2. OBJECTIVES

Marine fish is known for its medicinal properties from decades and used as a common protein meal in and around Tamilnadu. But, specific conformational on this aspect is lacking in commercially available fishes. So, to investigate the biomedical and industrial applications of marine fishes this study was taken and the aim was achieved with the following objectives.

I.  *In vitro* and *in vivo* characterization of antioxidant peptides isolated from the skin, muscle, bone and viscera protein hydrolysates of horse mackerel (*Magalaspis cordyla*) and croaker (*Otolithes ruber*).

II. Isolation of collagen from skin and bone of horse mackerel (*Magalaspis cordyla*) and croaker (*Otolithes ruber*).
2.1 DESCRIPTION OF ANIMALS

Two marine fish’s horse mackerel (*Megalaspis cordyla*) and croaker (*Otolithes ruber*) were selected for the present work.

a) *Megalaspis cordyla* (Linnaeus, 1758)

Systematic position

<table>
<thead>
<tr>
<th>Kingdom</th>
<th>Animalia</th>
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<tbody>
<tr>
<td>Phylum</td>
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<tr>
<td>Class</td>
<td>Actinopterygii</td>
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<tr>
<td>Order</td>
<td>Perciformes</td>
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<tr>
<td>Genus</td>
<td><em>Megalaspis</em></td>
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<tr>
<td>Species</td>
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![Figure 1 Megalaspis cordyla (Linnaeus, 1758)](image)
*Megalaspis cordyla* (horse mackerel) is one of the most commercially important species available in Tamilnadu, India. *M. cordyla* is reported to be a good source of omega 3 fatty acid with high percentage of unsaturated fatty acids than saturated fatty acids [87].

**Distribution**

*Megalaspis cordyla* is widespread in the Indo-west Pacific ranging from east Africa to Japan and Australia. It is generally reef associated, brackish/marine form, occurs in a depth of 20 - 100 m. primarily oceanic, lives near the surface of coastal waters. Forms schools and feeds mainly on fishes [88]. In India it is abundant in South-East and West coast of Kerala and Tamil Nadu.

**Morphology**

Body elongate, sub-cylindrical, a little compressed posteriorly, and has a strongly compressed caudal peduncle with a marked medial keel (Figure 1). Snout and lower jaw pointed with a single row of small teeth, except a narrow band at anterior region; upper jaw extending posteriorly to centre of eye with small villiform teeth, outer teeth moderately enlarged. Eye moderate, with well developed adipose eyelid completely covering eye except for a vertical slit centred on pupil. Gill rakers contain 8 to 11 upper, 18 to 22 lower and 26 to 32 rudiments on first gill arch. Shoulder girdle (cleithrum) margin was smooth without papillae. Lateral line strongly arched, with junction of curved
and straight parts below 4th or 5th spine of dorsal fin; chord of curved part of lateral line contained 3.6 to 4.7 times in straight part (to caudal base); scales in curved part of lateral line 21 to 28; straight part with 51 to 59 very large scutes. Breast naked ventrally and laterally in a triangular area for about one third distance to pectoral fin base. Two separate dorsal fins, the first with 8 spines; the second with I + 18-20 soft rays, posterior 7 to 9 rays consisting of detached finlets. Anal fin with 2 spines and I + 16-17 soft rays, posterior 8 to 10 rays consisting of detached finlets. Colour head and body bluish to green dorsally, sides and belly silvery; large black opercular spot. Dorsal and anal fins pale to yellow, distally dusky; pectoral and pelvic fins pale, with upper half dusky. Caudal fin dark, especially leading and trailing edges of the fin.

Commercial importance

The total catch reported for this species to FAO for the year 2009 was 98,259 t. The countries with the largest catches were Thailand (31,300 t) and Malaysia (22,895 t). Generally marketed fresh and dried salted.

b) *Otolithes ruber* (Bloch & Schneider, 1801)

*Otolithes ruber* (Croaker) is a species from the family Sciaenidae, and widely distributed in shelf waters of tropical and subtropical Indian, Pacific and Atlantic oceans [89, 90]. Their maximum size ranges from 90-40 cm and known for their delicate taste and nutritious value [91].
Systematic position

Kingdom Animalia
Phylum Chordata
Class Actinopterygii
Family Sciaenidae
Genus *Otolithes*
Species *ruber*

![Figure 2 Otolithes ruber (Bloch & Schneider, 1801)](image)

Distribution

It is a benthopelagic and amphidromous [92] form mostly found in brackish or marine waters.

Morphology

Body gray purple at upper part and white at lower part; medial surface moderately convex with a tadpole-shaped impression, head heart shaped, tail
slightly bend with bluntly rounded tip, silvery white lining of body cavity with brown spots. Body is elongated, compressed and roughly triangular head (Figure 2). Terminal and slightly oblique large mouth and length of upper jaw is longer than that of lower jaw. 1 or 2 pairs of strong canine teeth at front of upper and lower jaw and exposed when mouth is closed. Dorsal fin X, I, 26-30; anal fin II, 7-8; pectoral fin I, 15-16; pelvic fin I, 5; lateral-line scales 47-50; gill-rakers 3-7 + 9-10; gill rakers slender, as 0.6 times of gill filaments at angle of arch. Scales cycloid; dorsal and anal fins without scales; anterior 2/3 of caudal fin covered by small cycloid scales; lateral line scales reaching to tip of caudal fin. Top of pectoral fin base before the origin of pelvic fins base and below the tip of gill cover; origin of pelvic fin before dorsal fin origin; caudal fin rhomboid. Swim-bladder is carrot-shaped with 40 pairs of arborescent appendages, each with a ventral limb only, branched in a fan manner; none entering head and the morphology referrers to the typical *Otolithes* form. Dorsal fin light brown; upper half of caudal fin yellowish brown and bright yellow at lower half; anal and pelvic fins with bright yellow at anterior half and colourless at posterior half; pectoral fin colourless, axillary fold with a dark brown patch. Lining of mouth white, mouth margin yellow; gill chamber black, gill cover with a brown patch.

### 2.2 COLLECTION OF ANIMALS

The live marine fishes horse mackerel (*Magalaspis cordyla*) and croaker (*Otolithes ruber*) were collected from the Royapuram fish market and
brought to the laboratory under sterile conditions in a ice box layered with ice. The samples were washed thoroughly in running water and wiped with blotting paper. The fishes were dissected and separated into skin, muscle, bone and visceral mass. The samples were stored in deep freezer (-20 °C) until used.

2.2.1 Sample collection site

Royapuram fishing harbor in Chennai is one of the biggest and most ideal fishing grounds for catching crustaceans, molluscs and fishes in Tamil Nadu. As shown in, figure (3), it is situated near Bay of Bengal with 13° 6’ 26” N and 80° 17’ 43” E. The surroundings are highly populated with fishermen colonies and fishing goes throughout the year and the high season for fishing commence in the month of June.

Figure 3 Map of India showing Bay of Bengal and Royapuram fishing harbor. (www.maplandia.com/india/tamilnadu/madras royapuram)