



Biodegradation of triclosan by newly bacterial strain MS45 under aerobic condition

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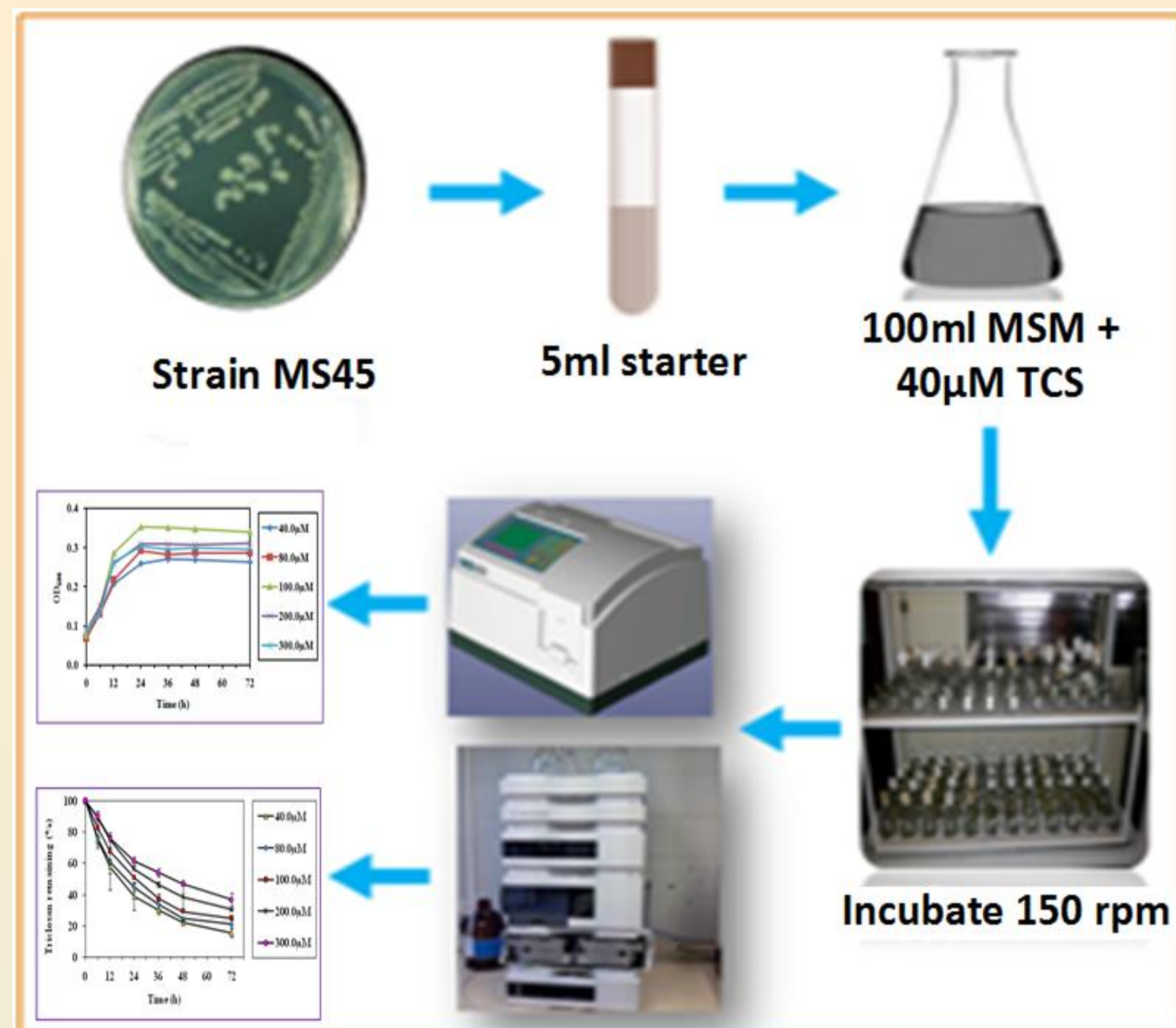
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Introduction

