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Development of a rapid screening method for long chain polyunsaturated fatty acid producing marine bacteria

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Outline

- Screening methods
- Approach
- Results from controls
- Results from environment

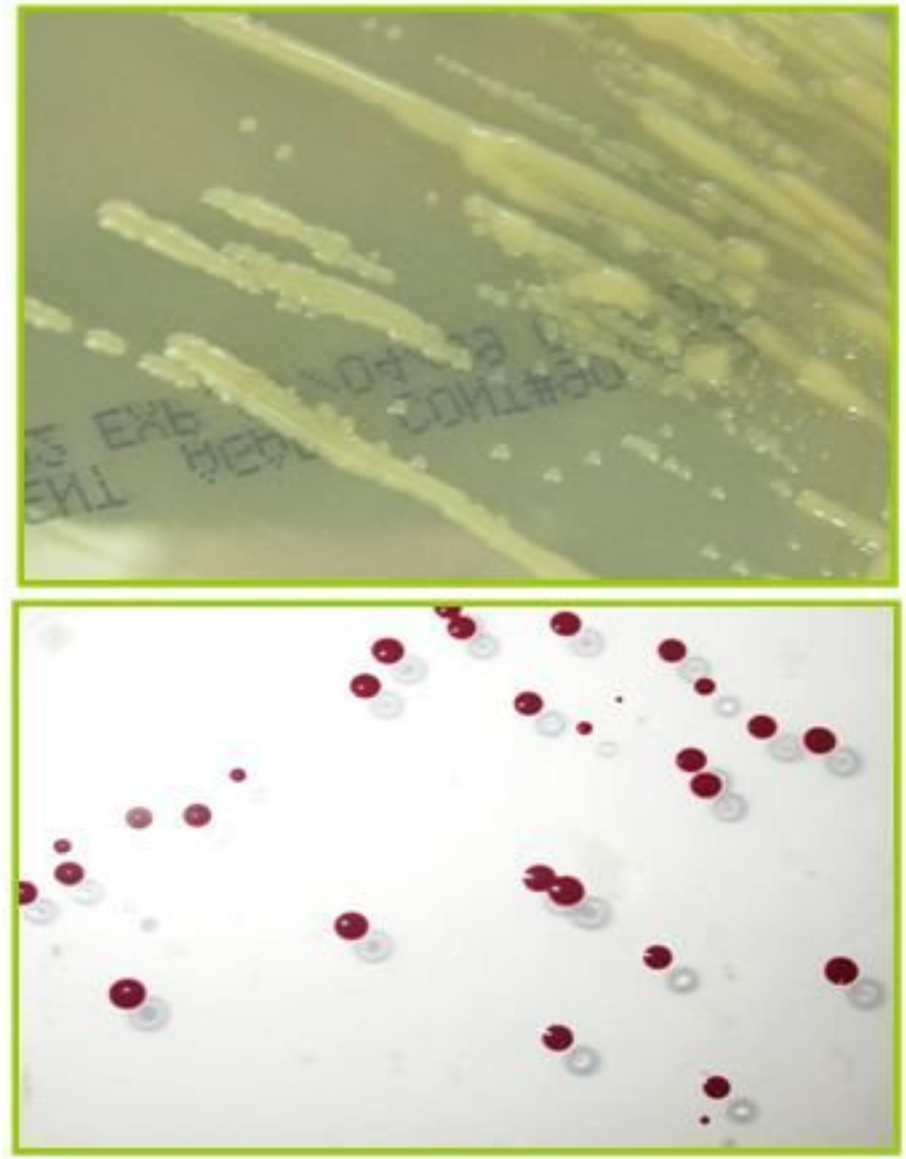
EPA producing bacteria

- Gram negative marine commonly found in cold water environments
  - Open water
  - Sediments
  - Marine organisms
- Unique biochemistry
  - LC-PUFA fatty acid biosynthesis capability
- Screening using 2 selective components
  - Triphenyltetrazolium salt (TTC)
  - Low temperature incubation (15°C)

