

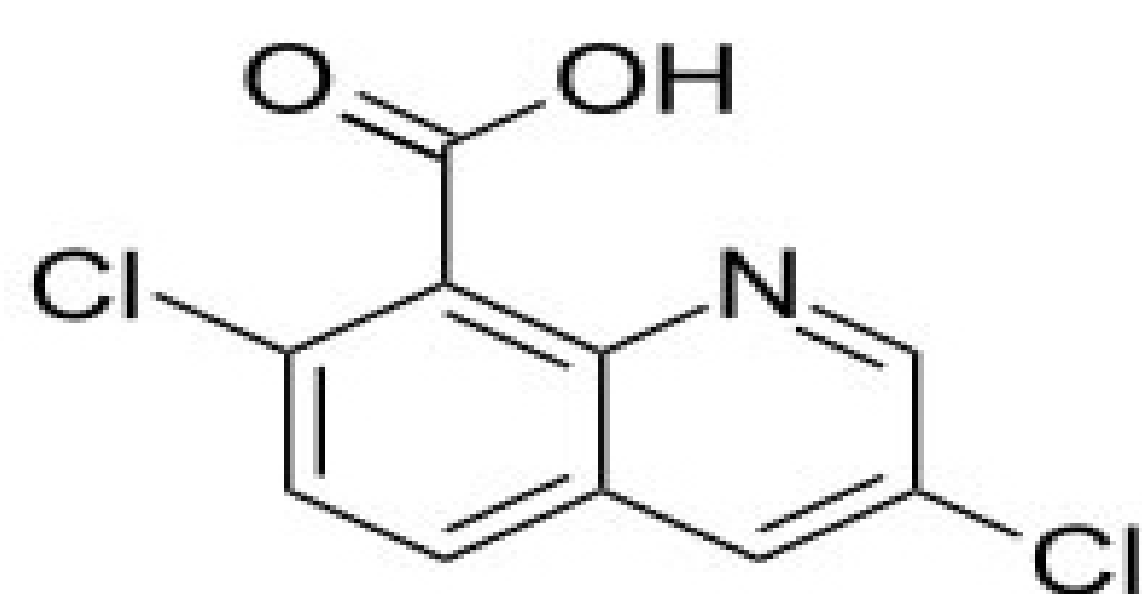
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Objective and advantage

1. Elimination of filtration steps in water treatment with TiO₂.
2. Simultaneous production of H₂ from the same procedure.
3. Scaling of process to meet demands.

Model Treatment

Quinclorac (3,7-Dichloro-8-quinoline carboxylic acid) selective auxine herbicides applied for paddy field mainly used to control bardyard grass *Echinochloa Crus-galli*



Impact of this compound

1. Ground Water Contamination
2. Phyto toxicity to succeeding crops (Tomato, potato, egg plant etc.)
3. Toxicity to Fish and aquatic animals

