

Bölüm 6

BİTKİSEL VE HAYVANSAL ATIKLARDAN BİYOHİDROJEN ÜRETİMİ

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1. GİRİŞ

Enerji, bir ülke ekonomisinin en önemli faktörlerinden biridir. Sanayi devriminden bu yana, dünya için enerji kaynağı olarak fosil yakıtlar önemli bir kaynak olmuştur. Enerji tüketim sürecinde fosil yakıtların yanması, başta karbon-dioksit (CO₂), nitrojen oksitler (NO_x), kükürt oksit (SO_x) ve partikül madde gibi sera gazları olmak üzere çeşitli gaz halindeki kirleticileri açığa çıkar ve bu zararlı gazların çevreye salınması küresel ısınmaya sebebiyet verir. Ayrıca, bu zehirli gaz halindeki kirleticiler insan sağlığına zarar vererek astım, solunum bozuklukları, felç, kalp krizi ve erken ölüme neden olur (1). Ancak, son zamanlarda fosil kökenli yakıtların, rezervlerin azalması ve çevre dostu olmaması gibi nedenlerle yenilenebilir enerji kaynaklarına ilgi artmıştır (2).

Geleneksel fosil enerji ile karşılaştırıldığında, hidrojenin enerji içeriği (142.9 kJ/g), benzinin ~2.8 katı ve kok kömürünün 4.5 katı olan son derece yüksek bir yanma ısısına sahiptir (3). Ayrıca, hidrojen başka kirleticiler içermeyen tek yanma ürünü olan su nedeniyle en temiz enerji olarak kabul edilir ve hidrojenin kimyasal enerjisi termal enerjiye dönüştürüldüğünde, termal verimliliği geleneksel fosil enerji kaynaklarından %30-60 daha yüksek olması nedeniyle birçok avantaja sahiptir (4).

Hidrojen; fosil yakıtlar, kömür, biyokütle gazlaştırma, doğal gaz ve suyun parçalanması veya su elektrolizi gibi birçok farklı yöntemlerle elde edilmektedir (Şekil 1.) (5).

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Tartışma ve Sonuç

Hızla gelişen dünyada hidrojen, gelecek için umut verici bir kaynaktır.

Biyohidrojen üretiminde çok önemli bir payı olan atık materyal seçimi doğrudan verimi etkileyecek bir faktördür. Bu nedenle bol miktarda ve kolay bulunabilen, ucuz, işlemler sırasında kolayca parçalanabilen ve kirliliği ortadan kaldıran yeni bir kirlilik oluşturmayacak atık materyal seçimine özen gösterilmelidir.

Biyolojik yöntemler diğer fiziksel ve kimyasal yöntemlere göre daha çevre dostu ve uygun maliyetlidir.

Lignoselüloz yapısına sahip olan tarımsal atıkların katma değer ürüne dönüşebilmesi için ön işleme tabi tutulması gereklidir.

Günümüzde özellikle tarımsal atıkların oksidatif bozunma, iyonik sıvı, buhar patlaması (birleştirme fiziksel ve kimyasal yöntemler), CO₂ katalitik patlaması ve amonyak lifi patlaması gibi birçok yeni teknolojik yöntemler geliştirilmiştir.

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