Tetrazolioum salt

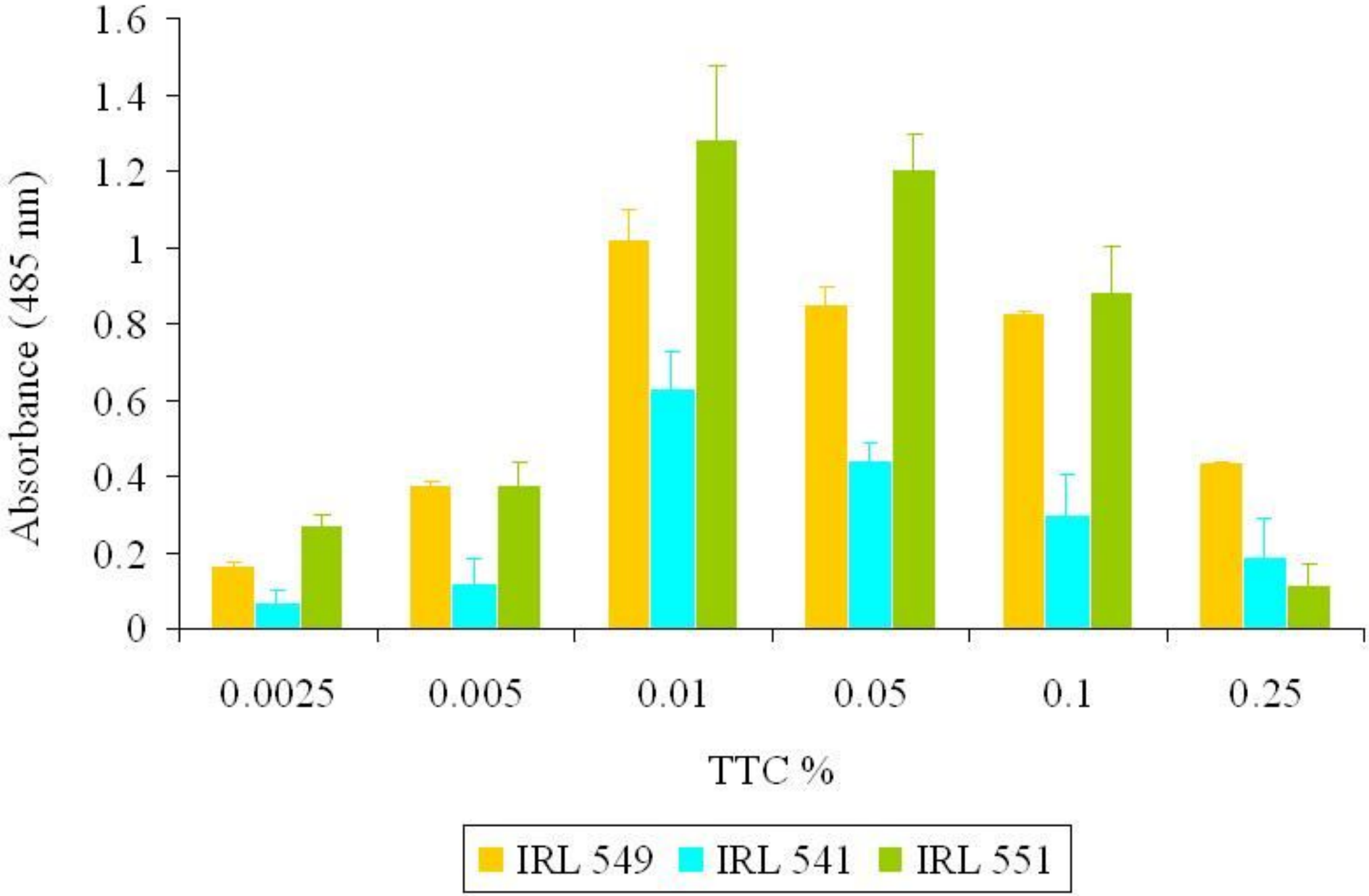
- Delta 5 desaturase reduced triphenyltetrazolium salt to red formazan
- Reduction occurs *in-situ*
- No affect on growth or ability to synthesis LC-PUFA's