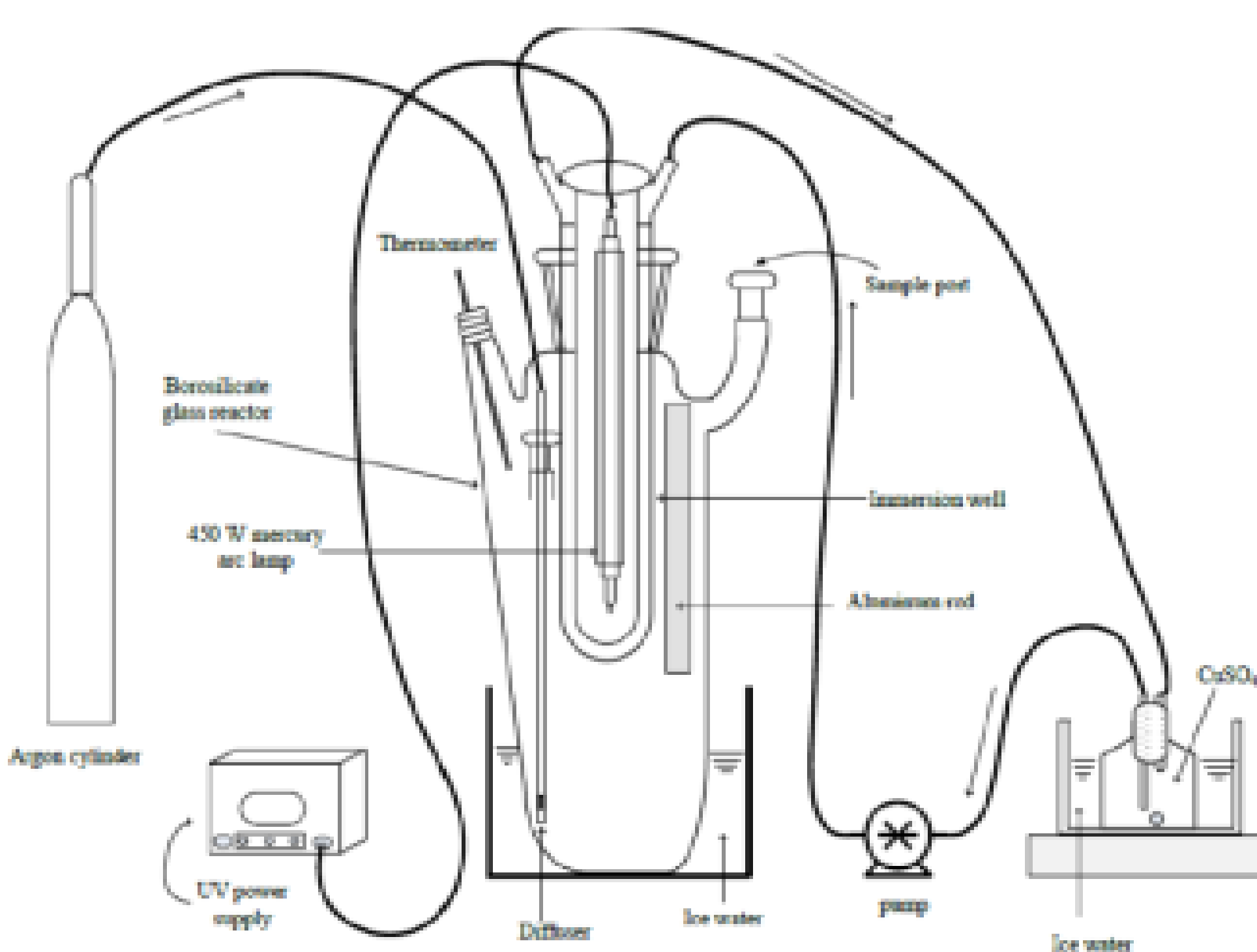


Fig. 1 UV Photocatalytic reactor set up

Materials and Methods

1. The advanced oxidation processes (AOPs) helps for conversion of many organic compounds (herbicides) by degradation
2. Degradation of herbicides using Mercury UV vapor lamp 450 W light based on Photocatalytic reactor using TiO₂ in coated film.
3. TiO₂ thin coated film deposited on film is characterized by X-ray diffraction (XRD), SEM and TEM.
2. Coated film tested using UV-VIS spectrophotometer.
4. The degradation of the herbicides would be assessed by liquid chromatography and mass spectrometry (LC-MS) to identify the compound concentration and intermediate degradation products.
5. All these reacts with organic contaminants that lead to effective decontamination.



Fig. 2 UV-Lamp For Photo-catalytic reactor

Increase in the percentage ethanol concentration causes increases in H₂ production rate with the highest rate of 21.2 μmol H₂/min at 120 min with 6 Pt-TiO₂ coated slides and 30% ethanol solution. Pt-TiO₂ surface area (from 4 slides to 6 slides) also increase H₂ production.

