The present investigation was designed with a view to study the expansion growth of isolated leaf disks of *Phaseolus vulgaris* L. (var., Sutton's Premier) by the application of various organic and inorganic chemical compounds. The following chemicals were applied alone and in various combinations to get fuller appraisal of their individual and combined effects: sucrose, maltose, glucose, fructose and arabinose; potassium nitrate and cobalt nitrate; thiamine hydrochloride (TH), pyridoxine hydrochloride (PH), nicotinamide (NAm) and DL-alanine; 1-Naphthylmethyl sulphide acetic acid (NMSA), skatole (B-methyl indole) and coumarin; Indole-3-acetic acid (IAA), gibberellic acid (GA or specifically GA$_3$), kinslin (6-Furfurylaminopurine) and Beta(2-Furyl) Acrylic acid.

Disks 7.00 mm in diameter were cut from the primary leaves of 8-day old etiolated seedlings. After surface sterilization and thorough washings, the disks were transferred to culture solutions in petridishes. Culture solutions of various compounds prepared in the basal medium of 1 per cent sucrose solution were poured into the petridishes on which sterile Whatman filter papers were inserted over horse-shoe shaped glass rods. The control
could not be maintained in sterile distilled water in all experiments performed with carbohydrates. Therefore, 1 per cent sucrose solution was applied as the basal medium in the subsequent experiments. Randomly chosen sets of 5 disks were transferred with the lower epidermis up to the medium in the petridishes. The leaf disks were incubated under saturated humidity and the temperature was maintained at 25 ± 1°C. Growth measurements were made after regular intervals of 24, 48 and 72 hours of incubation with the help of a travelling microscope. All the manipulations involving leaf disks were completed under dim green safe light.

All the carbohydrates except pentose sugar exhibited high potentiality in inducing leaf disk expansion. The stimulatory effect of these sugars was found to be highly significant. Sucrose had eloquently established its superiority over other carbohydrates. In their relative efficiency sucrose was followed by glucose, maltose and fructose. The rate of growth was higher during the first growth phase (0-24 hours), but declined in the subsequent phases.

Potassium nitrate and cobalt nitrate proved highly stimulatory in growth promotion. But the cumulative effect of potassium nitrate was found to be much higher than that of cobalt nitrate. The latter registered its
potentiality at a relatively lower concentration than the former.

Thiamine hydrochloride, nicotinamide and pyridoxine hydrochloride caused expansion growth of etiolated bean leaf disks, the former two being highly stimulatory. From the nature of action of these vitamins it appeared certain that the leaf tissues largely depended on exogenous supply of vitamins for sustained growth. Amino-acid, alanine also exhibited similar growth promoting effect.

Coumarin, a potent growth inhibitor, registered well-marked growth promotion. Skatole, too, behaved like coumarin in inducing leaf disk expansion. From the identical manner of action it could be deduced that skatole is an inhibitor rather than an anti-auxin. On the contrary, NMSA, a well defined anti-auxin proved highly inhibitory at all its concentrations during all the growth phases. NMSA virtually nullified the growth promotion induced by stimulatory range of IAA concentrations.

IAA registered its high potentiality in stimulation of growth at relatively very dilute concentrations. IAA in conjunction with sucrose projected a synergistic effect. The interaction between the two turned out to be highly significant. An additive effect was observed when stimulatory range of concentrations of IAA was combined
with NAm. However, this effect seemed to be apparent one, since the interactions between the two failed to reach a statistically significant level.

Gibberellic acid at comparatively higher concentrations promoted disk expansion. The stimulation soared to such a high point that it surpassed those caused by other compounds. The magnitude of stimulation increased with the progress of time. GA in combination with IAA imparted synergistic effect and the interactions between the two turned out to be highly significant.

Kinetin also caused high degree of stimulation within the range of concentrations tried. Kinetin in combination with IAA produced an additive effect. The inhibition evoked by supra-optimal concentration of IAA was also relieved. However, this observed effect was only apparent, since the interactions between the two did not reach a statistically significant level.

B-(2-Furyl) Acrylic acid, a substituted fatty acid, too, exhibited identical behaviour with IAA. It promoted growth at relatively lower concentrations, while higher concentrations proved toxic causing death of cells.