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Food to Microorganism Ratio or F to M Ratio Formulas

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List of 20 Food to Microorganism Ratio or F to M Ratio Formulas

Food to Microorganism Ratio or F to M Ratio

1) Biological Oxygen Demand Influent

Open Calculator

fx $$\mathrm{BOD_i} = \frac{\mathrm{FM} \cdot \mathrm{V} \cdot \mathrm{X}}{\mathrm{Q}}$$

ex $$0.000901\mathrm{mg/L} = \frac{0.001 \cdot 1.5\mathrm{m^3} \cdot 2.0\mathrm{mg/L}}{3.33\mathrm{m^3}}$$

2) BOD Influent given MLSS

Open Calculator

fx $$\mathrm{Q_i} = \frac{\mathrm{BOD} \cdot \mathrm{X} \cdot \mathrm{V}}{\mathrm{M_t} \cdot \mathrm{Q}}$$

ex $$0.000901\mathrm{mg/L} = \frac{3.0\mathrm{mg} \cdot 2.0\mathrm{mg/L} \cdot 1.5\mathrm{m^3}}{3\mathrm{g} \cdot 3.33\mathrm{m^3}}$$

3) BOD Load Applied given MLSS

Open Calculator

fx $$\mathrm{BOD} = \mathrm{M_t} \cdot \left(\frac{\mathrm{Q} \cdot \mathrm{Q_i}}{\mathrm{V} \cdot \mathrm{X}}\right)$$

ex $$2.997\mathrm{mg} = 3\mathrm{g} \cdot \left(\frac{3.33\mathrm{m^3} \cdot 0.0009\mathrm{mg/L}}{1.5\mathrm{m^3} \cdot 2.0\mathrm{mg/L}}\right)$$

4) BOD Load applied to Aeration System

Open Calculator

fx $$\mathrm{BOD_a} = \mathrm{Q} \cdot \mathrm{Q_i}$$

ex $$2.997\mathrm{mg} = 3.33\mathrm{m^3} \cdot 0.0009\mathrm{mg/L}$$

5) BOD of Influent Sewage given BOD Load Applied

Open Calculator

fx $$\mathrm{Q_i} = \frac{\mathrm{BOD}}{\mathrm{Q}}$$

ex $$0.000901\mathrm{mg/L} = \frac{3.0\mathrm{mg}}{3.33\mathrm{m^3}}$$

6) Daily BOD Load given Food to Microorganism Ratio

Open Calculator

fx $$\mathrm{BOD} = \mathrm{FM} \cdot \mathrm{M_t}$$

ex $$3\mathrm{mg} = 0.001 \cdot 3\mathrm{g}$$

7) Food to Microorganism Ratio

Open Calculator

fx $$\mathrm{FM} = \frac{\mathrm{BOD}}{\mathrm{M_t}}$$

ex $$0.001 = \frac{3.0\mathrm{mg}}{3\mathrm{g}}$$

8) Food to Microorganism Ratio given MLSS

Open Calculator

$$\mathrm{FM} = \frac{\mathrm{Q} \cdot \mathrm{Q_i}}{\mathrm{X} \cdot \mathrm{V}}$$

$$0.000999 = \frac{3.33\mathrm{m^3} \cdot 0.0009\mathrm{mg/L}}{2.0\mathrm{mg/L} \cdot 1.5\mathrm{m^3}}$$

9) Microbial Mass in Aeration System

Open Calculator

$$\mathrm{M_a} = \mathrm{X} \cdot \mathrm{V}$$

$$3000\mathrm{mg} = 2.0\mathrm{mg/L} \cdot 1.5\mathrm{m^3}$$

10) Microbial Mass in Aeration System given MLSS

Open Calculator

$$\mathrm{M_t} = \frac{\mathrm{BOD}}{\frac{\mathrm{Q} \cdot \mathrm{Q_i}}{\mathrm{V} \cdot \mathrm{X}}}$$

$$3.003003\mathrm{g} = \frac{3.0\mathrm{mg}}{\frac{3.33\mathrm{m^3} \cdot 0.0009\mathrm{mg/L}}{1.5\mathrm{m^3} \cdot 2.0\mathrm{mg/L}}}$$

