Physiochemical features and their utility of products of vermicomposting

1. Vermiprotein

Definition:
Vermiprotein refers to the protein-rich biomass obtained from earthworms. It is especially valuable in animal and aquaculture feed.

Physicochemical Properties:

- **Protein Content:** 50–70% (dry weight basis) – highly digestible
- **Amino Acids:** Contains essential amino acids like lysine, methionine
- **Fat:** Low fat, but includes beneficial lipids
- **Moisture Content:** ~80–85% in live worms
- **Minerals:** Rich in iron, calcium, magnesium, and zinc

Utility:

- Used in **poultry, fish, and livestock feed** as a high-protein supplement
- Promotes **rapid growth in animals**
- Useful in **vermiculture** to start or expand worm populations
- Emerging use in **human nutrition** (protein supplements) in some studies

2. Vermicompost

Definition:
Vermicompost is the nutrient-rich, organic manure produced by earthworms from decomposed organic waste.

Physicochemical Properties:

- **pH:** 6.5–7.5 (neutral to slightly alkaline)
- **Moisture Content:** 25–30%
- **NPK Content:** Nitrogen (1–2%), Phosphorus (0.5–1%), Potassium (0.5–1%)
- **Organic Carbon:** ~15–25%
- **C/N Ratio:** Ideal range of 15–20
- **Texture:** Granular and loose; improves soil aeration

Utility:

- Used as a **natural fertilizer** for crops, gardens, and potted plants
- Enhances **soil microbial activity**, aeration, and water retention
- Improves **plant health and yield**
- Safe and eco-friendly alternative to chemical fertilizers

3. Vermiwash

Definition:
Vermiwash is the liquid extract obtained by allowing water to pass through a worm bed, collecting nutrient-rich exudates.

Physicochemical Properties:

- **pH:** 6.0–7.0 (slightly acidic to neutral)
- **Color:** Light brown to yellow
- **Nitrogen Content:** ~0.01–0.03%
- **Phosphorus & Potassium:** Low but bioavailable
- **Contains:** Enzymes, mucus, plant growth hormones (auxins, cytokinins), beneficial microbes

Utility:

- Used as a **foliar spray** or liquid fertilizer
- Acts as a **natural growth enhancer** for plants
- Strengthens **plant resistance** against pests and diseases
- Improves **soil microbial life** when added to compost or directly to soil

Summary Table:

Product	Key Properties	Main Uses
Vermiprotein	High protein, essential amino acids, mineral-rich	Animal feed, aquaculture, vermiculture
Vermicompost	NPK-rich, neutral pH, organic carbon, C/N balance	Soil fertilizer, plant growth promoter
Vermiwash	Enzyme-rich liquid, natural hormones, beneficial microbes	Foliar spray, bio-pesticide, microbial booster