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Electrophoretic pattern of muscle proteins in chilled eel fish (*Mastacembelus armatus*)

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Abstract
In the present study effect of ice storage on fish proteins of fresh water eel (*Mastacembelus armatus*) was observed for 7 days at 4 ºC. SPP (Sarcoplasmic protein) and MFP (Myofibrillar protein) were extracted daily from the samples to determine electrophoretic pattern of muscle proteins. No appreciable denaturation of MFP was observed during storage as the bands were resolved on the same place throughout the experiment. Numerous bands in SPP pattern were observed in all the days during storage.

Keywords: *Mastacembelus armatus*, muscle proteins, electrophoresis, ice storage

1. Introduction
Fish are perhaps one of the most vulnerable to the world's resources. For many economically developing nations, fish and fish based products are the largest export commodity. As a healthy alternative to other protein sources, the seafood has gained huge demand over the world. Since ancient times fishes are consumed by humans not only in fresh condition but in the form of products amenable from the functional properties of proteins and other compounds in the fresh fish.

During post hatching growth, fish undergo dramatic changes in the fiber type composition (myosin expression and organization of fiber type) and in the isoforms of myofibrillar molecule [1]. The role of each of these isoforms expressed during its development in imparting functional properties deserved special attention. Actin and myosin constitute the basic functional component of the myofibrillar proteins (MFPs). Hence, understanding physico-chemical characteristics is most important as it is linked with the final quality of products.

The changes in electrophoretic pattern of fish proteins during ice storage have been reported in mackerel and rohu where the electrophotetic pattern of water soluble proteins remains unchanged during frozen storage (-18 ºC) but salt soluble proteins (myofibrillar) showed major changes during 90 days of storage [2]. In case of atlantic salmon, no marked changes in protein profiles were observed during 0 to 9 days of cold storage (4 ºC) [3]. In contrast, changes in electrophoretic pattern of high molecular weight proteins of common carp surimihad direct relation with numbers of washing cycles [4]. In case of tilapia ice storage, the myosin (200 kDa) and actin (45 kDa) bands remain unchanged and again the bands between 97 kDa and 66 kDa did not show much variation during ice storage upto 14 days [5]. In view of the literature cited, information on the changes in electrophoretic pattern of fresh water eel (*M. armatus*) during ice storage is inaccessible. Therefore, in the present investigation, eel muscle proteins were examined for understanding the changes in the proteins during chilled storage.

2. Material and Methods
Fresh eel (*Mastacembelus armatus*) sampleswere harvested from Sanglireservoir and brought to College of Fisheries, Shirgaon, Ratnagiriin frozen condition in an insulated box (CF-60). The samples collected were reconfirmed following FAO sheets (FAO, 2002). Table sized fish, weighing around 225±13.22 g, were de-skinned and filleted. The fillets were minced in agrinder and boneless meat was stored at 4 ºC for further experiments**.** Extraction of muscle protein fraction was done following King and Poulter [6] while SDS-PAGE was performed as suggested by Laemmli [7].

3. Results and Discussion
The SDS-PAGE showing MFP and SPP band pattern of the samples drawn on each day of storage has been illustrated in Figure 1 and 2, respectively.

In case of Myofibrillar protein, the bands with their approximate molecular weight were varied from 200 kDa and 45 kDa, during 7 days of storage. No appreciable denaturation was observed as the bands were resolved on the same place. On the other hand, Sarcoplasmic protein bands were resolved very lighter during initial 4 days while several protein bands, approximately 135 kDa, were appeared in consequent days. On 5th day, one band (100 kDa) was appeared while on 6thand 7thdays two and three (135 and 75 kDa) bands were observed.

Similar results were observed by Crupkin *et al.* [8], as there was no change in electrophoretic pattern of hake actomyosin fraction during 11 days of iced storage. In contrast, Jose and Raghunath [9] observed changes in the electrophoretic pattern of mackerel (*Rastrilliger kanagurta*) during iced storage due to hydrolysis of muscle proteins. A reduction in myosin heavy chain and actin was reported in threadfin bream stored in ice upto 12 days [10]. Chummar *et al.* [2] also reported inverse relation of electrophoretic bands with storage period in *L. rohita* and *M. cordyla* muscle proteins. Tironi *et al.* [11] observed similar findings in Sea Salmon during chilled storage. Geirsdottir *et al.* [12] also reported rare changes in SDS electrogram for Herring proteins during frozen storage for 6 month. Lakshmisha *et al.* [13] also observed that the SDS-PAGE pattern of myofibrillar proteins during storage under accelerated condition showed significant decrease in electrophoretic pattern when storage period was increased in mackerel and threadfin bream. According to Tironi *et al.* [11], Myosin and actin are the major proteins responsible for the functional properties of myofibrillar proteins and found decrease in solubility due to formation of aggregates between different chains of myosin.

In the present study, not much variation of electrophoretic pattern of eel MFP was observed during ice storage might be due to the stability of myosin and actin. These results were in agreement with Parthiban *et al.* [5] for electrophoretic pattern of tilapia muscle protein during ice storage as he noticed no alterations in myosin (200 kDa) and actin (45 kDa) bands.

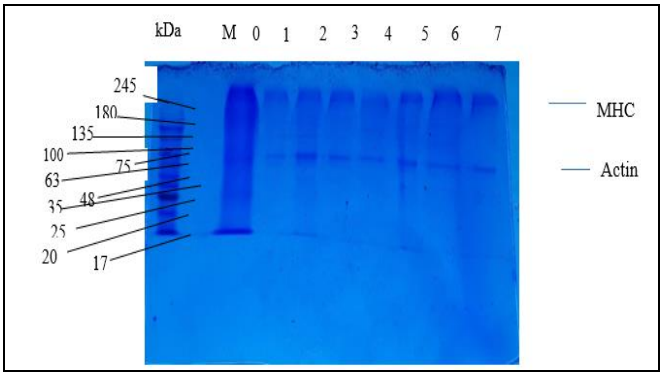

Fig 1: SDS-PAGE pattern for MFP

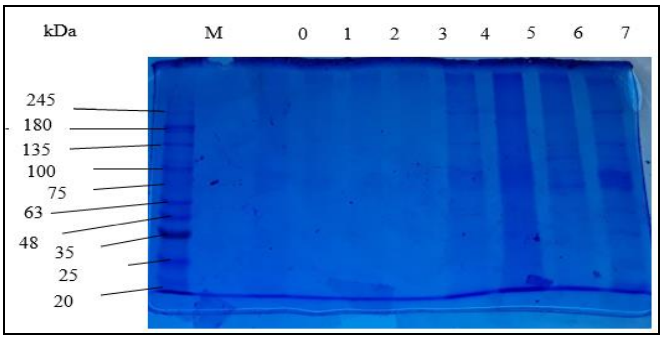

Fig 2: SDS-PAGE pattern for SPP

4. Conclusion

During study period, in MFP no appreciable denaturation was observed as the bands were resolved on the same place (200 and 45 kDa). On the other hand, three bands (135, 100 and 75 kDa) were observed in SPP indicating absence of denaturation. Through the experiment it can be concluded that the fresh water eel (*M. armatus*) muscle proteins remain unchanged during ice storage upto 7 days. The concept can be adopted by fisher folks for storage of fresh water eel.

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