11) Mixed Liquor Suspended Solid

Open Calculator

$$\mathrm{X} = \frac{\mathrm{Q} \cdot \mathrm{Q_i}}{\mathrm{FM} \cdot \mathrm{V}}$$

$$1.998\mathrm{mg/L} = \frac{3.33\mathrm{m^3} \cdot 0.0009\mathrm{mg/L}}{0.001 \cdot 1.5\mathrm{m^3}}$$

12) MLSS given BOD Load Applied to Aeration System

Open Calculator

$$X = \frac{M_t \cdot Q \cdot Q_i}{V \cdot BOD}$$

$$1.998\text{mg/L} = \frac{3\text{g} \cdot 3.33\text{m}^3 \cdot 0.0009\text{mg/L}}{1.5\text{m}^3 \cdot 3.0\text{mg}}$$

13) MLSS given Microbial Mass in Aeration System

Open Calculator

$$X = \left(\frac{M_t}{V}\right)$$

$$2\text{mg/L} = \left(\frac{3\text{g}}{1.5\text{m}^3}\right)$$

14) Sewage Flow given Food to Microorganism Ratio

Open Calculator

$$Q = \frac{FM \cdot V \cdot X}{Q_i}$$

$$3.333333\text{m}^3 = \frac{0.001 \cdot 1.5\text{m}^3 \cdot 2.0\text{mg/L}}{0.0009\text{mg/L}}$$

15) Sewage Flow given MLSS

Open Calculator

$$Q = \frac{BOD \cdot X \cdot V}{M_t \cdot Q_i}$$

$$3.333333\text{m}^3 = \frac{3.0\text{mg} \cdot 2.0\text{mg/L} \cdot 1.5\text{m}^3}{3\text{g} \cdot 0.0009\text{mg/L}}$$

16) Sewage Flow into Aeration System given BOD Load Applied

Open Calculator

fx $$Q = \frac{BOD}{Q_i}$$

ex $$3.333333m^3 = \frac{3.0mg}{0.0009mg/L}$$

17) Total Microbial Mass given Food to Microorganism Ratio

Open Calculator

fx $$M_t = \frac{BOD}{FM}$$

ex $$3g = \frac{3.0mg}{0.001}$$

18) Volume of Tank given Food to Microorganism Ratio

Open Calculator

fx $$V = \frac{Q \cdot Q_i}{FM \cdot X}$$

ex $$1.4985m^3 = \frac{3.33m^3 \cdot 0.0009mg/L}{0.001 \cdot 2.0mg/L}$$

19) Volume of Tank given Microbial Mass in Aeration System

Open Calculator

fx $$V = \frac{M_t}{X}$$

ex $$1.5m^3 = \frac{3g}{2.0mg/L}$$

20) Volume of Tank given MLSS

Open Calculator

fx $$V = \frac{M_t \cdot Q \cdot Q_i}{X \cdot BOD}$$

ex $$1.4985\text{m}^3 = \frac{3\text{g} \cdot 3.33\text{m}^3 \cdot 0.0009\text{mg/L}}{2.0\text{mg/L} \cdot 3.0\text{mg}}$$

Variables Used

- **BOD** Daily BOD *(Milligram)*
- **BOD_a** BOD Load applied to Aeration System *(Milligram)*
- **BOD_i** Biological Oxygen Demand *(Milligram per Liter)*
- **FM** Food to Microorganism Ratio
- **M_a** Microbial Mass in Aeration System *(Milligram)*
- **M_t** Total Microbial Mass *(Gram)*
- **Q** Sewage Flow *(Cubic Meter)*
- **Q_i** Influent BOD *(Milligram per Liter)*
- **V** Volume of Tank *(Cubic Meter)*
- **X** MLSS *(Milligram per Liter)*

Constants, Functions, Measurements used

- Measurement: **Weight** in Milligram (mg), Gram (g)
  Weight Unit Conversion
- Measurement: **Volume** in Cubic Meter (m^3)
  Volume Unit Conversion
- Measurement: **Density** in Milligram per Liter (mg/L)
  Density Unit Conversion

Check other formula lists

- **Design of Conical Humus Tank Formulas**
- **Design of Continuous Flow Type of Sedimentation Tank Formulas**
- **Efficiency of High Rate Filters Formulas**
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