Marine agar

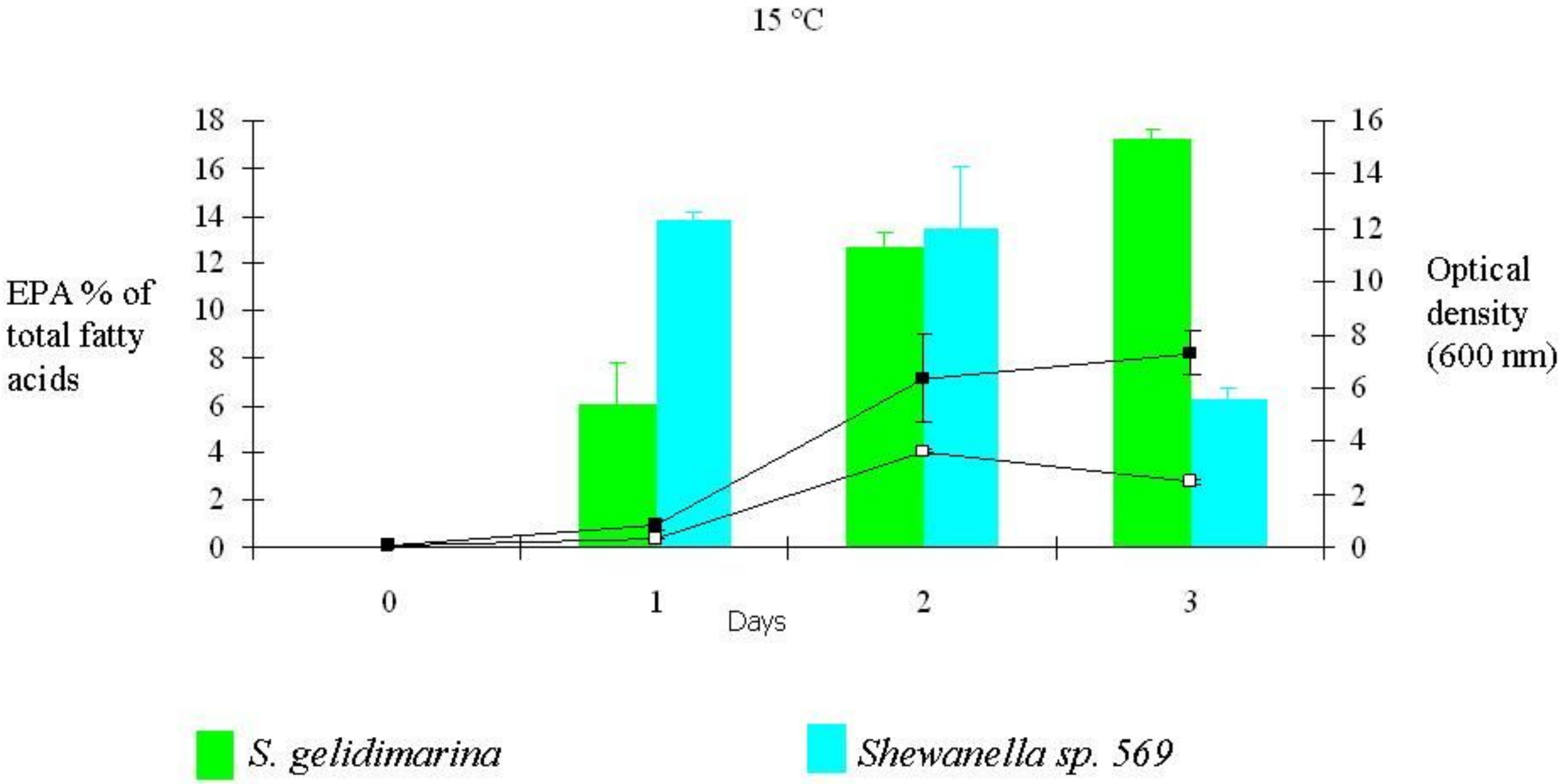


TTC agar

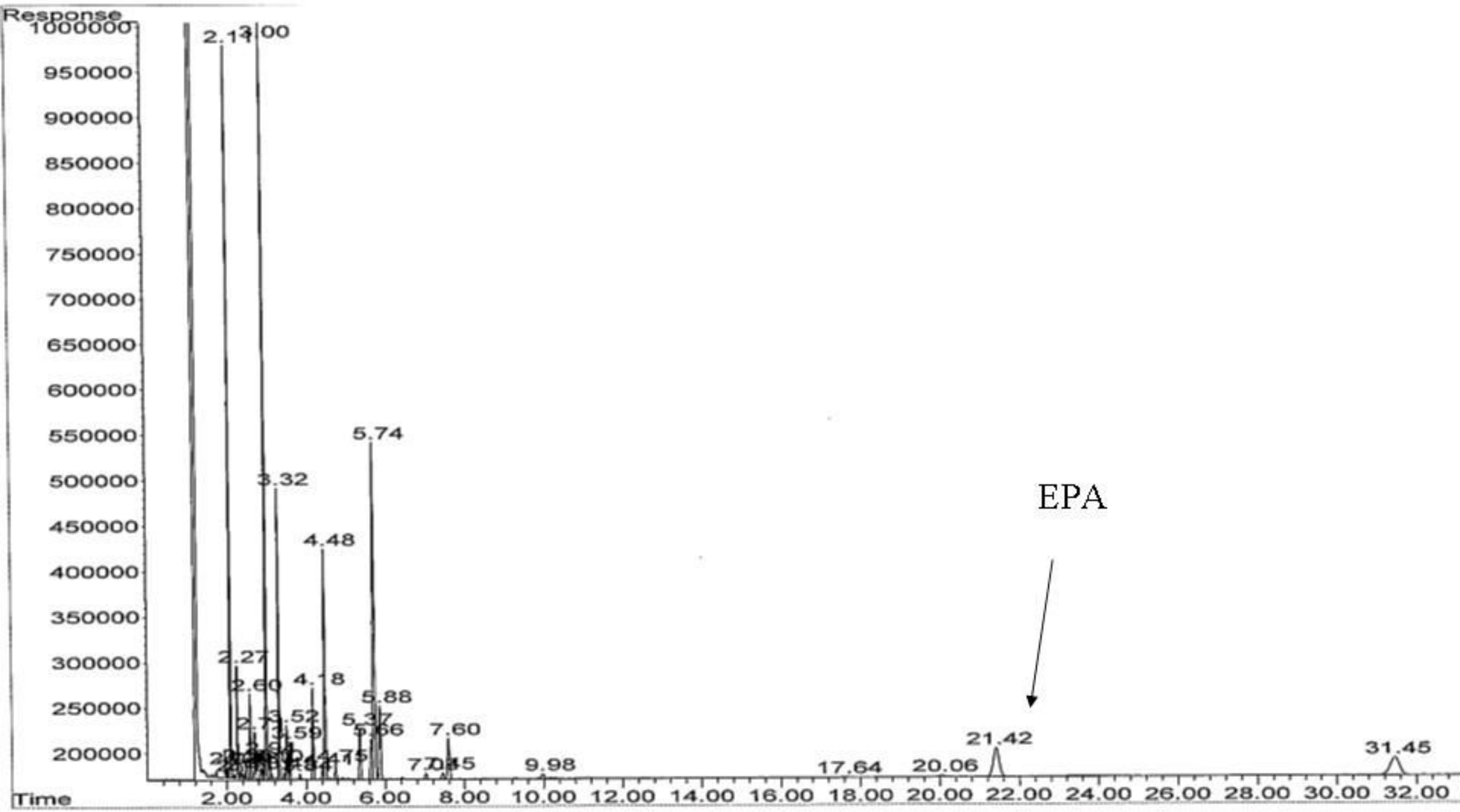
