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Retort processing of traditional chicken *biriyani* and its microbiological quality

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Abstract

Traditional dishes such as chicken biriyani are relished by many and consumed in almost every celebration. The lifestyle changes and rapid urbanisation calls for the development of ready-to-eat processed foods, which are safely processed and neatly packed. Retort processed shelf-stable foods are an alternative to such a demand. In the study conducted, the retort processing conditions of traditional chicken biriyani was standardised and commercial sterility of the product was analysed. Microbiological parameters such as aerobic and anaerobic plate counts were assessed on 0th, 30th, 60th, 90th and 120th days of storage. The commercial sterility test was satisfactory and the microbiological analysis revealed an absence of bacterial colonies throughout the storage study. The highly perishable, traditional product was sterile on all days of storage study and was suitable as a shelf-stable product for mass production.

Keywords: *Chicken biriyani, retort processing, commercial sterility, microbiological parameters*

Traditional foods represent the cultural heritage and connect to the past of a particular region. Present day consumers prefer traditional foods of high quality, which are safely processed and neatly packed. In the present world scenario of changing lifestyle, increased work pressure and nuclear families, the demand for ready-to-eat processed foods has increased, even in developing countries like India. Thermal processing is one of the most effective means of preserving food and it can be used to enhance the shelf life of food products. Nowadays, retorted products in pouches are accepted more than canned foods, especially among the urban middle class.

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A study was conducted, to standardise and optimise the processing conditions of traditional chicken *biriyani,* determine the commercial sterility and assess the microbiological quality of the product, so that more traditional products that are shelf-stable at room temperature could be made available in the market.

The study was carried out at Department of Livestock Products Technology, College of Veterinary and Animal Sciences, Pookode and Fish Processing Division, ICAR-Central Institute of Fisheries Technology (ICAR-CIFT), Kochi. Preliminary trials were conducted to obtain the optimum rice: water combination. This included 1:0.8, 1:0.9, 1:0.95, 1:1, 1:1.5, 1:1.6, 1:1.7, 1:1.75, 1:1.8 and 1:2 combinations. The best rice:water combination was selected based on sensory evaluation. In addition, trials were conducted to find the optimum time required for soaking rice. Rice was soaked for 5, 10 and 15 minutes and after retort processing, based on sensory analysis and texture profile analysis, ideal soaking time was arrived at. For the *biriyani* preparation, boneless breast meat of broiler chicken, rice, spices and condiments were obtained from local markets. After sautéing cinnamon, cardamom and cloves in ghee in a pan, the soaked and drained rice, was added and sautéed for 2 minutes. The chicken *masala* was prepared by cooking chicken with onion, ginger-garlic paste, green chilli, mint leaves, coriander leaves, prepared *biriyani* spice mix and tomato in oil. Eighty grams of the prepared chicken *masala*, 50 grams of rice and 50 grams of hot water were filled in each of the retort pouch manually and sealing of the pouches was done immediately after flushing away the air with steam. The pouches were then processed in a steam-air retort (John Fraser and Sons Ltd., New castle upon Tyne, UK) at ICAR-CIFT, Kochi at 121.1^{0}C with an Fo value of 3.5. The Fo value was determined after a series of preliminary trials and a value of 3.5 was selected based on sensory and texture evaluation. The heat penetration characteristics were evaluated by fixing the pouches with thermocouple glands (type GEM-K distance piece GEM-26008-K030, Ellab A/S, Roedovre, Denmark) through which thermocouples (type SSA 12080—G700-TS, Ellab Co. Denmark) were inserted. The tips of the thermocouples were inserted into the chicken pieces and rice for recording the core temperature during heat processing. Temperatures were then monitored using a data recorder (Ellab E val flex 9016; Ellab A⁄S, Rodovre, Denmark). After processing, the pouches were cooled rapidly by pumping and recirculating water into the retort. The pouches were then stored at ambient temperature.

The analysis of commercial sterility was done according to the procedure of Bureau of Indian Standards (IS: 2168, 1971). The pouches were incubated at 37°C for 15 days and 55°C for minimum of 5 days. 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 anaerobic condition and incubated at 37°C for 48 h and at 55°C for 5 days.

