SHELF LIFE STUDY OF LACQUERED CANNED TOMATO: influence of different variables of the process/product

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The shelf life of a food product is defined as the time during which, after packaging, the product remains acceptable in well defined conditions. The evaluation and prediction of shelf life of packaged foods are important both in relation to ensure product quality and in strictly economic-commercial terms and cannot be separated from the study of the effects of distribution conditions. Tomato products are most packed in cans protected with white enamel. The shelf life can vary significantly in relation to the formulation used, the characteristics of container used and the type of distribution. Then is very important to define the key factors that most influence the degradation process and the values which constitute the critical limit. The research aimed to obtain information on the shelf life of enameled cans packed with tomato products taking into account the main variables, not easy to control, in the normal industrial practice and in particular:

- Weight (400, 410, 420 and 430 g) and filling temperature (35, 50 and 70°C, use of jet steam);
- Presence of corrosion accelerators, such as copper (2 mg/kg) and nitrates (40 mg/kg);
- Type of can body beading, 5+5 and “millerighe” (19 beading);
- Presence of mechanical damage, scratches of the organic coating;
- Storage temperature (20, 37 and 50° C).

The packaging was done at the SSICA pilot line in Parma in two different moments; in the first case the filling was done in the presence of jet steam. In each test about 900 cans (0.5 kg) coated internally with white enamel, supplied by two different canmakers, were filled with tomato puree. After packing all the cans were placed in thermostatic cells at three different temperatures.

At predetermined times (time 0, 7 days, 1, 3, 6, 9, 12, 18 and 24 months) some packages for each type and temperature of storage were controlled. To assess the degree of corrosion of the container some physico-chemical test were carried out on the cans. To confirm the analytical data the morphology of the inner surface was also examined. The results obtained at 24 months were satisfactory for all the cans stored at 20 ° C, even in the presence of corrosion accelerators or mechanical damage; the behavior of the cans with high filling weight differs from all others. At temperatures higher than room temperature the accelerating effect of nitrates on the undermining corrosion and of the filling temperature was significant; the presence of copper, unlike what expected, showed no particular influences. The work has thus confirmed the importance of storage temperature on corrosion resistance also for internally lacquered cans.