Results and Discussion

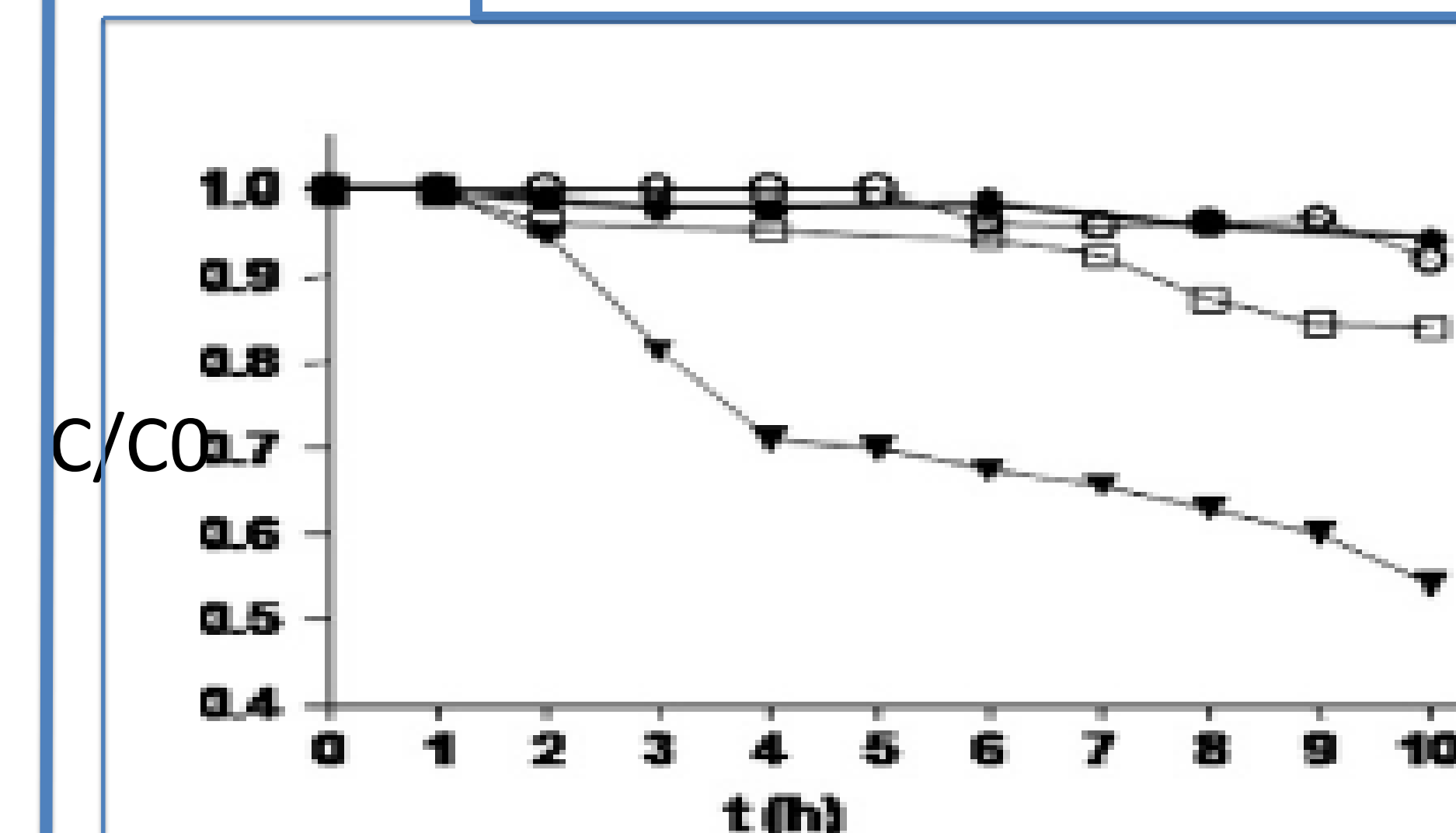


Fig.3 Deg. Of QNC in paddy field water under 250 and 700 Wm⁻²

