CONCLUSIONS
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The present study was undertaken to investigate the role of carotenoid pigments in cold adaptation using a psychrotrophic *Micrococcus roseus* obtained from the soil samples of Antarctica. The carotenoid pigments of the bacterium were identified and subsequently their interaction with model membranes was studied. Temperature-dependent biosynthesis of carotenoid pigments was also studied. The highlights of the work are as follows:

1. The carotenoid pigments of psychrotrophic *M. roseus* (45R) were identified as bacterioruberin diglycoside, bacterioruberin monoglycoside, bacterioruberin, monoanhydrobacterioruberin and haloxanthin.

2. The chromophores of the pigments in psychrotrophic and mesophilic *M. roseus* were found to be similar.

3. The pigments in both psychrotrophic and mesophilic *M. roseus* were found to be present in the cell membranes.

4. Pigments of *M. roseus* of different polarity bound to synthetic membranes of phosphatidylcholine with almost equal affinity.

5. The carotenoid pigments 'Bacterioruberin' and 'Bacterioruberinmonoglycoside' were found to interact with membranes and decreased the fluidity of membranes.

6. Bacterioruberin was observed to be fluorescent and had very low quantum yield, similar to that observed in other carotenoid pigments.

7. The synthesis of the pigments was found to increase in the bacterial cells grown at 5°C as compared to the cells grown at 25°C.
8. In psychrotrophic *M. roseus* the relative proportion of polar carotenoid pigments increased when grown at low temperatures (5°C) as compared to the cells grown at 25°C.

9. The psychrotrophic strain of *M. roseus* synthesised more polar carotenoid pigments as compared to the pigments of the mesophilic *M. roseus* grown at 30°C.

10. The major pigments of a psychrotrophic *S. antarcticus* were identified as zeaxanthin and β-carotene.

11. Even in *S. antarcticus*, the relative proportion of polar carotenoids increased when grown at low temperatures. In addition, the relative proportion of polar carotenoids in *S. antarcticus* was found to be more as compared to the pigments of mesophilic *S. multivorum*.

12. Psychrotrophic *M. roseus* synthesised more unsaturated and branched chain fatty acids only when grown at low temperatures (5°C).

Thus, it appears that pigmented bacteria require more polar carotenoid pigments, to survive cold climatic conditions. Further, carotenoid pigments and fatty acids may be working in a coordinated fashion to regulate membrane fluidity.