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REVIEW ARTICLE

Medicinally Essential Ichthyofaunal Biodiversity of Palk Bay (Mallipattinam Coast), Tamilnadu

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ABSTRACT
The highly diverse and important group on the earth is "Macro fauna". In aquatic ecosystem, there are varieties of fishes are present with different size, shape, colours, fascinating beauty and behaviours. There is rapidly increasing consumption need in many countries, but the essential requirement of fish in every day diet is not yet completely understood. It is still an additional diet to a huge division, generally regarded as a low weight of well and luscious food items. The present study was carried out on medicinal fish availability along the Mallipattinam coastal waters to identify and verify its medicinal uses. The collected fishes were recognized up to species level by using the FAO classification sheet. A bulk collection of medicinal fish was made along the coastal line of Mallipattinam and totally 30 species belonging to 25 families and 29 genera of medicinal fishes were identified over a 6 months study period from October 1, 2020 to March 11, 2021. Generally, the species were usually accessible in all the period along the Mallipattinam coastal waters. The present survey exposed the occurrence of essential medicinal marine fish species along the Palk bay landing centre, Mallipattinam, southeast coast of India.
Keywords: Mallipattinam, Palk bay, Medicinal fish, Coastal waters, Marine fish

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INTRODUCTION

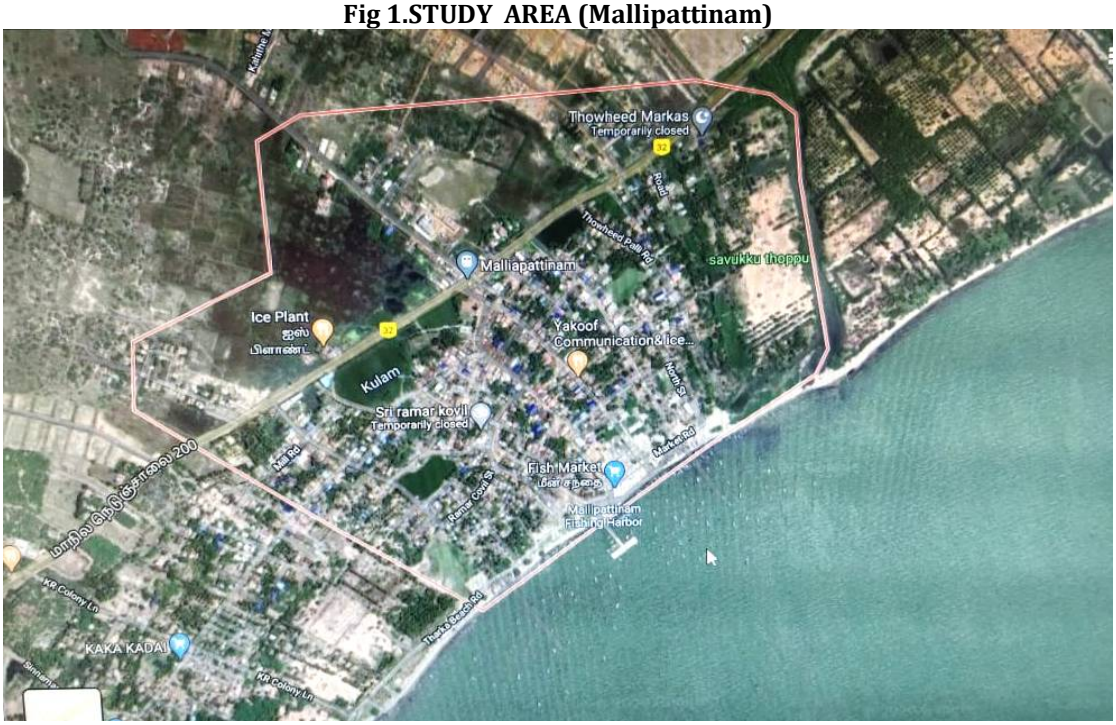
In India, fishery resources are essential source of food and build a worthy financial contribution to the local communities [1]. They offer a source of income and earnings for millions of poorest people in the world and also contribute by means of export, trade, tourism and recreation. About one percent of GDP is contributed by the fisheries sector to the Indian economy. Fish is packed with loads of nutrients that majority of the people are lacking. Fish is a major source of protein (providing 16% of the animal protein), vitamins, and calcium; it provides healthy nutrition to humans by the means of food, medicine and drugs[2].Fatty fish also possess omega 3 fatty acids, which are essential for brain and optimal body function and also decrease the risk of several ailments[3].Scientists consider that fatty fishes are even more helpful for heart health due to their high omega 3 fatty acid content[3]. Various clinical trials also reveal that omega 3 fatty acids may battle against depression and considerably raise the efficiency of antidepressant medications [4-6]. Research shows that usual fish consumption is linked to a 24% lower risk of asthma in children, but no significant effect has been found in adults[7]. Only a few works have been confined to medicinally important fishery resources in Malli pattinam [8-10] . The present survey exposed the occurrence of essential medicinal marine fish species along the Palk bay landing centre, Mallipattinam, southeast coast of India.

