**CONCORSO PUBBLICO, PER ESAMI, PER N. 1 UNITÀ DI PERSONALE APPARTENENTE ALL'AREA DEI FUNZIONARI, SETTORE SCIENTIFICO-TECNOLOGICO, CON CONTRATTO DI LAVORO SUBORDINATO A TEMPO INDETERMINATO E REGIME DI IMPEGNO A TEMPO PIENO, PER LE ESIGENZE DEL DIPARTIMENTO DI ECCELLENZA DI AGRARIA DELL'UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II (COD. RIF. 2416), IN ATTUAZIONE DEL PROGETTO "DIPARTIMENTI DI ECCELLENZA 2023-2027" - CUP E63C22003650006, INDETTO CON DECRETO DEL DIRETTORE GENERALE N. 1109 DEL 3.10.2024**

**GRUPPO 1 ESTRATTO PROVA ORALE DEL 22.11.2024**

***Quesito A***

Il candidato esponga le caratteristiche tecnologiche di un dispositivo per la crescita di organismi (piante o microorganismi) in ambiente controllato.

***Quesito B***

**Shomope, I., Tawalbeh, M., Al-Othman, A., Almomani, F. (2024).** "Predicting biohydrogen production from dark fermentation of organic waste biomass using multilayer perceptron artificial neural network (MLP–ANN)." *Computers and Chemical Engineering*, 192, 108900. https://doi.org/10.1016/j.compchemeng.2024.108900

Testo estratto dalla pagina 1 – paragrafo introduction

1. Introduction

The global shift towards renewable and sustainable energy sources has prominently positioned hydrogen as an ideal alternative fuel (Abdelsalam et al., 2024; Acar and Dincer, 2019). Recognized for its zero emissions, high energy density, and wide applicability; hydrogen is central to future energy strategies (Madadi Avargani et al., 2022; AlNouss et al., 2024). Among various biohydrogen production technologies, such as photo fermentation, dark fermentation, and water biophotolysis, dark fermentation stands out due to its efficiency and environmental benefits (Urbaniec and Bakker, 2015). This process involves anaerobic bacteria breaking down organic matter in the absence of light to produce hydrogen (Kazi et al., 2021; Bonk et al., 2015). Notably, it converts organic waste into clean energy while minimizing greenhouse gas emissions, estimated at 15 kg $CO_2$-equivalent per kilogram of hydrogen produced (Hosseinzadeh et al., 2022). Operating conditions, such as temperature, pH, substrate type, hydraulic retention time (HRT), inoculum-to-substrate ratio (ISR), organic loading rate (OLR), reactor type, and metabolite production significantly influence the dark fermentation process (Wong et al., 2014). It should be noted that bacterial exposure to light can disrupt their activity and inhibit their metabolic processes, which, in turn, reduces biohydrogen production efficiency.

Organic waste, which includes biodegradable materials from living organisms, encompasses food waste (FW), agricultural residues, and other organic materials that can be transformed into biohydrogen through dark fermentation. With such a strategy dual challenges of waste management and sustainable energy production could be addressed (Chen et al., 2021; Zhao et al., 2012). For a long time, the management of FW from households and food industries, as well as agricultural waste and livestock by-products, was primarily conducted through landfill disposal. This practice has contributed significantly to greenhouse gas (GHG) emissions and has posed numerous disposal challenges (Kumar et al., 2015; Soares et al., 2020; Sivagurunathan et al., 2017). Yet, they hold untapped potential for biohydrogen production due to their rich organic content. However, the variability in

***Caso situazionale C***

Ti è stata affidata la realizzazione di un progetto importante e ciò comporta il coordinamento di un nuovo gruppo di colleghi che sembrano non gradire il tuo ruolo. Non accettano la tua modalità di gestione e sembrano ostacolarti continuamente. Come gestisci questa situazione?

**PER ORDINE DEL PRESIDENTE DELLA COMMISSIONE**
**IL SEGRETARIO**
**F.TO GIANNIELLO NICOLA**