conferenceseries.com

Int J Waste Resour 2017, 7:4 (Suppl)
DOI: 10.4172/2252-5211-C1-009

Dark fermentative hydrogen gas production from molasses by hot spring microflora of Pamukkale travertines: Effects of temperature and inoculum percentage

Hidayet Argun, Gulizar Onaran, Ismail Gorgul, Muhammed Enes Miynat, Handan Han, Ayse Calkaya, Zeynep Karaoglan, Nurce Keskin and Ikbal Oren
Pamukkale University, Turkey

Hydrogen gas (H_2) is considered as the energy carrier of the future and it is expected to be one of the most widely used fuels in the following decades. H_2 has high energy content and its combustion does not result in greenhouse gas emissions. However, it is not readily available and conventional H_2 production technologies such as steam reforming of methane require intensive energy and complex operation. Dark fermentative (DF) H_2 production from wastes offers advantages over conventional technologies but it is still in research stage and has not found applicability at large scale due to low H_2 yields and rates. In this study, H_2 was produced for the first time from molasses by a microbial culture obtained from the travertines of Pamukkale hot springs in Turkey. In this context the effects of temperature and inoculation percentage (IP) on H_2 production performance were investigated in batch experiments. The effects of IP was investigated at constant temperature of 37 oC by varying the IP between 1-30% (v/v) and the effects of temperature was carried out at 10% (v/v) IP by varying the temperature between 25-70 oC. Optimum IP and temperature resulting maximum hydrogen yield (202.32 mL H_2/g COD), rate (14.02 mL H_2/h) and H_2 percentage (41.83) were 37 oC and 10% (v/v), respectively. The maximum H_2 yield of this study corresponds to 42.15% of the theoretical yield in dark fermentation indicating effective performance at mesophilic conditions.

hargun@pau.edu.tr