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Joint Event
2nd International Conference on
Food Safety and Hygiene
&
7th International Conference on
Nutrition, Food Science and Technology
March 07-09, 2019 | London, UK

Lidiya Wilwet, J Food Technol Pres, Volume 3
DOI: 10.4066/2591-796X-C1-005

Development of species-specific PCR assay for fast fraud detection in seafood: Application to the authentication of commercially important shrimp species

Lidiya Wilwet
Central Institute of Fisheries Education, India

Shrimps are the important resources from both commercial fisheries and for aquaculture in many countries, account for more than 30% of global consumption of seafood worldwide. The high demand and popularity of shrimp products have paved way for species substitution in the commercial market. Identification of species becomes complicated once its external morphological identification characteristics are removed particularly in frozen and precooked shrimp products. Therefore, to enforce labelling regulations and prevent product substitution, there is a need for sensitive analytical methods that can be used to determine the species of a seafood product with no detectable external features. This study describes a uniplex PCR assay with species specific primers based on the 16S rRNA mitochondrial gene to identify the commercially important shrimp species such as: *Fenneropenaes indicus*, *Penaeus monodon*, *P. semisulcatus*, *Litopenaeus vannamei*, and fresh water prawn *Macrobrachium rosenbergii*. The regions which shows maximum inter specific variations were selected through whole mitochondrial genome analysis and which paves a way to design five pairs of species-specific primers based on the 16S rRNA were developed for species identification. The sensitivity estimation indicated that the species-specific primers could correctly amplify the target 16S rRNA gene and which yield band sizes of 220, 376, 146, 275 and 750 bp respectively. The specificity of the primers was very high since it doesn't cross react with any one of the closely related species under the same family. The unique band patterns were also obtained in processed shrimp products without any degradation or alteration in the major fragments. The proposed method was also validated with 100 shrimp products such as frozen, fried, cooked and canned shrimp products collected from all over the country. Thus, the developed protocol can be performed within 2 hrs to authenticate five shrimp products of commercial significance so it can be used to expose fraudulent substitution of processed shrimps in national and international trade.

Speaker Biography

Lidiya Wilwet is doing second year of PhD in Central Institute of Fisheries Education, Mumbai, India. She is doing research in the field of "Development of Rapid analytical techniques for finding seafood fraud". During her M.F. Sc research, she has developed RFLP markers for commercially important exportable shrimp species viz. *Penaeus monodon*, *Penaeus semisulcatus*, *Fenneropenaeus indicus* and *Litopenaeus vannamei* and which is published in Journal of Food Chemistry through this she acquired Best Research paper and Technology Development Award from Tamil Nadu Fisheries University. Apart from this, she published four research papers in reputed journals.

e: midhunlidiya@gmail.com

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