MATERIAL AND METHODS

Fishes were collected from the commercial landing centre at Mallipattinam (10.2806° N, 79.3170° E) of tanjavur dist (Fig.1) during the month of October 2020 to March 2021. The specimens were examined for various morphological characters for identification. The fishery data were collected by watching the

landing of fishes and interviewing the fisher man personally. For further studies specimens were preserved in 5% formalin after identification.

Fig 1.STUDY AREA (Mallipattinam)



MEDICINALLY ESSENTIAL ICHTHYOFAUNAL BIODIVERSITY OF PALK BAY

Table 1: Medicinally Essential Ichthyofaunal Biodiversity of Palk Bay (Mallipattinam Coast), Tamilnadu

S.No	NAME OF THE SPECIES	COMMON NAME	BIO ACTIVE COMPOUND	MEDICINAL USES
1	***Trichiurus lepturus***	**Large head hair tail**	Hairtail Peptides and digestible proteins [11]	Health benefits of this fish include healthy heart, lower levels of bad cholesterol and toxin levels. It helps in improving skin health, Anti- oxidant, and Antibacterial effect [11].
2	***Stolephorus commersonnii***	**Commerson Anchovy**	Vitamin A,D and E. minerals including calcium, iodine, selenium etc [12] omega 3 Fatty acids [13]	Presence of Vitamin A, D and E and minerals including calcium, iodine, selenium etc. There are abundant evidence indicating the significant of fish in brain development and learning in children, protects vision and eye health, and protection from cardiovascular disease and some cancers. [12].

3	***Chirocentrus dorab***	**Dorab Wolf – herring**	Protein, Vitamins, Minerals [14].	They are one of the most important sources of animal protein, [15], Fish flesh contains varying proportion of water, protein, fat, ash, carbohydrate and other important mineral and vitamins. Fish have been reported to contain approximately 72 % water, 19 % protein, 8 % fat, 0.5 % calcium, 0.25 % phosphorus and 0.1 % vitamins A, D, B and C. [15]. Fish has a distinctive role in diets, as it is one of the best food supplying proteins of high biological value [16]. Fish are vital resource of the highly unsaturated fatty acids (HUFA), eicosapentaenoic (EPA) and docosahexaenoic (DHA) acids [17].
4	***Mugil cephalus***	**Flathead grey mullet**	Vitamins A, D,E, cholesterol metabolism. [18] Poly unsaturated Fatty acids [19,20]	Lipids are an important component in fish product and human diets, both as energy and fatty acids (FA) sources[21]. The fats are also needed in diets to absorb fat-soluble vitamins A, D, E and K from food; and for regulating body cholesterol metabolism [18 22].The composition of fatty acids in fish is influenced by the environment and type of feed [23].Nowadays, researchers focused on the significance of PUFAs in human nutrition. In particular - omega 3 fatty acids, EPA and DHA which display several properties beneficial for human health. [19,20].
5	***Arius arius***	**Threadfin sea catfish**	Omega-3 Fatty acids [24]	Fleshed fish with white skin is high in omega-3 fatty acids. Habitual intake of this fish can reduce the risk of heart disease, also lower blood triglycerides and hypertension, thrombosis, it is also acts a anti-inflammatory agent and decrease the risk of abnormal cardiac rhythms[24].
6	***Congresox talabonoides***	**Indian Pike Conger Eel**	Lipids,Fatty acids ,omega 3 fatty acid [13]	This improves the Skin health, Formation of DNA, Regeneration of cells and tissues, Bone health, and it also assist digestion. Health benefits and facts of eel fish
7	***Sphyraena barracuda***	**Great Barracuda**	Niacin, Poly unsaturated Fatty acids , Panthothenate ,Sodium, Pottassium, Magnesium, Vitamin B2.	These fish products are used to treat various types of diseases such as Cancer, gastric ulcers, Alzheimer's and arthritis.[24].
8	***Rhynchobatus djjddensis***	**Giant guitar fish**	Taurine [26]	Guitar fishes are found to be associated with seagrasses [27], their presence presumably contributes to the healthy functioning of this habitat that is of very high ecosystem service value to humans [28]. Guitar fishes are important prey items to non-human apex predators vital to ecosystem functioning [29-31] .