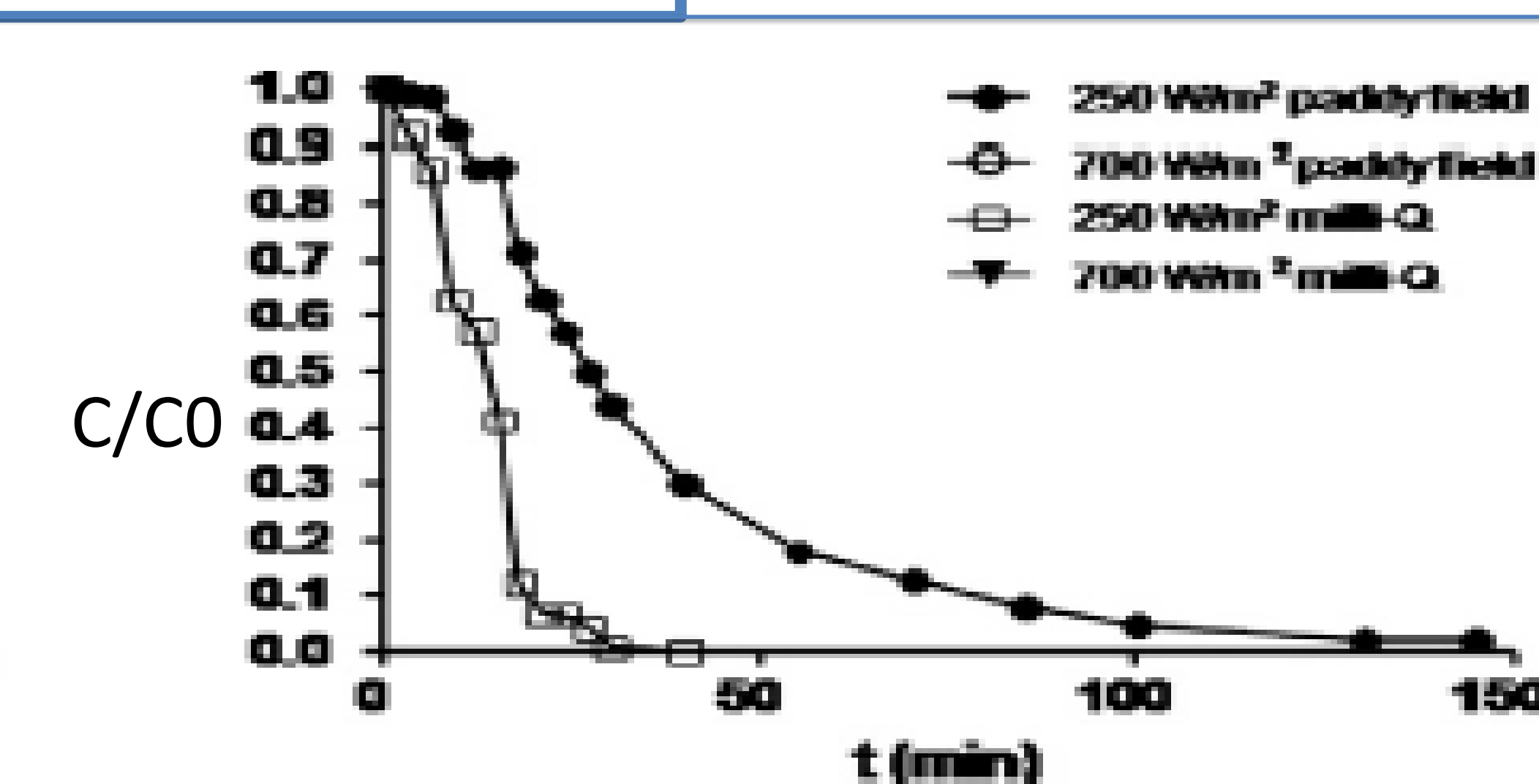


Fig.4 Deg. of QNC in pure and paddy water at 250Wm⁻²

Note: Fig. 3 and 4 from Reference No. 1

