0.60	0.52	0.90	0.70	0.50	0.48

In *Rosa indica* KN is reported as antisenescent. The role of senescence is positively correlated with the concentration. Both ABA and ETH is strong promoter of senescence.

REFERENCES

Hassanein, A.A. and Emam. M.M. (1999). Metabolic activities associated with sequential leaf senescence in the Duranta and simultaneous leaf senescence in pear plant. *Egyption J. of Physiological Science*. **22**(2):63-278.

Singh. I; Nandwal. A.S.; Kuhad. M.S, and Singh. I (1998). Biochemical changes occurring during development of leaves emerged at three different stages in pigeon pea. *Indian J. of Pl. Physio*. **3**(2): 89-93.

Sharma, M.K and Tomar, Y.S. (2008). Studies of abscission and senescence of leaves by effect of growth promoters in *Rosa indica*. *Plant Archives*. **8**(1):329-331.