

MICROBIOLOGY AND MOLECULAR BIOLOGY

Chairman: LARRY DAY, Eli Lilly & Co., Indianapolis, Ind. 46206.

ROBERT RAMALEY, Bacteriology Department, Indiana University, Bloomington, Ind. 47405, was elected Chairman for 1971

ABSTRACTS

Biochemical Response in the Compatible Potato Tuber *Phytophthora infestans* Interaction. S. SUBRAMANIAN, J. L. VARNIS and J. KUC', Department of Biochemistry, Purdue University, Lafayette, Indiana 47907.—A consistent tuber response to infection by *Phytophthora infestans* was demonstrated with eleven potato cultivars and three fungal races. The response in resistant tuber tissue included the accumulation of rishitin (a norsequiterpenol $C_{14}H_{22}O_2$) and phytuberin (a sesquiterpenoid acetate $C_{17}H_{26}O_4$) before or after the hypersensitive collapse of host cells. Their structure suggests the activation of the acetate-mevalonate pathway during the hypersensitive response of the potato. The biochemical response in the susceptible interactions of six potato cultivars and four races of *P. infestans* indicated accumulation of an unknown compound with increasing time after inoculation. The compound appeared blue on plates coated with Silica gel G after spraying with vanillin-sulfuric acid reagent and heating at 120 degrees Centigrade for 3 minutes, and has an Rf of 0.39 when plates are developed with hexane:acetone (95:5 volume/volume) followed by cyclohexane:ethyl acetate (4:1 volume/volume). The unknown compound appeared to accumulate in the compatible interaction as a result of a block in the pathway(s) leading to hypersensitive cell collapse and/or rishitin and phytuberin biosynthesis. Examination of the compound by gas-liquid and thin layer chromatography suggested the compound is not stable in neutral solvents at room temperature. The possible significance of the compound in the host-pathogen interaction was discussed.

Effect of Inoculation with *Phytophthora infestans* on the Activities of Enzymes Associated with Phenolic and Terpenoid Biosynthesis in the Potato Tuber. M. SHIH and J. KUC', Department of Biochemistry, Purdue University, Lafayette, Indiana 47907.—Chlorogenic acid, caffeic acid, α -solanine, α -chaconine, rishitin and phytuberin accumulated in potato tubers after injury or inoculation with *Phytophthora infestans*. The most rapid accumulation of chlorogenic and caffeic acid, rishitin and phytuberin occurred in the resistant tuber-pathogen interaction, whereas cutting induced the most rapid accumulation of α -solanine and α -chaconine. Accumulation of phenolics and terpenoids was suppressed in the susceptible interaction. Activities of key enzymes in phenolic and terpenoid biosynthesis were determined at intervals after injury and inoculation with compatible and incompatible races of the fungus to establish the cause for the differences in accumulation. Phenylalanine ammonia-lyase, shikimate oxidoreductase and peroxidase increased after cutting or infection. The activities of glucose and 6P gluconate dehydrogenases remained unchanged for 72 hours after

injury or infection. Peroxidase and phenylalanine ammonia-lyase activities increased more markedly in the resistant interaction than the susceptible interaction or after cutting, but this difference appeared too late to account for resistance. A method for measuring β -hydroxy- β -methylglutaryl CoA synthetase and reductase was developed.

Regulation of Rishitin and Phytuberin Accumulation in Potato Tubers by Pathogens and Non-Pathogens. W. W. CURRIER, J. L. VARNIS and J. KUC', Department of Biochemistry, Purdue University, Lafayette, Indiana 47907.—Two terpenoid compounds, rishitin and phytuberin, accumulated in potato tubers of eleven cultivars in response to inoculation with an incompatible race (resistant interaction) of the pathogen *Phytophthora infestans*. The two terpenoids also accumulated in the resistant reaction induced by the non-pathogens of potato *Helminthosporium carbonum*, *Ceratocystis fimbriata* or *Cladosporium cucumerinum*. Inoculation with a compatible race of *P. infestans* (susceptible interaction) suppressed rishitin and phytuberin accumulation induced by subsequent inoculation with an incompatible race of *P. infestans* or the non-pathogens *H. carbonum* or *C. cucumerinum*. Suppression of a normal resistance response is suggested as an active mechanism for susceptibility.

The Adsorption of Bacteriophage T2 on Magnetic Iron Oxide. JOHN SWEZ and HENRY CHUNG-HOAH YU, Department of Physics, Indiana State University, Terre Haute, Indiana 47809.—It previously was shown that bacteriophage T1 and T2 adsorb to magnetic iron oxide in either H medium or nutrient broth. Aliquots of phage lysate were mixed with aqueous suspensions of MO9853 magnetic iron oxide and shaken for a short interval. The iron oxide was precipitated with a strong magnet and the supernatant assayed for plaque-forming-units. Data recently obtained indicate that the fraction of bacteriophage T2 adsorbed in lysates prepared from minimal salts medium depends strongly on the temperature. Maximum adsorption occurs at 0 degrees Centigrade and becomes unstable at room temperature. The percentage of maximum adsorption is 90-95 per cent at a concentration of 25 milligrams per milliliter of iron oxide.