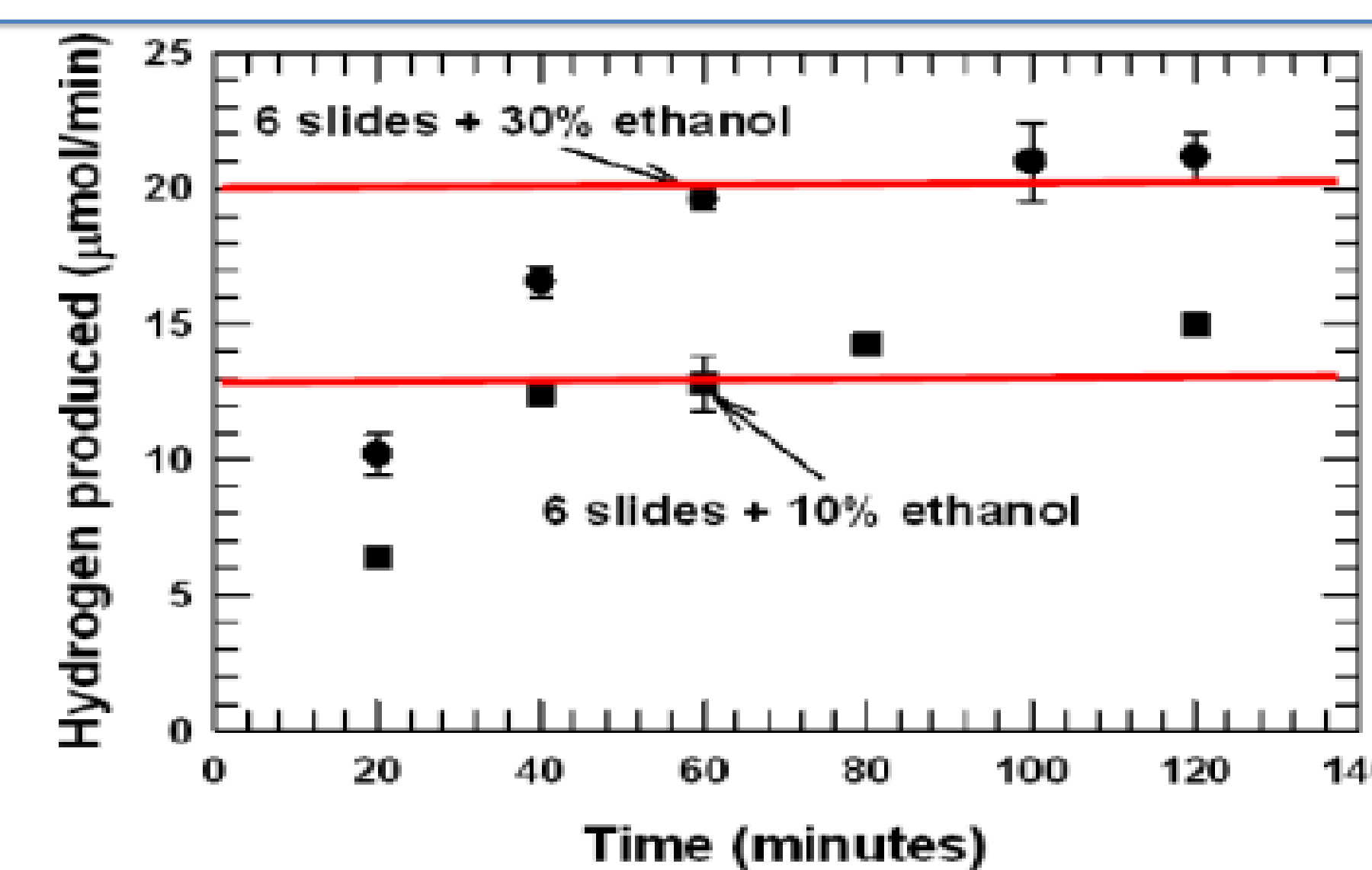


Fig. 5 Effect of Pt- TiO₂ surface area and solution ethanol concentration on H₂ production

