Spent Coffee Grounds Valorization Technologies

Environmental Science · Answer Key · 16 Questions

1. What is a primary environmental concern related to traditional disposal of spent coffee grounds (SCG)?

A) Reduced handling costs
B) Serious pollution problems
C) Increased organic solid waste
D) Decreased need for environmental protection

2. What are the three categories of technology bundles reviewed for high-value use of SCG?

A) SC-CO2 extraction, Thermal treatment, SCG-based material
B) Composting, Landfilling, Incineration
C) Fermentation, Distillation, Condensation
D) Extraction, Filtration, Evaporation

3. What compounds can be extracted from SCG using supercritical carbon dioxide (SC-CO2)?

A) Sugars and starches
B) Lipids, diterpenes, phenolics, and peptide-rich proteins
C) Cellulose and lignin
D) Water and minerals

4. What materials can SCG be converted into through thermal treatment/activation?

A) Fertilizer
B) Adsorbent materials like biochar/activated carbon
C) Animal feed
D) Construction materials

5. What pollutants can be removed by adsorbent materials made from SCG?

A) Dyes, heavy metals, and organics
B) Plastics and polymers
C) Gases and odors
D) Dust and particles

6. What is a potential application of SCG-based materials in bio-based polymers?

A) Fuel source
B) Filler or reinforcement
C) Insulation
D) Lubricant

7. In the activated carbon industry, which application represents the largest revenue share?

A) Air purification
B) Water treatment
C) CO_2 capture
D) Soil remediation

8. What is the primary goal of using SCG in bio-based polymers?

A) To increase the density of the material
B) To improve interfacial compatibility with the polymer matrix
C) To reduce the flammability of the material
D) To enhance the color of the material

9. What is the TRL (Technology Readiness Level) of Technology A (SC-CO_2 extraction)?

A) TRL 1-2
B) TRL 4-5
C) TRL 6-7
D) TRL 8-9

10. What is the TRL of Technology B (Thermal treatment/activation to make activated carbon)?

A) TRL 1-3
B) TRL 4-6
C) TRL 7-9
D) TRL 9

11. What is the main advantage of technology licensing as a commercialization path?

A) High profit margins
B) Fast, low-risk income
C) Complete control over production
D) Direct customer feedback

12. What is a key limitation or risk associated with technology licensing?

A) Unlimited income potential
B) Loss of strategic control
C) High initial investment
D) Guaranteed market success

13. What is the main advantage of building a start-up for commercializing SCG technology?

A) Low capital needs
B) Value maximization
C) Limited competition
D) Quick market entry

14. What is a major disadvantage of building a start-up for commercializing SCG technology?

A) Low risk
B) Very high capital needs and risks
C) Easy market entry
D) Guaranteed profitability

15. What is the core benefit of a strategic partnership agreement for SCG commercialization?

A) Resource supply (feedstock and customers)
B) Complete autonomy
C) Unlimited profit potential
D) Minimal risk

16. Which commercialization path is recommended for SCG to activated carbon technology?

A) Technology Licensing
B) Start-up creation
C) Strategic Partnership Agreement
D) Direct sales