TTC concentration effect



Temperature effect

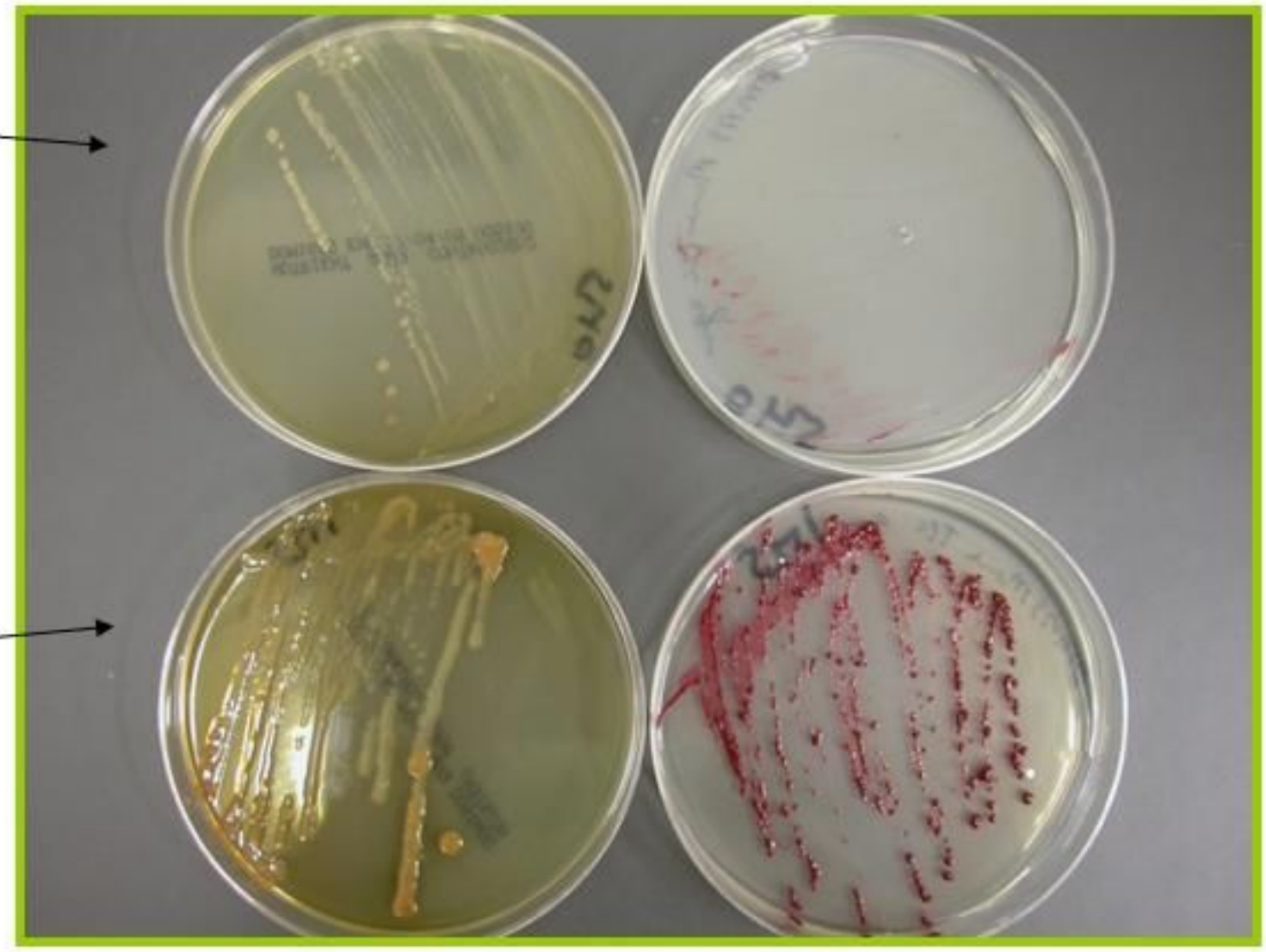


Direct transmethylation