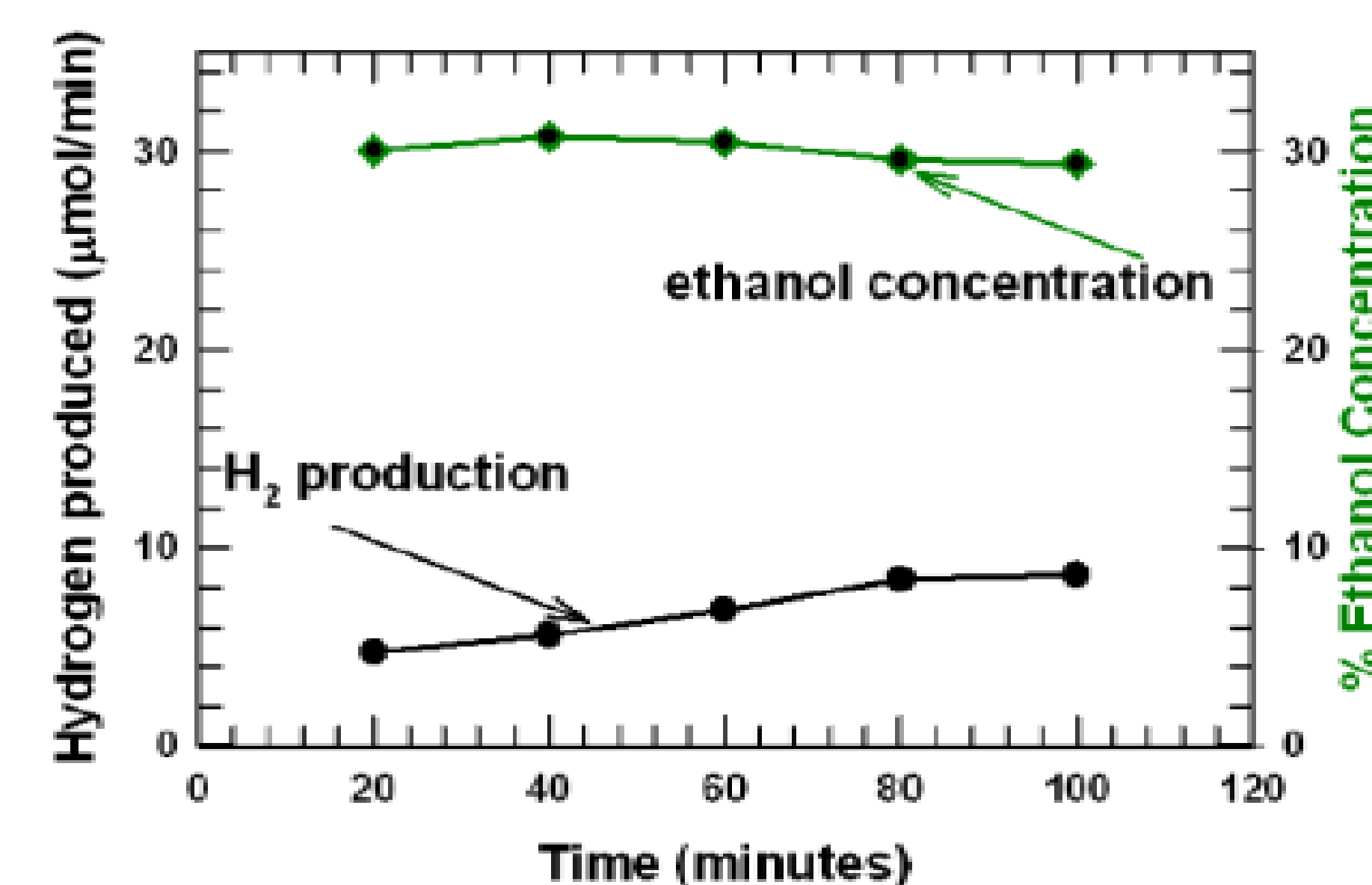