9	***Etroplus suratensis***	**Green Chromide**	protein rich in essential amino acids viz. lysine, methionine, cystine, threonine, and tryptophan [32],	This type of fishes are rich in essential amino acids viz. lysine, methionine, cystine, threonine, and tryptophan [32], calcium, phosphorus, fluorine, iodine, lipids, fat-soluble vitamins and unsaturated fatty acids that have a hypocholesterolemic effect[33]. It is reported that certain amino acids like aspartic acid, glycine and glutamic acid are also known to play a key role in the process of wound healing [34]. Habitual intake of this fish is heart-friendly as it assists lower blood pressure.
10	***Pampus argenteus***	Silver Pomfret	Proteins , amino acids, vitamins [35] ,[36]	The silver pomfret, Pampus argenteus is one of the most valuable and demanded fishes due to its high market value for export.Thus the safety of this fish has been a growing interest to determine the levels of contaminants to minimize the potential health risk to humans who consume them. [37].
11	***Gymnura poecilura***	**Long – tailed Butterfly Ray**	Taurine [26]	This fish is known to be one of the cheapest sources of animal protein and other essential nutrients required in human diets [38]. They are also increasingly marketed for their health benefits to consumers[39] · Also, feeding habit of an individual fish species has great effect on its body nutrient composition[40].
12	***Parastromateus niger***	**Black pomfret**	Proteins, Iodines,Vitamins [41]	Freshwater fish flesh provide an excellent source of protein for human diet. Studies related to nutrition have proved that fish proteins are superior to egg albumin, beef protein and milk but it is rank in the same class as chicken protein. It consist of all the 10 necessary amino acids in desirable power for human utilization. Besides protein, fish flesh also offer mineral,iodine,vitamins and fats. [41].
13	***Himantura bleekeri***	**Whip- Tail Sting Ray**	EPA and DHA. [42]	The traditional Inuit diet was known to be rich in long-chain n-3 polyunsaturated fatty acids (PUFAs) and believed to account for the low incidence of cardiovascular disease in those populations [42]. This observation is the starting point of the increasing interest of these fatty acids [43]. Indeed, PUFAs and particularly eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) are nowadays recognized to prevent inflammatory, arrhythmias, hypertension and triacylglycerolemia, atherosclerosis, autoimmune disorders [42] .and to display a variety of beneficial effects in area ranging from foetal development to cancer prevention [18].
14	***Hemiramphus far***	**Black – barred halfbeak**	Minerals are essential nutrients; enzymes metabolism [44].	More over consuming this type of fish results in reduction of heart attack, stroke, obesity and hypertension [45].

15	***Terapon jarbua***	**Crescent Banded Grunter**	Omega-3 fatty acids present such as EPA and DHA present [46,47]	Omega-3 fatty acids such as EPA and DHA present in this fish have the ability to reduce the blood serum triglycerides. Long chain Poly unsaturated fatty acid can prevent the disease of rheumatoid arthritis, human coronary artery, asthma,brain development, inflammatory bowel, retina improvement and regulate the prostaglandin synthesis and can decrease the breast cancer incidence,[46,47] .
16	***Pampus argenteus***	**White Pomfret**	Proteins, aminoacids, vitamins [35,36]	Pampus argenteus is one of the valuable and demanded fishes due to its high market value for export.Thus the safety of this fish has been a growing interest to determine the levels of contaminants to minimize the potential health risk to humans who consume them. [37].
17	***Scomberomorus commerson***	**Narrow – barred Spanish Mackerel**	(PUFA), i.e., eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). [48,49]	Most of the reasechers have suggested that fatty fish like S.commerson are profitable for marketing purpose and for human usage[48,49] Marine fish often contain more fat than freshwater fish. Ahlgren , G.; 1994 et al [50]., Henderson and Tocher [51] in an extensive review of lipid composition in freshwater fish have reported that lipids from freshwater fish contain large proportions of saturated fatty acids (SAFA) and 18 carbon PUFA. However, low levels of 20 and 22 carbon PUFA, and low o3=o6 ratios were found in fresh water fish correspond to marine fish. It is well accepted that lipids rich in EPA and DHA have the capability to decrease the blood lipid levels, mainly the serum triglycerides, [56,54,55]which prevents thrombus formation and slow down the atherosclerotic process.
18	***Rastrelliger kanagurta***	**Indian mackerel**	proteins, unsaturated fatty acids, minerals (calcium, [20]. Taurine[26]. iron, selenium zinc etc), [20].omega 3 fatty acid [13] Vit A and D [57]	This fish consumption has several nutritional and health benefits which are mainly due to the presence of proteins, unsaturated fatty acids, minerals (calcium, iron, selenium zinc etc) and vitamins including A, B3, B6, B12, E, D [20]. The deficiency in these principal nutritional mineral elements induces a lot of malfunctioning; as it reduces productivity and causes diseases, such as inability of blood to clot, osteoporosis, anemia etc. [58,59]. The dietary value of fish meat consist of dry matter, moisture, lipids, protein, minerals and vitamins [60-62].
19	***Selaroides leptolepis***	**yellowstripe scad**	fatty acids, polyunsaturated fatty acids (PUFAs) [63]	Fatty acids present in the fish oils is reported to have a therapeutic effect on a various pathophysiological and heart related diseases. Most species contained high levels, around 30%, of n -3 PUFAs but contained low levels of other positional isomers. Among the species studied, the highest percentage of n-3 PUFAs were present in buccaneer anchovy (Stolephorus punctqer, 36.2%, 218.7mg/100g fish), brushtooth lizardfish

