PRACTICE ABSTRACT NO. 12

Assessing the Economic Viability of Biochar-compost Composite Production as an Innovative Bio-Based Fertiliser

Main results / outcomes

The analysis shows that all financial indicators are strongly negative when using the nutrient price method, indicating that producing biochar-compost composite, under this pricing strategy, is economically unfeasible. A total of 635 tons of waste is required to produce the targeted amount of bio-based fertilizer (BBF). Using self-sourced inputs does not significantly improve profitability due to the low raw material (input) cost and high equipment expenses. However, under the cost-based method, the most favorable outcome was achieved using own input, with a BBF selling price of €62,800 per ton, when a payback period is 8.03 years, and a gross margin 41.34%. This represents the most economically viable scenario identified in the study.

Practical recommendations

Efforts should be focused on regions with favorable economic conditions, such as lower labour and energy costs, to maximize the viability of production. Where feasible, using self-sourced inputs may offer marginal benefits but is not a key factor in profitability due to the dominant influence of equipment costs. To improve financial outcomes, practitioners should explore cost-reduction strategies, such as shared equipment, energy-efficient technologies, or process optimization. Finally, pilot implementations should be concentrated in areas like Italy, where the model has shown the best potential for economic sustainability.

	Nutrient price method			
Biochar composite	STREAM INPUT	BBF PRODUCED	Net profit (EBIT)	PRICE
Norway				
purchased input	635,00 ton/year	16,584 ton/year	-811.038,48	20,84 eur/t
own input	635,00 ton/year	16,584 ton/year	-677.688,48	20,84 eur/t
Italy				
purchased input	635,00 ton/year	16,584 ton/year	-788.428,06	20,84 eur/t
own input	635,00 ton/year	16,584 ton/year	-610.628,06	20,84 eur/t

Figure 1: Nutrient price method financial results

	Cost method					
Biochar composite	STREAM INPUT	BBF PRODUCED	Net profit (EBIT)	Gross margin (GM)	Payback period (PP)	PRICE
Norway						
purchased input	635,00 ton/year	16,584 ton/year	424.123,91	34,33%	8,15 year	74.500 eur/t
own input	635,00 ton/year	16,584 ton/year	424.801,91	38,52%	8,14 year	66.500 eur/t
Italy						
purchased input	635,00 ton/year	16,584 ton/year	421.858,33	34,85%	8,19 year	73.000 eur/t
own input	635,00 ton/year	16,584 ton/year	430.501,53	41,34%	8,03 year	62.800 eur/t

Figure 2: Cost method financial results

Further information

SEA2LAND project website - https://sea2landproject.eu/

About this abstract

Authors: IPS Konzalting d.o.o. za poslovne usluge
Date: May 2025
SEA2LAND project is a collaborative Innovation Action (IA) funded by the EU in the frame of the Horizon 2020 programme. The project aims to provide solutions to help overcome challenges related to food production, climate change and waste reuse. Based on the circular economy model, SEA2LAND promotes the production of large-scale fertilisers in the EU from own raw materials. This solution is expected to reduce the soil nutrient imbalance in Europe. The project is running from January 2021 to June 2025.
Website: www.sea2landproject.eu

THIS PROJECT HAS RECEIVED FUNDING FROM THE EUROPEAN UNION'S HORIZON 2020 RESEARCH AND INNOVATION PROGRAMME UNDER GRANT AGREEMENT NO 101000402.

PRACTICE ABSTRACT NO. 12

Procjena ekonomske isplativosti proizvodnje biougljena kao inovativnog biognojiva

Glavni rezultati/ishodi

Istraživanje pokazuje da su svi financijski pokazatelji izrazito negativni kada se koristi metoda cijene hranjivih tvari, što ukazuje da je proizvodnja biougljena prema ovoj strategiji ekonomski neisplativa. Za proizvodnju ciljane količine ovog biognojiva potrebno je ukupno 635 tona ribljeg otpada. Korištenje sirovina iz vlastitih izvora ne poboljšava značajno profitabilnost zbog niske cijene sirovina i visokih troškova opreme. Međutim, prema metodi koja se temelji na troškovima, najpovoljniji ishod postignut je ipak korištenjem vlastitih sirovina, s cijenom biognojiva od 62.800 € po toni, razdobljem povrata od 8,03 godine i bruto maržom od 41,34%. Ovo predstavlja ekonomski najodrživiji scenarij identificiran u studiji.

Preporuke

Napore treba usmjeriti na regije s povoljnim gospodarskim uvjetima, kao što su niži troškovi rada i energije, kako bi se povećala održivost proizvodnje. Gdje je to izvedivo, korištenje sirovina iz vlastitih izvora može omogućiti marginalne koristi, ali nije ključni čimbenik profitabilnosti, i to zbog dominantnog utjecaja troškova opreme. Kako bi poboljšali financijske rezultate, potencijalni ulagači bi trebali istražiti strategije smanjenja troškova, kao što su zajednička oprema, energetski učinkovite tehnologije ili optimizacija procesa. Konačno, implementacija postrojenja trebala bi se fokusirati na područja poput Italije, gdje je model pokazao dobar potencijal za ekonomsku održivost.

	Nutrient price method			
Biochar composite	STREAM INPUT	BBF PRODUCED	Net profit (EBIT)	PRICE
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Slika 1. Rezultati profitabilnosti uz „metodu cijene nutrijenata" određivanja prodajne cijene

	Cost method					
Biochar composite	STREAM INPUT	BBF PRODUCED	Net profit (EBIT)	Gross margin (GM)	Payback period (PP)	PRICE
Norway						
purchased input	635,00 ton/year	16,584 ton/year	424.123,91	34,33%	8,15 year	74.500 eur/t
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Slika 2. Rezultati profitabilnosti uz troškovnu metodu određivanja prodajne cijene

Više informacija

SEA2LAND projektna stranica - https://sea2landproject.eu/

Opširnije o praktičnom sažetku

Autor: IPS Konzalting d.o.o. za poslovne usluge
Datum: Svibanj 2025

SEA2LAND projekt je suradnička inovacijska akcija (IA) koju financira EU u okviru programa Horizon 2020. Cilj projekta je pružiti rješenja koja će pomoći u prevladavanju izazova povezanih s proizvodnjom hrane, klimatskim promjenama i ponovnom uporabom otpada. Na temelju modela kružnog gospodarstva, SEA2LAND promiče proizvodnju velikih količina gnojiva u EU iz vlastitih sirovina. Očekuje se da će ovo rješenje smanjiti neravnotežu hranjivih tvari u tlu u Europi. Projekt traje od siječnja 2021. do lipnja 2025. godine. Web stranica: www.sea2landproject.eu

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