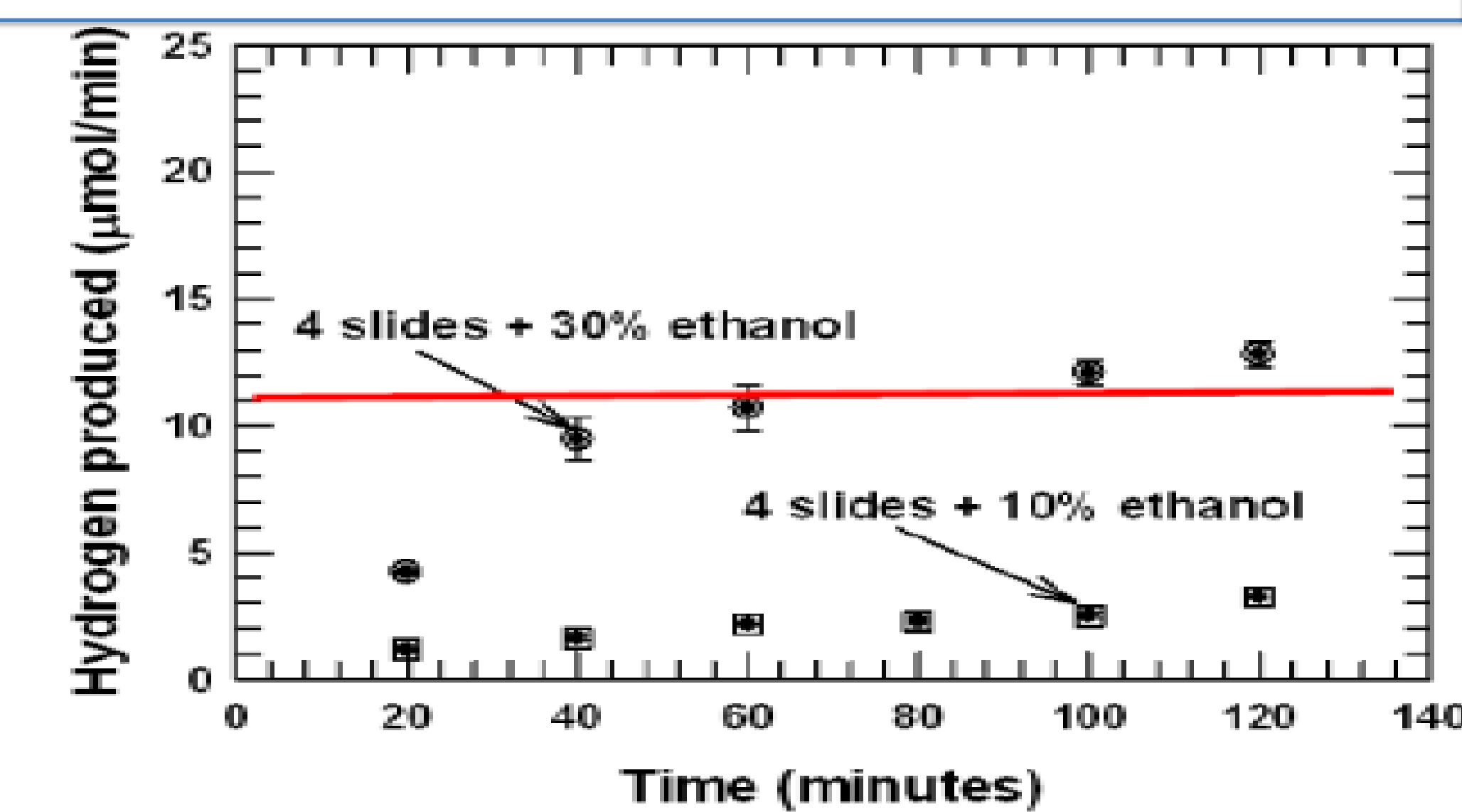


