PART V.

MISCELLANEOUS.
Severity of phytopathogenic diseases has long been experienced by the pathologists and agriculturists and therefore increasing interest is being noticed in attempts to elaborate the mechanism of disease incitation. The present work was undertaken to study the fruit rot of chillies with special reference to its physiological and biochemical aspects.

It was recorded that C. capsici causes considerable damage to the chilli fruits in fields of Sagar. A statistical record when periodically maintained, indicated that about 4 to 32% fruits were destroyed due to this disease during the year 1969 and the maximum severity was noticed during August-September months which also stand for the maximum rainfall of the year. The disease was intimately correlated with atmospheric conditions, particularly rainfall and temperature. The disease appears in the fields with the onset of the showers and exists in the fields till there is water saturated atmosphere. With the departure of the rains, the disease also abruptly vanishes from the fields. This indicates that rainfall and temperature are the two main controlling physical factors that are linked up with this disease. This was further proved when effect of
relative humidity and temperature on the development of the disease was recorded. Maximum disease outbreak was found at 96% R.H. and 28°C temperature. A slight change in these two factors was immediately followed by a decreased disease intensity. The pathogen had a narrow range of favourable temperature for its growth in culture and exhibited best growth at 28°C. Inoculation experiments have revealed that the pathogen entry is probably through wounds and not through natural openings and cuticle.

The pathogen showed strong pectolytic and cellulolytic enzyme activity in vitro and in vivo. The strongest pathogen enzymes were recorded to be PME, PG and cellulase. pH had a controlling influence over the secretion of pectic enzymes and invariably it was noticed that glycosidases were dominating under acidic range whereas lyases could appear only under alkaline range. Present studies have demonstrated that when PME and PG act on a native medium (e.g. glucose-pectin medium), their action is simultaneous. As PME makes available demethylated substrate for the action of PG, an increased PME action was followed by an increased PG activity. Secretion of PMG and lyases was in general poor except when secreted on native carbohydrates. These enzymes were poorly secreted in vivo and lyases appeared at a much later stages of disease development.
when tissue maceration and expression of disease symptoms was almost over. They appear to play an insignificant role in the manifestation of the disease. The pathogen secreted strong cellulases. Experimental studies have clearly revealed that both C₁ and Cₓ type of cellulases were produced by the pathogen. These enzymes were less influenced by pH and were freely secreted under a wide range of pH. The secretion of these enzymes was appreciably high in vitro and reveal of their importance in manifestation of the disease, if not in early stages, then at least in post-maceration stage of disease development which lead towards death and deformation of cell walls. The enzyme extract of the pathogen exhibited strong macerating activity. Experiments performed to characterise the macerating enzyme with respect to its pH preference, indicated a positive possibility of PG being the main macerating machinery of the pathogen. PME may assist the activity of PG by its demethylation action. Thus, it appears quite reasonable to conclude that fruit rot of chillies predominantly results due to the action of three pathogen oriented enzymes namely PME, PG and cellulase. The first two enzymes play an important role in maceration phase of disease development while cellulase appear to be significant in post-maceration phase of disease production.
Post-infection changes in the stored metabolites of the host-fruits have given interesting results. Organic acids of the host were found to be completely lost during disease development and there was a synthesis of another acid during pathogenesis. This may be considered to be responsible for $p^H$ changes of the host which control the secretion and activity of pectic enzymes to an appreciable extent.

Effect of fungicides and phenolics on development of disease and on secretion of enzyme by the pathogen in vitro was studied. The results indicate that no chemical could check the disease fully, though Bordeaux mixture and phenol were quite efficient in controlling the disease. Phenol could arrest total growth of the pathogen in vitro. It was concluded that disease-controlling agents may do so by checking the enzyme secretion of the pathogen which is the main pathogen machinery resulting in successful pathogenesis.
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Diseased chilli fruits infected by *Colletotrichum capsici*. 

Chromatogram of amino acids developed on Silica gel G Layer. Left-Healthy host tissue extract. Right-Colletotrichum infected tissue extract. Solvent-Phenol: Water 75:25; Spray-Ninhydrin.