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Microbial quality of retort processed traditional Kerala chicken curry#

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Abstract

The present study was carried out at the Department of Livestock Products Technology, College of Veterinary and Animal Sciences, Pookode and ICAR - Central Institute of Fisheries Technology, Kochi to develop retort processed traditional Kerala chicken curry and to evaluate its microbial quality. Traditional Kerala chicken curry was prepared using boneless chicken breast pieces and with a gravy of roasted coconut, spices and condiments. The product was packed in multilayer laminated pouch, which was then hermetically sealed and processed in an over-pressure retort. Accurate time-temperature standardisation was done to maintain sterility. The pouches were checked for commercial sterility after processing. The product was stored at ambient temperature and microbiological evaluation was conducted on days 0, 30, 60, 90 and 120 of storage. The curry showed no aerobic and anaerobic growth on different days of storage and did not spoil till day 120.

Keywords: *Traditional Kerala chicken curry, retort processing, ambient temperature storage, microbial quality*

Chicken curry is prepared traditionally in different parts of Kerala by incorporating ground coconut fried with spices as the gravy and is popularly called *varutharacha kozhi* curry. It involves marinated chicken incorporated with roasted coconut gravy along with coconut pieces which are perceptible. Kerala contributes to 45 per cent of coconut production in India and this

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curry is undoubtedly one of the most loved and sought after and is iconic as a dish of cultural significance. Nourishment, health, and ease of preparation are the driving forces for food industries to introduce their product in their profile.

A consumer would prefer traditional foods daily, only when it is safe, tasty, ready-to-eat and easily available. Retort processing is one such technology where the product remains stable and safe for a long time. Standardisation of the thermal process is based on the microbial heat resistance for each specific product formulation and composition and the heating rate of a specific product. Retort pouch processed foods maintain uniform product quality and they have better texture and the process time is less when compared to foods processed in metal cans (Mohan and Ravishankar, 2019). The products were microbiologically safe even after long-time storage. Retort processing of the traditional Kerala chicken curry (*varutharacha kozhi* curry) will help in converting a perishable curry into a shelf-stable one which can be stored at ambient temperature for a long duration, consumed as and when required.

The gravy was made by heating coconut oil in a pan, adding sliced shallots, sauteing till tender, and then adding grated coconut. The coconut was sautéed with coriander powder, chilli powder, and curry leaves until golden brown. The roasted mixture was mashed into a fine paste in a blender, with the addition of water and boiled for 2 minutes. Mustard seeds, dry chillies, curry leaves, and sliced coconuts were roasted in oil and added to the coconut paste to make the gravy/ curry medium. The cleaned boneless chicken breast pieces were marinated for 30 minutes in a mixture of turmeric powder, black pepper powder, chilli powder, and salt. Crushed ginger, garlic, and *garam masala* were sautéed in a pan and marinated chicken pieces were added and cooked for 4 minutes. Chicken pieces (85 ± 5 g) and gravy/ curry medium (100 ± 2 g) were filled in threelayer (12µ PET ALOX / 15µ Nylon/70µ cast polypropylene of size 16 x 18cm) retort pouches, residual air was removed by steam flush technique and sealed by a pneumatic impulse sealing machine (Model QS300X10PNIV2, M/s Sevana Electrical Appliances Pvt Ltd., Kizhakkambalam, Kerala). The pouches were subjected to cooking in an over pressure retort (Model 24 rotary retorting system, John Fraser and Sons Ltd., Newcastle-upon-Tyne, UK) with F_0 value of 7 min. The retort temperature (RT) was maintained at 121.1°C and air pressure was maintained at 28 psi throughout the heating and cooling periods. After processing the pouches to the required F_0 value, they were cooled rapidly by pumping water into the retort and recirculating it. The pouches were wiped and kept in dustproof cabinet at ambient temperature.

Commercial sterility was assessed as per the procedure of Bureau of Indian Standards (IS: 2168, 1971). Pouches were incubated at 37°C for 15 d and 55°C for 5 d. The incubated pouches were aseptically opened, and 1 to 2 g of the samples were taken by sterilised forceps and inoculated into the sterilised fluid thioglycolate broth in test tubes. Sterilised liquid paraffin was put on to the top of the broth to create an anaerobic condition and incubated at 37°C for 48 h and at 55°C for 4 d, respectively. The product was analysed for aerobic organisms (Morton, 2001) and anaerobic organisms (Lake *et al*., 2001) according to procedure of American Public Health Association, on days 0, 30, 60, 90 and 120. Readymade media (Hi-Media and Sisco, Research Laboratories, India) were used for all the microbial tests.

Commercial sterility assessment revealed absence of microbial growth. On storage under ambient temperature, no visible swelling or damage was observed, and the microbiological examination confirmed the absence of aerobic and anaerobic organisms throughout the storage period. Similarly, Devadason *et al*. (2014) stated that the retort processed buffalo meat blocks did not reveal aerobic and anaerobic microbial population in the storage period of 90 days which indicated the effectiveness of thermal processing. Shah *et al.* (2017) noted that the heat procedure with temperature of 121 °C and F_0 7 to 11 min used in the processing of *rogan josh* in retort pouches eliminated the microorganisms. Total

bacterial counts, and differential counts of *E. coli, Salmonella* spp*., Clostridium* spp*.,* and *Staphylococci* spp., did not reveal any growth during the entire storage period in pork curry samples processed with F_0 11.81 for 48 min, according to Girish *et al*. (2018). The product in the current study was shelf stable for a period of 120 days at ambient temperature.

Summary

Retort processing is one of the efficient technologies in food processing, which can convert perishable products to shelf-stable products. The microbiological examination throughout the storage period of 120 days revealed no growth of aerobic and anaerobic organisms and no spoilage of the product when stored at ambient temperature. This makes it possible for long term storage and transportation of this product to different parts of the state or country or abroad for consumers to relish this traditional curry and thus aid in popularisation of this traditional dish of Kerala.

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Conflict of interest

The authors declare that they have no conflict of interest

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