1. Abstract
2. Introduction
3. The composting process

* Historical introduction
* Importance of the composting process
* Phases of the process
* Mesophilic and thermophilic microbial
* Chemical reactions
* Physical factors

1. The model

* Theoretical aspects

1. Assumptions
   1. Environment:
2. Initial waste temperature: 25ºC (inside the house)
3. Sinusoidal variation of ambient temperature between 5 and 20 ºC
   1. Compost:
4. Homogeneous
5. Porosity constant
6. Evaporation compensated with moisture
7. Not periodic aeration
8. HDPE cubic container not completely isolated 🡪 Permits enough air flow
9. Thin walls 🡪 conduction neglectable
10. Low temperatures 🡪 radiation neglectable
11. Constant moisture 🡪 50%
12. 30 kg (weekly familiar vegetable waste)
13. Kitchen vegetable waste
    1. Microbial:

* Mesophilic: Aspergillus niger model (Esener and Raimbault)

Maximum growth at 40

* Thermophilic: extrapolation to replicate the thermophilic phase:

Maximum growth at

Less exothermicity

Slower growth

* Numerical model
* Generic expression 🡪 simplification: not considering constant flux of energy due to wind currents, m and c constants (Metaestudi Mason)
* Biological heat (Semenov model) 🡪 Consider an equilibrium of activation/inactivation of the microbes 🡪 simplification: not considering cellulose decomposing (pre-exponential factor of its Arrhenius expression is small)
* Deduction of the growth rate depending on temperature considering Arrhenius equation (Semenov & Esener and Roels)
* Logistic model of growth
* Heat losses 🡪 Calculation of the overall heat coefficient
* Experimental data: (Saucedo)
* Activation energies and pre-exponential factors for mesophilic microbes
* Initial concentration of microbes
* Assumptions:
* Activation energies and pre-exponential factors for thermophilic microbes
* Maximum concentration of microbes

1. Results and Discussion
2. Graphi

* Canberra experiment
* Aspergillus niger

1. Strengths and weaknesses
2. Further analysis
3. Conclusions

FOR THE SAKE OF SIMPLICITY