Fig.6 % Ethanol concentration With H₂ production rate

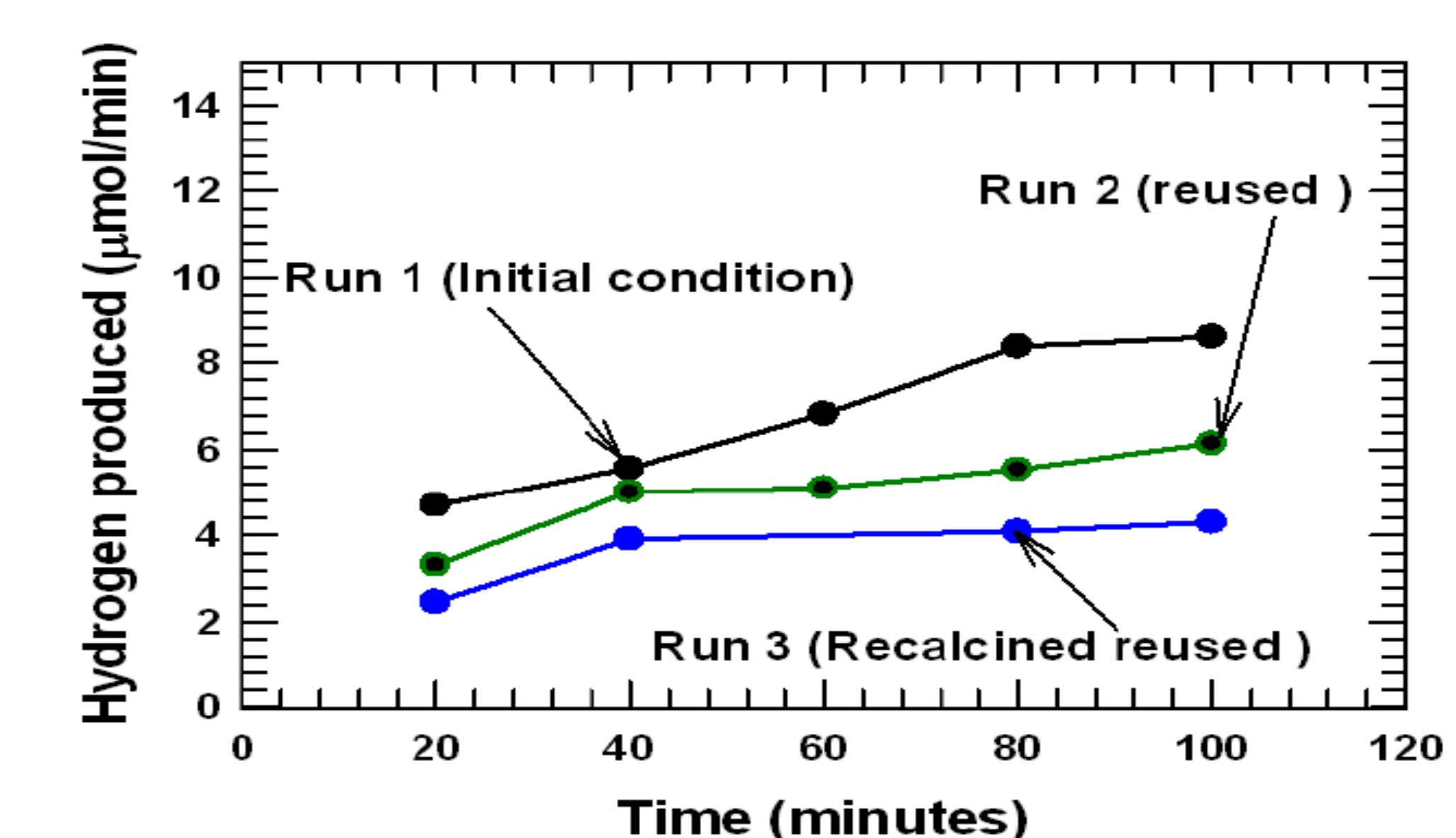


Fig.7 Effect of using different slide condition

References

1. Pareja L., Parada P.A., Aguera A., Cesio V., Hinzen H., Fernandez-Alba R.A., Photolytic and photocatalytic degradation of quinclorac in ultrapure and paddy field water: Identification of transformation products and pathways, *Chemosphere*, 2012(87)838-844
2. Okoye, N. H., Master Science Thesis, Tennessee Technological University, 2011