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Mitochondrial DNA sequences for forensic identification of the endangered whale shark, *Rhincodon typus* (Smith, 1828): A Case study

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Abstract — The whale shark (*Rhincodon typus)*, the largest fish in the ocean, has become susceptible to over-exploitation and has a global conservation status of 'vulnerable to extinction' as listed by World Conservation Union in the *Red list of threatened species*. The increase in demand for its meat, skin and fins in international trade is a severe threat to the animal and its indiscriminate capture will have to be taken seriously as they may have a major impact in the marine ecosystem. *Rhincodon typus* was nominated in Appendix II of Convention on International Trade in Endangered Species (CITES) in April 2000, to enable adequate regulation of trade of whale shark products. Whale shark (*Rhincodon typus)* is enlisted as one of the protected species in India and its fishing prohibited under Schedule I of the Indian Wildlife Protection Act, 1972, according to the Order No.1-2/2001 WL1 Dated 28.05.2001, Govt. of India, so as to conserve the species in Indian waters. still illegal fishing prevails in Indian waters and the catch is processed in the vessel itself and sold in markets as meat chunks. To curb the illegal trade and marketing of fishery products from whale shark, for devising good management practices and for the strict law enforcement, accurate and reliable species identification methods using molecular tools are of paramount importance. In an effort to establish a comprehensive identification data set, we have generated a species-specific partial sequence data of the mitochondrial genome of properly identified stranded whale shark samples, covering the 16S rRNA (546 bp),

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Cyt b (541bp), COI (600bp) genes as the reference genetic profile helping in accurate identification of any body parts of the species. In the year 2008, flesh suspected as that of the Wildlife protected whale shark (*Rhincodon typus*) was seized from fishermen by the Forest Range Officer (Govt. of Kerala), Kannur, Kerala, India and was brought before the Judicial First Class Magistrate, Thalassery, Kannur, Kerala, India. The detailed sample analysis and confirmation of species was carried out at NBFGR Cochin Unit (R.P.330/08, dt 29. 09. 2008). Based on DNA sequencing of 16S rRNA(525bp) and COI (600bp) Cyt b(541bp) genes and comparing with the sequences earlier generated by NBFGR (FJ375724, FJ375725, FJ375726, FJ456921, FJ456922, and FJ456923), the suspected sample was identified as that of endangered Whale Shark (*Rhincodon typus*) and the result was communicated to the court. This is the first criminal case in India in which scientific evidence was sought in forensic identification of the meat of an aquatic organism enlisted in the Wildlife Protection Act of India and the DNA markers reiterated their ability to reliably identify product/meat sample of a species, thus helping in curtailing illegal trade of the endangered organisms.

Index Terms — DNA markers, whale shark, identification.