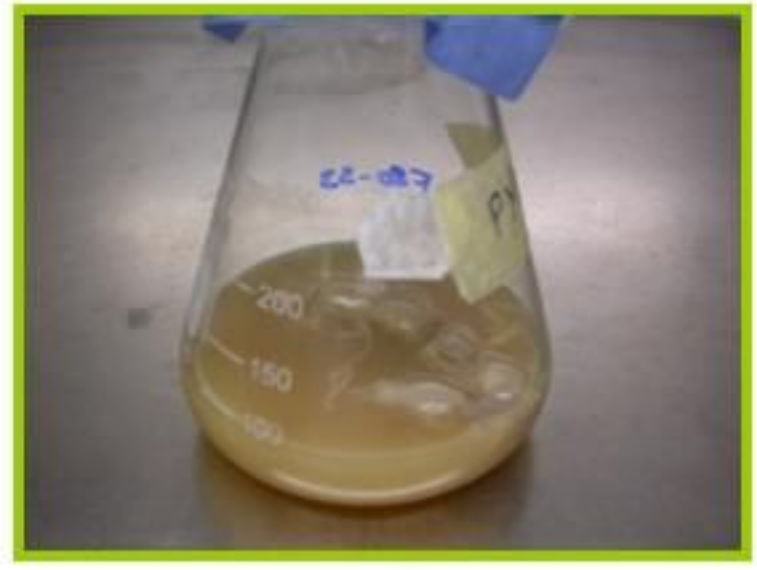


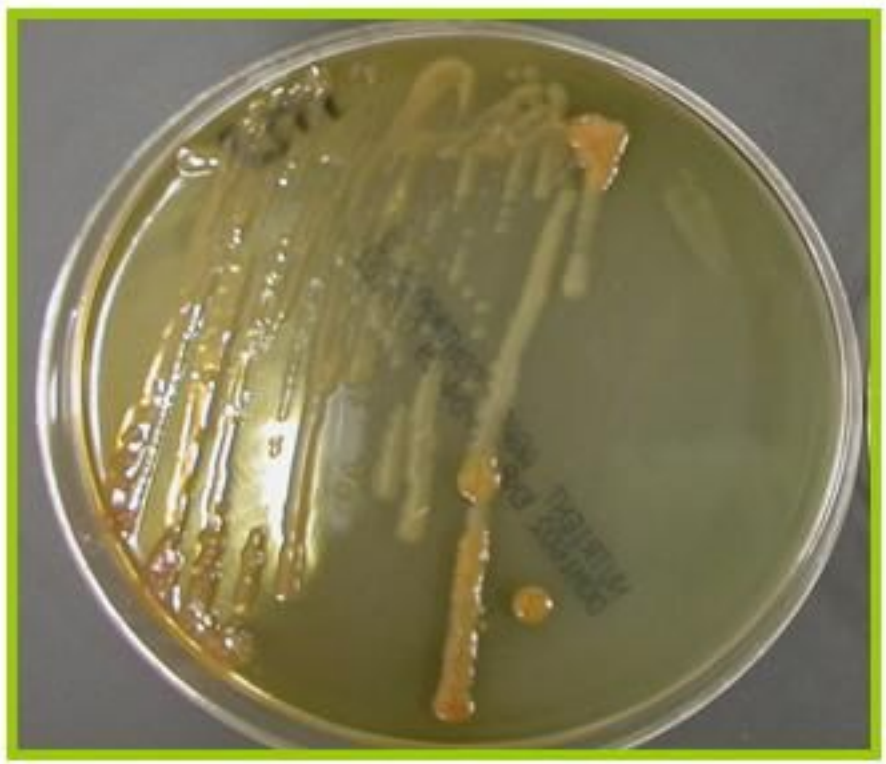
Controls

