6. SUMMARY

Myxobacters were found to be common inhabitants of the tropical to subtropical climates of India. Two hundred and seventy-six soil samples from 10 states of India yielded an enrichment of 152 strains of myxobacters. Of them, a total of 91 strains were purified. Using the soil baiting technique on dung pellets 61% of the enriched myxobacters could be purified, whereas using the Stanier's plate method the success rate was only 33%. The myxobacters isolated were found to be strains of the genera *Myxococcus, Archangium, Cystobacter, Stigmatella, Polyangium* and *Chondromyces*. Twenty-five strains were identified as *Myxococcus fulvus*, 15 as *Myxococcus xanthus*, 4 as *Myxococcus stipitatus*, 3 as *Archangium gephyra*, 15 as *Cystobacter fuscus*, 9 as *Cystobacter minus*, 9 as *Cystobacter ferrugineus*, 1 as *Stigmatella erecta*, 3 as *Polyangium aureum* and 7 strains as *Chondromyces crocatus*. The frequency of occurrence and the diversity of species were highest in forest soils. *Myxococcus fulvus* was the dominant myxobacter, constituting 27.5% of the total isolates. They were abundant in the rhizosphere of nearly neutral pH (6.5-7.0). Sea beach soils contained the least frequency and the least diverse type of myxobacters. Although they could be isolated from soils with the pH of 5.0 to 8.5, myxobacters were found to be most abundant in the pH range of 6.0-8.0. It had been possible to recover 85% of the total isolates from the soils of this range in pH.

Only 32 strains (35%) of the total isolates showed antagonistic activity against at least one of the six microorganisms tested. Twenty strains were antibacterial, 11 were antifungal and one was both antibacterial and antifungal. The frequency of antibacterial strains was maximum in riverbed soils,

and that of antifungal strains was maximum in rhizosphere as well as roadside soils. Tea garden soils were poor in microbicidal myxobacter content. Of these, 28 strains exhibited their antagonistic activity by releasing antimicrobial substances into the environment. While most of them showed strong antibacterial activity, only a few exhibited strong antifungal activity.

The production of antibiotic substance was studied in details using *Myxococcus fulvus* SF126 (ATCC 49305), one of the few well-characterized myxobacter isolates. Enhance production of the active principle was achieved by optimization of culture conditions. Productivity enhanced by the addition of 2% w/v fructose or 4% w/v glucose and 0.3-0.4% w/v yeast extract in peptone liquid medium (pH 6.8). Tryptone 0.6 % w/v) and casamino acid (0.1% w/v) were found to be the optimum source of nitrogen. Antibiotic titre was higher in shake culture than in still culture, and 4-6 days' fermentation at 35°C was found to be optimum.

Antibiotic compound was isolated from the culture supernatant of the myxobacter, *Myxococcus fulvus* SF126. The pale yellow coloured semi-solid with a pungent odour and a melting point of 228-229°C was soluble in non-polar solvents but insoluble in polar solvents. The antibiotic acted mainly against Gram-positive bacteria. Gram-negative bacteria, in a few cases, were also inhibited. Yeasts and moulds were completely resistant. The molecular formula was $C_{24}H_{33}NO_6$ (molecular ion at m/z 431). From the results of reactions with specific chemical reagents, and also of UV-, IR-, ^{1}H-NMR- and mass-spectral analyses, the

isolated antibiotic compound proved identical with myxopyronin B. This antibiotic has so far been isolated from only one strain of myxobacter, *Myxococcus fulvus* Mx f50.