

DIN EN 17983:2024-10 (E)

Algae and algae products - Measurement for renewable algal raw material for energy and non-energy applications

Contents	Page
European foreword	3
Introduction	4
1 Scope.....	5
2 Normative references.....	5
3 Terms and definitions.....	5
4 Measurement for renewable algal raw material.....	9
4.1 General.....	9
4.1.1 General.....	9
4.1.2 Green box inputs and outputs	9
4.1.3 Green box boundaries	10
4.2 Energy balance of algae facilities and algae products for life cycle assessment and techno-economic analysis.....	12
4.2.1 General.....	12
4.2.2 Energy inputs and outputs	12
4.2.3 Energy inputs	12
4.2.4 Energy outputs.....	13
4.2.5 Simplified energy balance, land-based cultivation.....	13
4.2.6 Energy balance, cultivation at sea.....	14
4.3 Mass balance of main algal biomass elements	15
4.3.1 Gas exchanges	15
4.3.2 Carbon.....	15
4.3.3 Nitrogen.....	19
4.3.4 Phosphorus	20
4.3.5 Hydrogen.....	21
4.3.6 Oxygen	21
4.3.7 Other nutrients and micronutrients.....	21
4.3.8 Mineral fraction of algae biomass.....	21
4.4 Carbon source parameters specific to algae as bio-based products	21
4.4.1 Algae as feedstocks for biofuels.....	21
4.4.2 Algae as feedstocks for non-food-feed applications other than biofuels	22
4.5 Water management.....	23
4.5.1 Water in closed systems	23
4.5.2 Algae cultivation at sea	25
4.6 Air management.....	25
4.6.1 Atmospheric equilibria in photosynthetic systems	25
4.6.2 Atmospheric equilibria in heterotrophic systems.....	26
Annex A (informative) Example of calculation for the measurement of energy and main elements balances of algae systems.....	27
Annex B (informative) Overview of carbon/CO ₂ neutrality.....	28
Annex C (informative) Overview of life cycle assessment (LCA)	29
Annex D (informative) Algae as feedstocks for biofuels	31
Bibliography	32