

**Title: Home composting of food wastes at a small scale: presence of *Escherichia coli* and total coliforms during the process**

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**Abstract:**

Previous researches indicate some factors regarding the public acceptance of home composting as the quality of the compost produced and how to achieve successful results. Among the microbiological parameters, the presence of total and thermotolerant coliforms is regulated by CONAMA in Resolution 375/2006. According to many authors, the thermophilic phase of the composting process causes the decrease of pathogenic microorganisms from domestic organic waste. However, when performed on a small scale composting stays always in the mesophilic phase, reaching a maximum temperature near 45°C, favoring the growth of coliforms. In order to achieve a better understanding of these issues, this research aimed to investigate the presence of *Escherichia coli* during the composting of organic food waste using a simple and small-scale domestic composter. Home composting of organic waste was evaluated for 68 days in the Laboratory of Solid Wastes and Effluents at Federal University of Bahia, Brazil. The experiment was performed using plastic containers of low cost (approximately U\$ 10.00) readily available in shops and supermarkets. The working volume was equal to 22.0 liters. The residue was comprised by bulking agent (wood chips) and food waste, always in a ratio of 2: 1 (v/v) respectively. The food waste consisted of vegetables and fruits. Temperature was measured with a 30 cm probe HI 145 - Hannah Instruments. Total coliforms and *E. coli* were quantified by defined substrate technique using Colilert<sup>®</sup>, IDEXX.  $5.8 \times 10^6$  NMP/g<sub>dw</sub> of total coliforms and  $5.3 \times 10^4$  NMP/g<sub>dw</sub> of *E. coli* were quantified in the food waste. On the first composting day, the waste within the container had  $2.4 \times 10^{10}$  NMP/g<sub>dw</sub> of total coliforms and  $1.4 \times 10^3$  NMP/g<sub>dw</sub> of *E. coli*. The highest temperature (45.2°C) was reached after 16.5 hours of composting. After this, the *E. coli* population increased to  $2.5 \times 10^7$  NMP/g<sub>dw</sub>. In contrast, the total coliforms decreased to  $2.5 \times 10^9$  NMP/g<sub>dw</sub>. After 54 days, the concentrations of *E. coli* and total coliforms decreased to  $2.7 \times 10^3$  NMP/g<sub>dw</sub> and  $3.8 \times 10^6$  NMP/g<sub>dw</sub>, respectively. 14 days later, less than 100 NMP/g<sub>dw</sub> of *E. coli* were quantified. The concentration of total coliforms remained in order of  $10^6$  NMP/g<sub>dw</sub>. These results show that in mesophilic range of temperature, the composting time is the main factor responsible for the disappearance of pathogenic microbial communities.

**Key words:** *Escherichia coli*, food waste, home composting

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