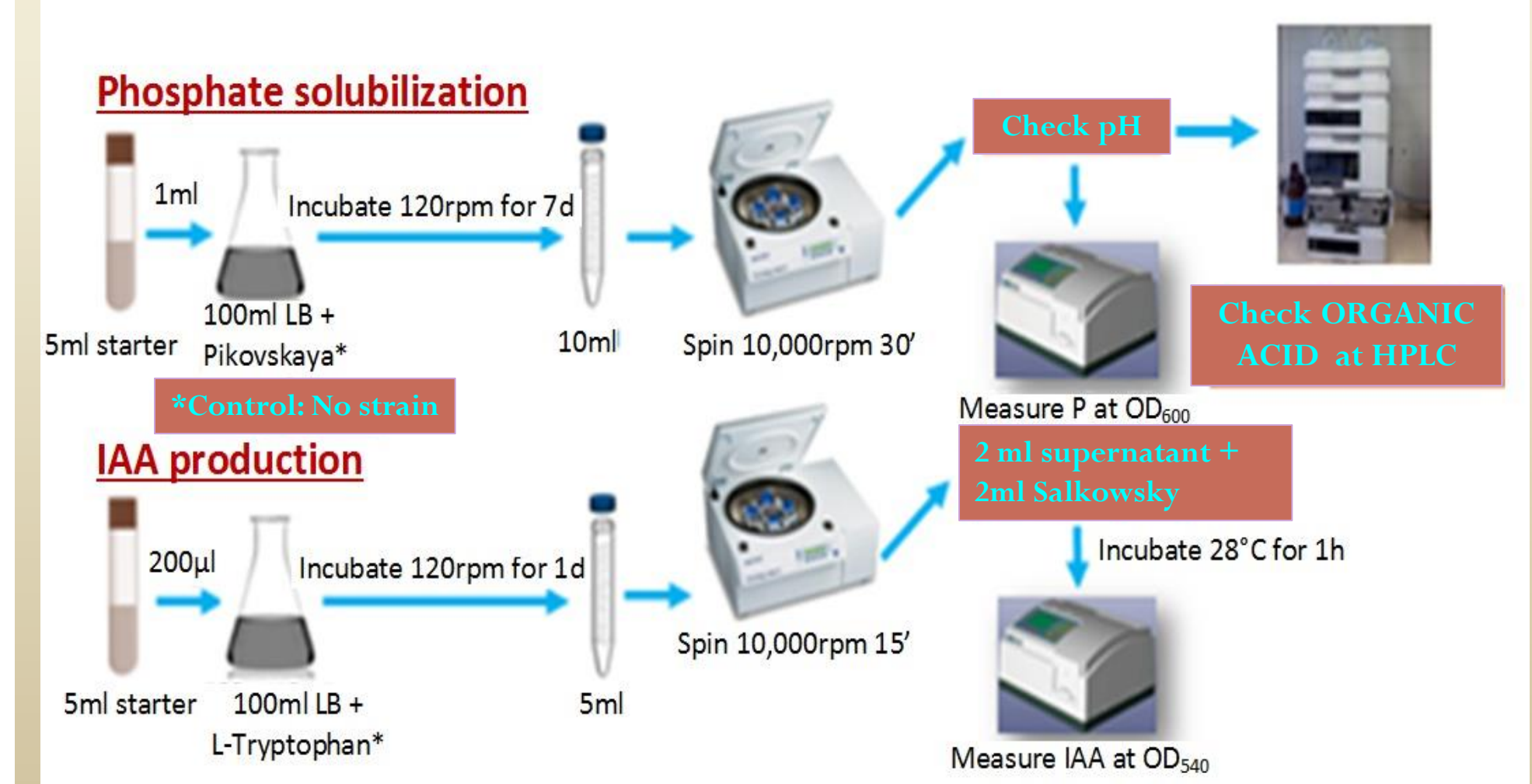
Triclosan {TCS; 5-chloro-2-(2,4-dichloro-phenoxy)-phenol}, a common synthetic antimicrobial agent widely used in many personal care products, is an emerging contaminant and toxic pollutant, and so far only partial degradation has been reported in environment. Since there is limited information on bacteria with ability to degrade TCS, this work aimed to isolate and characterize such a bacterium. *Pseudomonas* sp. MS45, that confirmed plant growth promoting traits, was able to utilize TCS as carbon and energy source.