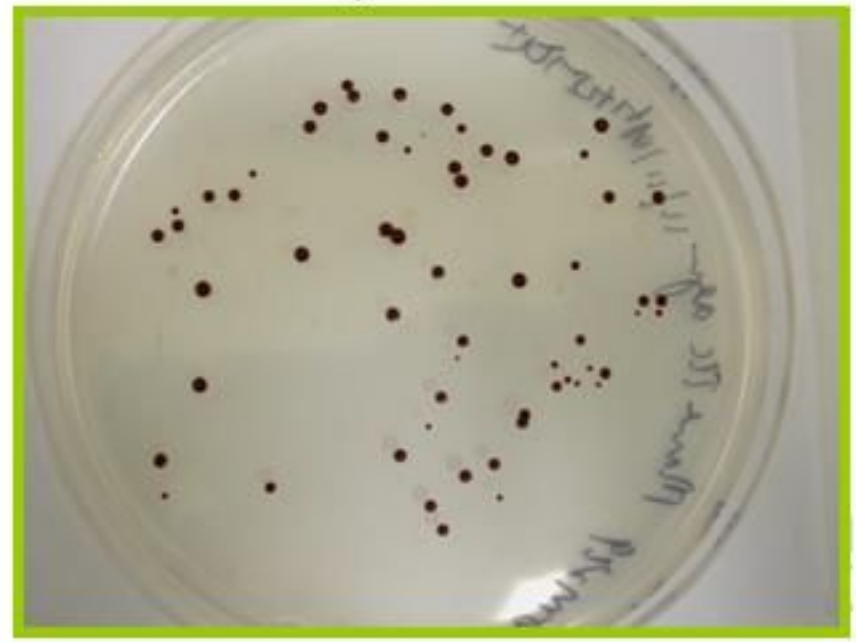
- *S. fidelis*
  - Does not contain EPA
- *S. gelidimarina*
  - Contains EPA