Microbiological parameters like aerobic plate count and anaerobic plate count were assessed on days 0, 30, 60, 90 and 120 of ambient temperature storage by following standard methods of American Public Health Association. Readymade media (Hi-Media and Sisco Research Laboratories, India) were used for all the microbiological examinations. Serial dilutions were made and aerobic plate count (APC) was evaluated as per the procedure of Morton (2001). Duplicate sets of sterilised Petri-dishes were inoculated aseptically with 1 ml of aliquots from appropriate dilutions. About 15 ml of agar, melted and maintained at 45 ^{0}C was poured gently in to each dish and rotated in clockwise and anticlockwise directions for 3 sec to mix the media uniformly. The plates were incubated at 35 ^{0}C for 48 h. After incubation, plates were examined for colony formation. Anaerobic count was evaluated as per procedure of Lake *et al* (2001). The inoculated plates were incubated at 37 ^{0}C for 48 h under anaerobic condition. After incubation, plates were examined for colony formation.

The sterility test conducted on the samples of retort processed chicken *biriyani* was found to be satisfactory as shown by the absence of turbidity in thioglycolate broth. This

result indicated that the samples were sterile after processing. Bindu *et al*. (2010) analysed the commercial sterility of ready-to-eat fish *peera* in retort pouches and found an absence of turbidity in the test tubes, indicating sterility of samples. Aerobic plate count and anaerobic plate count assays revealed the absence of bacterial colony formation on days 0, 30, 60, 90 and 120, indicating the commercial sterility of the product. This result agreed with the findings of Shah *et al.* (2017), who analysed *rogan josh* in retort pouches for total plate count. They reported an absence of microbial growth during the storage period and concluded that the temperature applied during the processing as well as the sterility maintained inside the packets could be the reason behind this. Zarim *et al.* (2021) reported an absence of anaerobic bacteria during 6 months of storage in retort packaged texture-modified chicken *rendang* using xanthan gum. This showed that the process standardisation of chicken *biriyani* was optimum for attaining commercial sterility.

Summary

Retort processing is one of the most significant advancements in food preservation after the innovation of canning and the most suitable processing method for the busy lifestyle of today. The results of the study showed that chicken *biriyani*, a highly perishable, traditional product, could be stored at ambient temperature for a period of 120 days without any decline in its microbial quality by retort processing.

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Conflict of interest

The authors declare that they have no conflict of interest.

References

Bindu, J., Ravishankar, C.N., Srinivasa Gopal, T.K. and Mallick, A.K. 2010. Investigation of shelf life and heat penetration attributes of ready-to-eat "fish peera" from anchovy (*Stolephorous commersoni*) in retort pouches. *J. Food Process. Preserv*. **34**: 207-222.

IS: 2168. 1971 - *Specification for Pomfret Canned in Oil*. Indian Standard Institute, Manak Bhavan, 9 Bahadur Saha Zafar Marg, New Delhi-1, 30p.

Lake, D.E., Bernard, D.T. and Kautter, D.A. 2001. Mesophilic anaerobic sporeformers. In: Downes, F.P., and Ito, K. (ed.), *Compendium of Methods for the Microbiological Examination of Foods*. (4th Ed.). APHA, Washington, D.C., pp. 209-213.

Morton, R.D. 2001. Aerobic plate count. In: Downes, F.P., and Ito, K. (ed.), *Compendium of Methods for the Microbiological Examination of Foods*. (4th Ed.). APHA, Washington, D.C, pp. 63-67.

Shah, M.A., Bosco, S.J.D., Mir, S.A. and Sunooj, K.V. 2017. Evaluation of shelf life of retort pouch packaged Rogan josh, a traditional meat curry of Kashmir, India. *Food Packag. Shelf Life*, **12**: 76-82.

Zarim, N.A., Abidin, S.Z. and Ariffin, F. 2021. Shelf life stability and quality study of texture-modified chicken rendang using xanthan gum as thickener for the consumption of the elderly with dysphagia. *Food Biosci.* **42**: 101054.

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