Methods

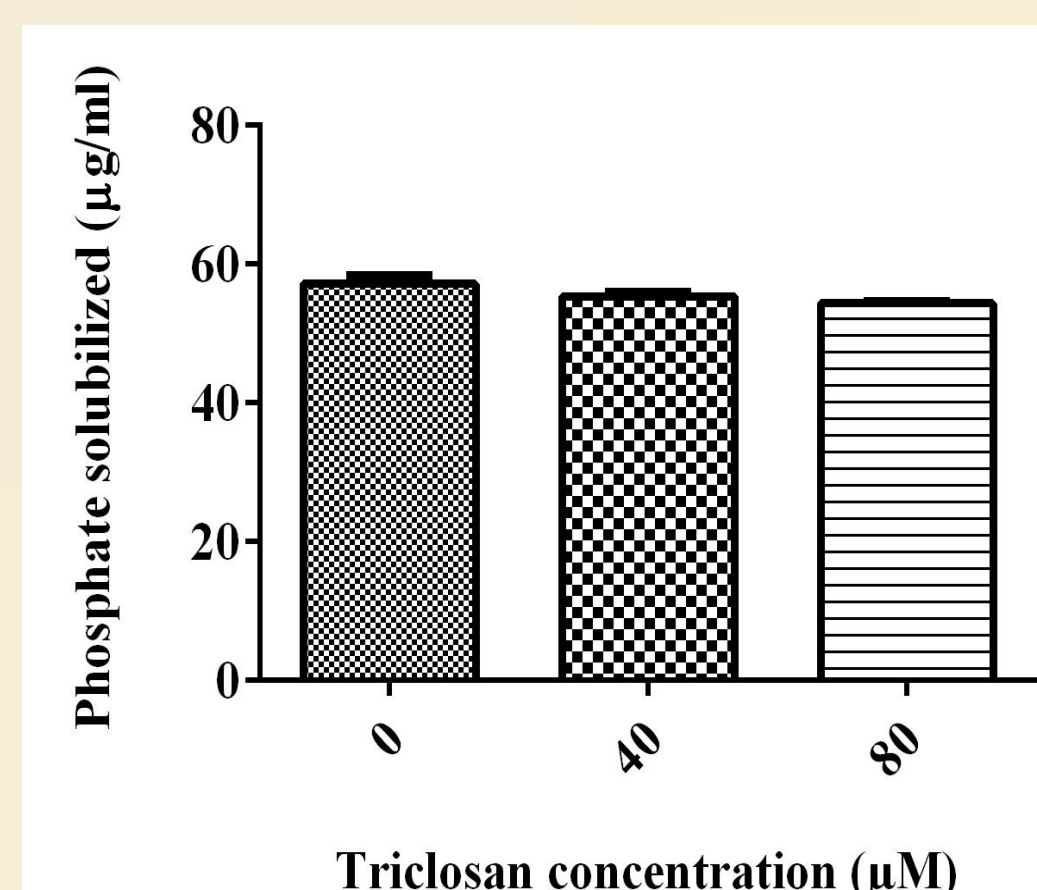
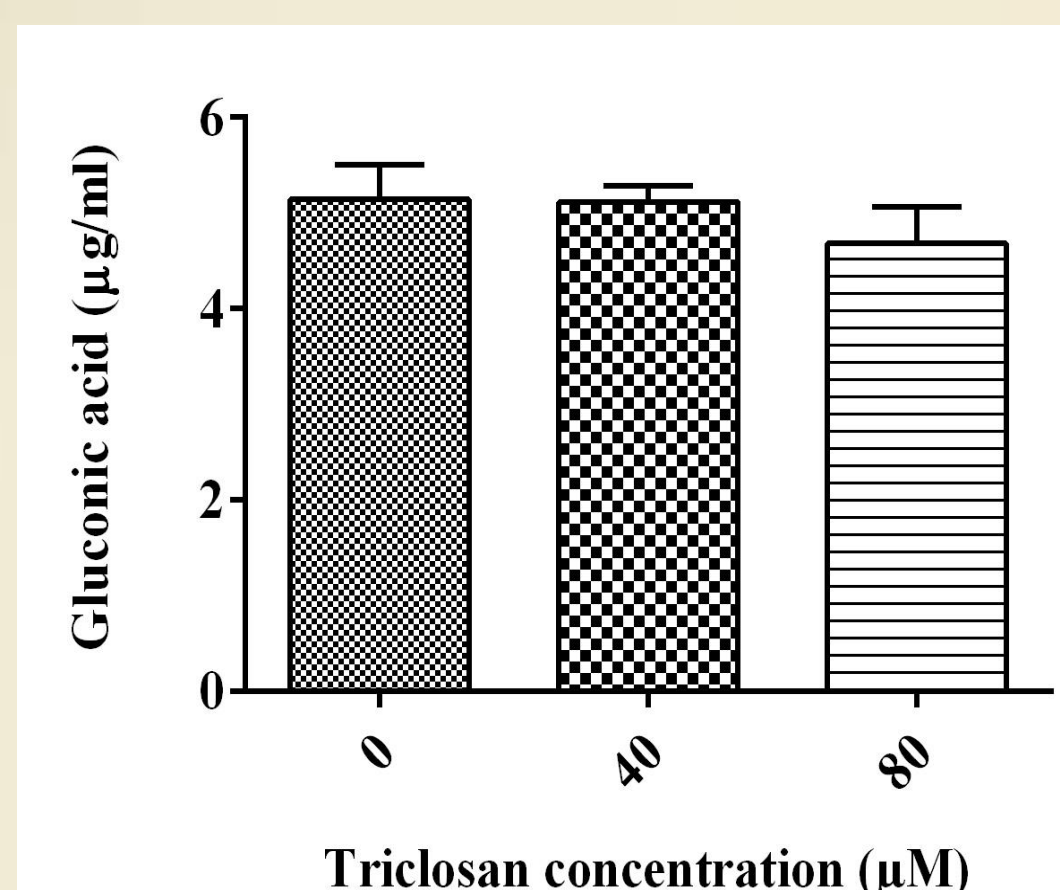
