



# **SOUTH ASIAN BIOTECHNOLOGY CONFERENCE**

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BIOTECHNOLOGY : ROLE IN REGIONAL DEVELOPMENT



## **BOOK OF ABSTRACTS**



## POSTER PRESENTATIONS I

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### **A novel low cost approach for Tuberculosis diagnosis using Coconut water and Silicon solar cell *cum* biosensor**

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Tuberculosis (TB) still causes around two million deaths per year. Mycobacterial culture and identification provide a definitive diagnosis of TB and it is now often required that a unit of a liquid medium be used, along with solid media, for any attempt of mycobacterial culture isolation to expedite the laboratory diagnosis of TB.

We present a low-cost natural culturing medium and an easy set up capable of rapidly indicating tubercular growth. Mature coconut water was used as growth medium with a silicon solar cell *cum* biosensor detector. Autoclaved mature coconut water was formulated by adding penicillin and amphotericin B. The prototype biosensor comprised a light source of LED 600 nm, silicon solar cell (0.05 W, 0.5 V, 0.25 cm<sup>2</sup> effective area) and a multimeter. Turbidity which is detected by the setup is inversely proportional to variation of photocurrent. The inoculum of three bacterial suspensions equivalent to McFarland Standards-No. 0.5, 1 and 2 were prepared using a standard strain of MTB. Each suspension (3 ml) was incubated for 24 days at 37 °C in a CO<sub>2</sub> (10%) incubator. Growth was measured using biosensor at three day intervals and for comparison, also with a multi-mode plate reader. Increase in bacterial number was confirmed with ZN staining. Biosensor readings decreased as turbidity increased and seemed more sensitive to the initial increase in bacterial number (1x10<sup>6</sup>-1x10<sup>8</sup> CFU/ml); day3-day14.

MTB propagates in coconut water with clump and cords formation; and results indicate that generation time varies with initial inoculum size. Coconut water composition allows the propagation of MTB. The readings of the prototype biosensor were correlative to the spectrophotometer ( $R^2=0.5202$ ), with a minimum time to detection (TTD) of: 7-10 days.

This approach using coconut water as culture medium and silicon solar cell *cum* biosensor is useful for resource limited environments.