Methodology for isolation





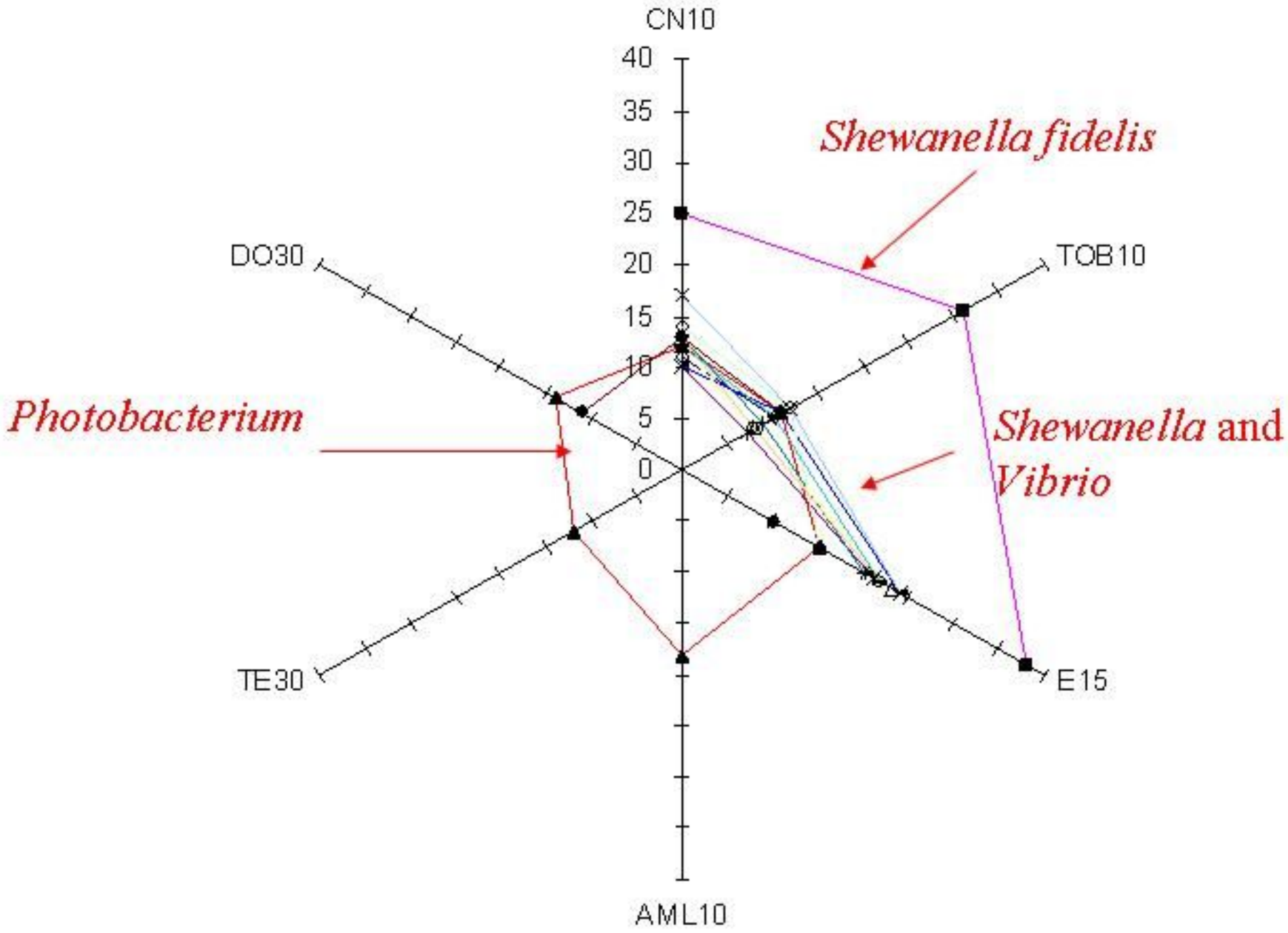


Isolation so far

Source	Genus	Species	EPA %
Chazma Bay	Shewanella	fidelis	0
Antarctica	Shewanella	gelidimarina	7.4
Tarakihi	Photobacterium	P65	5.5
Tarakihi	Shewanella	sairae	8
Trevally	Shewanella	MPU12	1.6
Snapper	Vibrio	LMG 20012	2.3
Blue Warehou	Shewanella	halifaxensis	5.5
Blue Warehou	Shewanella	marintestina	7

Plus another 50 unidentified isolates

Antibiotic testing



Conclusion

- It is possible to use TTC to select LC-PUFA producing bacteria from environment
- Marine organisms in New Zealand are a rich resource for the isolation of omega 3 producing bacteria
- Mechanisms for selection unknown
  - FA profile of *S. gelidimarina* and *S. fidelis* suggest lack of high concentrations of delta 5 fatty acids in *S. fidelis* likely cause of poor TTC reduction leading to toxicity

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