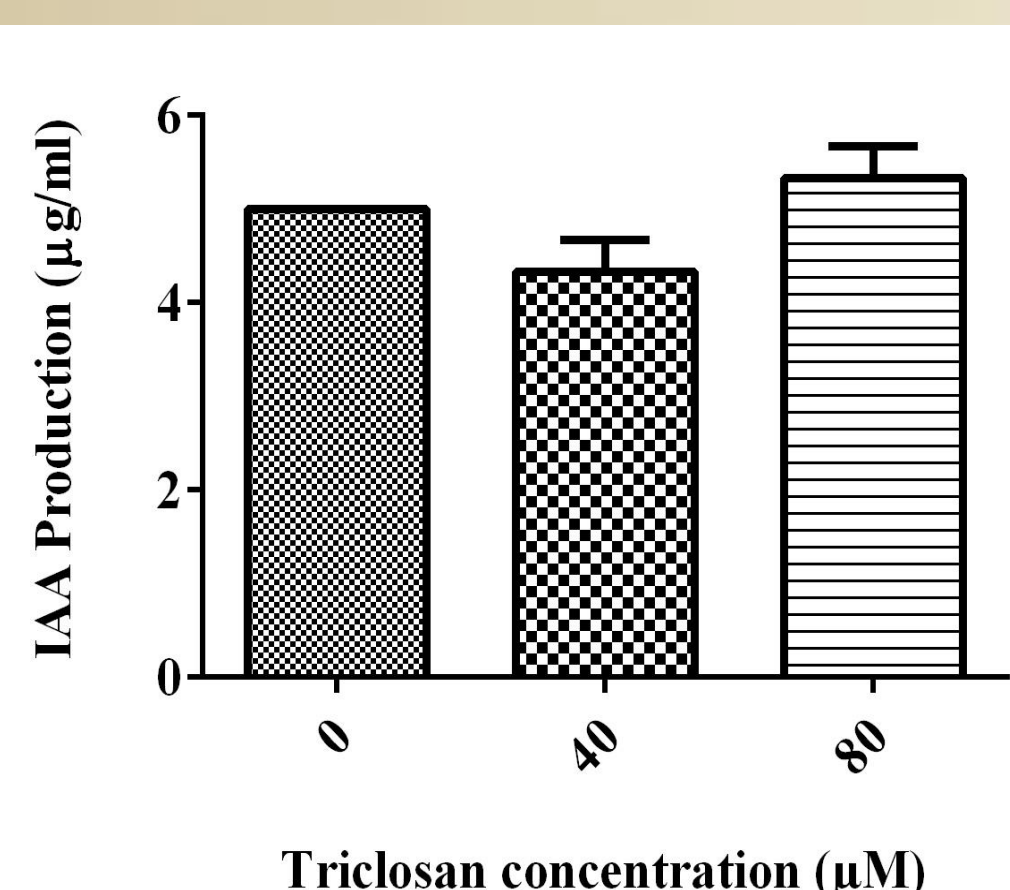
Cell Growth and triclosan biodegradation



