ASSESSMENT OF BACTERIAL CONTAMINATION OF DRINKING NATURAL MINERAL WATERS COMMERCIALLY IN 20 L RETURNABLE BOTTLED

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ABSTRACT

The aim of this study was to assess the microbiological quality of natural mineral waters commercialized in 20 L returnable bottles available in Brazil. A total of 33 representative samples (three from each lot, totalizing 99 individual samples) were analyzed for bacterial contamination (total coliforms, *Escherichia coli*, clostridium sulphite-reducing, *Pseudomonas. aeruginosa* and enterococci) according to the Brazilian legislation. The time of manufacture (T_m) of the returnable bottle were divided into three categories $0 \leq T_m \leq 1$ year ($T_{m\ 0\text{-}1}$), $1 \leq T_m \leq 2$ years ($T_{m\ 1\text{-}2}$), $2 \leq T_m \leq 3$ years ($T_{m\ 2\text{-}3}$); and their microbiological quality were evaluated using Student *t* test ($p<0.05$). *P. aeruginosa* isolates were characterized for antimicrobial susceptibility using the standardized agar disc diffusion method. Total coliforms were found in 16 (16.2%) samples, *P. aeruginosa* in 10 (9.9%), clostridium sulphite-reducing in five (5.0%), *E. coli* in two (2.0%), and no sample present contamination by enterococci. In total, 22 (22.2%) individual samples were considered unsatisfactory for human consumption according to the Brazilian legislation. Furthermore, considering each representative sample, from the 33 lots analyzed, 16 (48.5%) lots were considerate unsatisfactory. The highest percentage of unsatisfactory samples was found in samples in bottles with $T_{m\ 2\text{-}3}$ (12.1%), followed by $T_{m\ 0\text{-}1}$ (6.1%) and $T_{m\ 1\text{-}2}$ (4.0%), and significant differences were detected when we compared the time of T_m 0-1 and T_m 2-3 ($p=0.01$) and T_m 1-2 and T_m 2-3 ($p=0.003$). This result indicates that the validity of three year may not be enough to guarantee the integrity of the bottles for reuse, showing that these bottles can be more susceptible to contamination during the production. The *P. aeruginosa* strains were susceptible to all (n=9) antibiotics tested. Since there is a high consumption of natural mineral waters by elderly and immunosuppressed persons, epidemiological surveillance agencies should be aware of the risk that these waters may represent for these groups.

Keywords: bacterial contamination; natural mineral water; food security; antibiogram.

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