Plant growth promoting activities



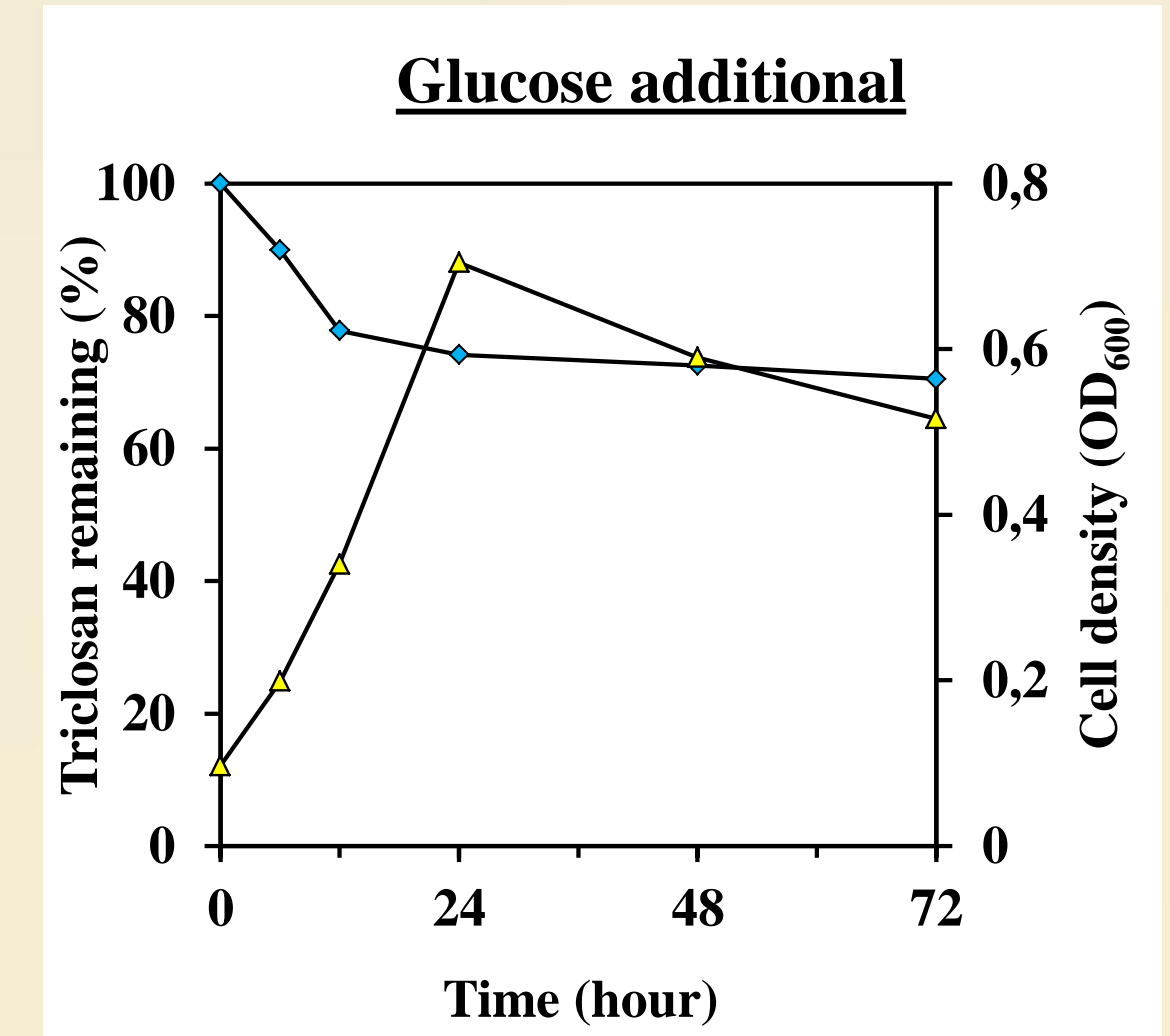
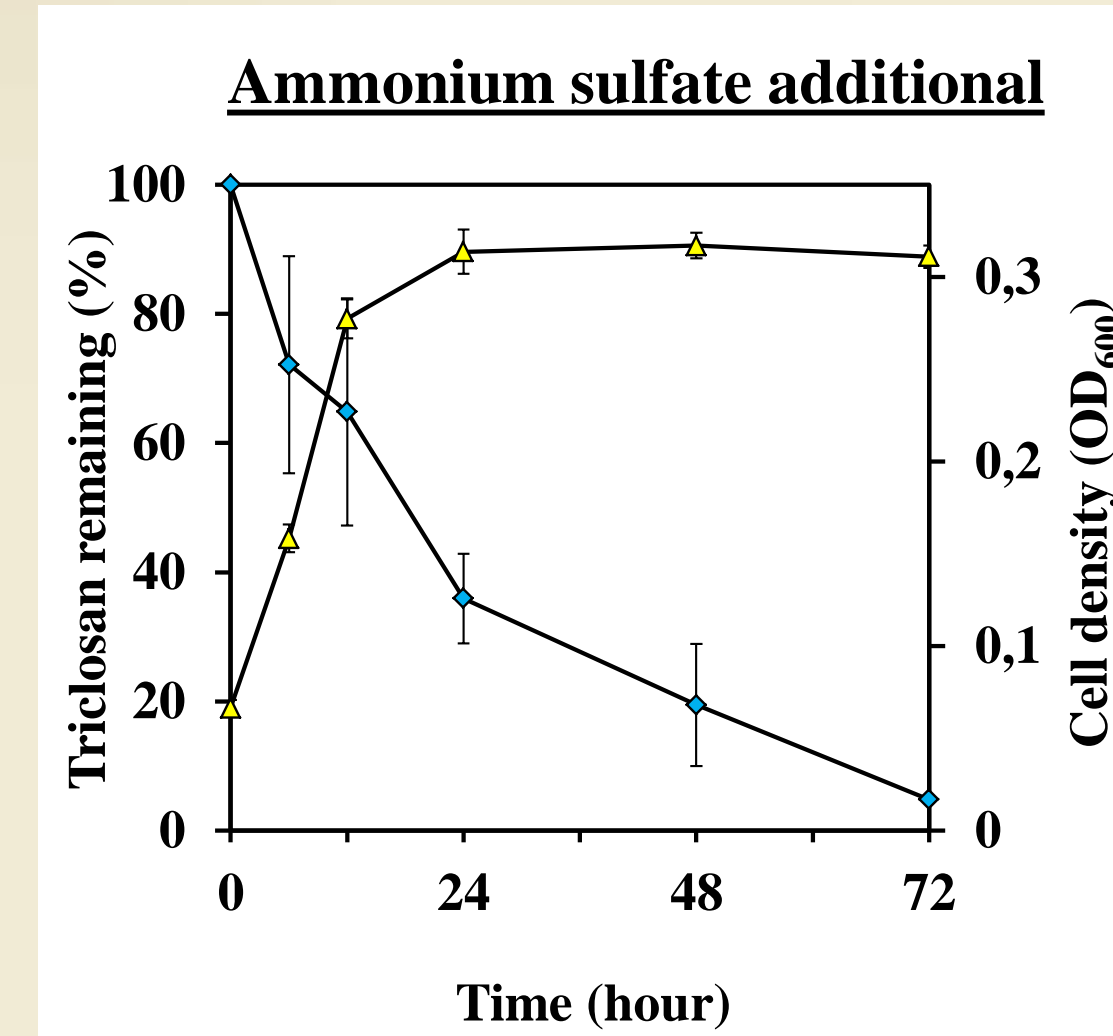
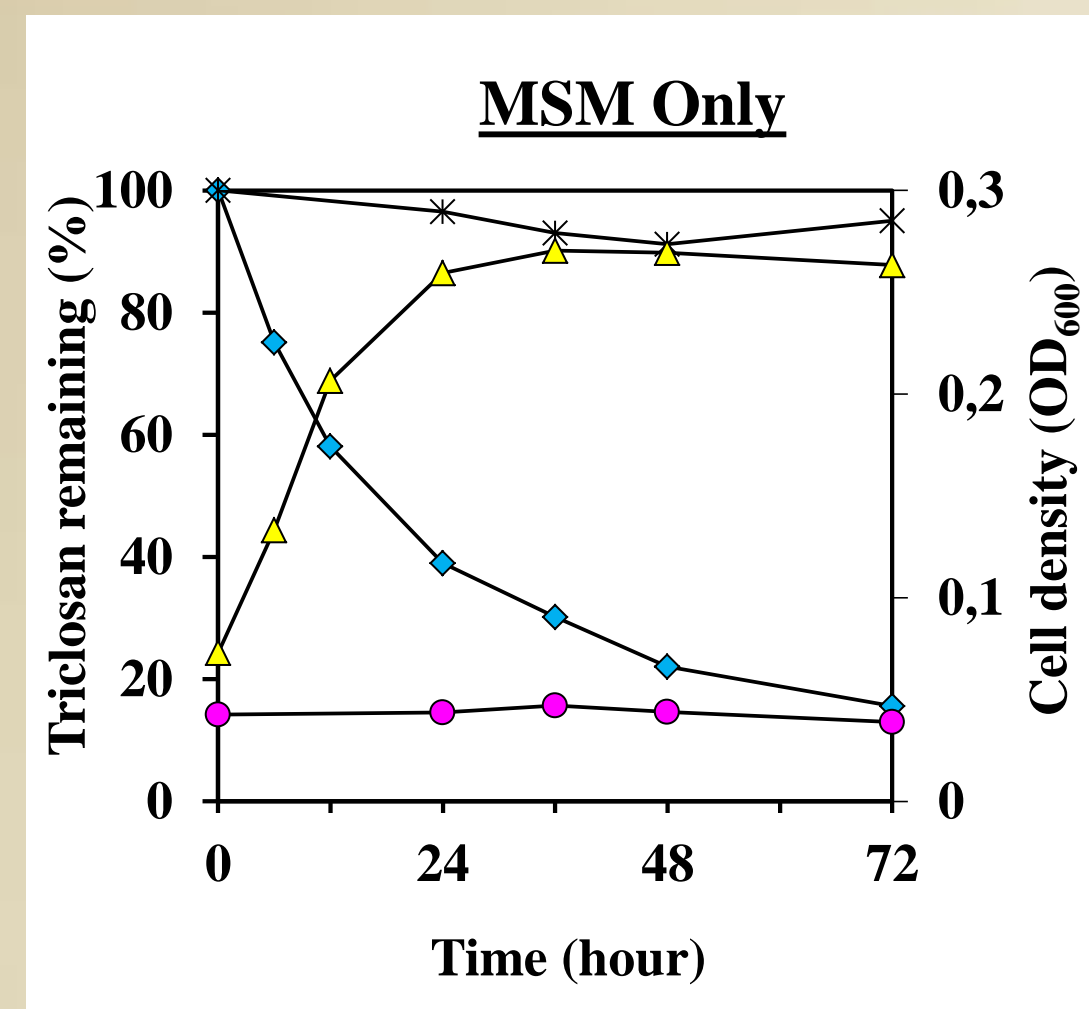
Plant growth promoting activities



In the absence of TCS, MS45 produced a substantial amount of indole acetic acid (IAA), gluconic acid, and phosphate solubilized at $5 \pm 0.001 \mu\text{g mL}^{-1}$; $57.5 \pm 3.09 \mu\text{g mL}^{-1}$; and $5.21 \pm 0.363 \mu\text{g mL}^{-1}$, respectively. Although found a bit decreased of IAA in the presence of $40 \mu\text{M}$ TCS and organic acid (gluconic acid) at $80 \mu\text{M}$ TCS, reasonable activity was remained under the toxic chemical stress.

Results

Cell Growth and triclosan biodegradation



Pseudomonas sp. MS45 was able to utilize TCS as carbon and energy source and could degrade up to 78% of initial concentration of TCS (12 mg/L) within 72 hours in mineral salt medium (MSM) only. Co-substrate supplementation test was conducted aiming to enhance TCS biodegradation. In the ammonium sulfate additional, about 95% TCS was degraded within 72 hours. While MS45 rapidly grew on TCS with glucose, but inhibitory effect toward TCS degradation was observed.

Conclusion

Pseudomonas sp. MS45 was an efficient TCS degrading bacterium. It could not only make use of TCS as a sole carbon source, but its plant growth promoting traits (IAA production, organic acid production, and phosphate solubilization) were also well sustained even under toxic chemical stress.

Acknowledgments

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