				(Saurida undosquarnis, 34.6%, 361.4mgllOOg fish), yellow stripe scad (Selaroides leptolepis, 34.4%. [63].
20	***Drepane punctata***	**spotted sicklefish**	PAHs. [64] Polycyclic aromatic hydrocarbons[65]	Sickle fish containedd high concentration of PAHs.[62].Polycyclic aromatic hydrocarbons have received attention due to their potential negative effects on human and ecosystem health. Undesirable effects of PAHs have also been experimented in marine organisms, which include destruction in growth and development, growth reduction, endocrine modification, malformations of embryo and larvae and DNA damage.[65-67].
21	***Sepia officinalis***	**Common Cuttle Fish**	Cholesterol	Women around the world suffer from ailments characteristic for the menopausal period regardless of ethnic origin, skin colour or sociodemographic factors. Urogenital symptoms, fatigue and weakness, body aches and pains are the predominal symptoms in both rural and urban menopausal women. [68].
22	***Sardinella longiceps***	**Indian Oil Sardine**	Omega -3 Fatty Acids , [13] Protein , Poly unsaturated fatty acids [69]carbohydrates and micronutrients., Vitamin – A and D [57]	The health benefits related to sardine fish consumption are due to the presence of proteins, Poly unsaturated fatty acids, carbohydrates and micronutrients. It provide valuable source of animal protein. As compare to mammalian protein fish protein is rich in amino acid such as methionine, lysine and low in tryptophan[69]. Its muscle contains all the nutrients required for maintenance of human body [70]. It helps to control weight and prevent heart disease [71].
23	***Eleutheronemate tradactylum***	**Indian Salmon**	Omega – 3 Fatty Acids , [13] of long- chain poly unsaturated fatty acids n-3 (n-3 LC-PUFA)[72]. Taurine [26]	This Fish tissue possesses high nutritional value and is therefore a particularly recommended dietary component. Fish tissue is the main source of long-chain poly unsaturated fatty acids with beneficial or even therapeutic effects on human health, [70]. The significance of the long chain PUFA has gained attention because of the prevention of human coronary artery disease and important of retina and brain development and also decreasing incidence breast cancer, rheumatoid arthritis, multiple sclerosis and inflammation, [73].
24	***Tenualosa ilisha***	**ilish Fish**	Polyunsaturated fatty acids (PUFAs), especially ω-3 PUFAs and Vitamins and Minerals , [74] .	This fish serves as a health-food for the affluent world owing to the fish oils which are rich in polyunsaturated fatty acids (PUFAs), especially ω-3 PUFAs and at the same time, it is a health-food for the people in the other extreme of the nutritional scale owing to its proteins, oils, vitamins and minerals and the benefits [74]. This fish is conjectured to be one of the major causes of reduced risk of cardiovascular diseases in Eskimos [53].
25	***Lates calcarifer***	**Barramundi**	(PUFA) enriched of omega-3 fatty acid [75]	L. calcarifer contains polyunsaturated fatty acids (PUFA) enriched of omega-3 fatty acid, which play important roles in

				cardiovascular system to reduce the risk of heart attack [75]. Omega-3 fatty acids are helpful to reduce cholesterol level in blood and helpful in the prevention of hyperlipidemia, secondary cardiovascular disease and high blood pressure [76].
26	***Alepes djedaba***	**Shrimp scad**	Eicosapentaenoic acids (EPA) and Docosahexaenoic acids (DHA) [20], [77 -79]	Shrimp scad are good sources of high quality proteins which in turn made up of all essential amino acids; provide required quantity of protein to human diet. Marine fishes possess high concentration of long chain ω-3 poly unsaturated fatty acids in their muscles . (R.G. Ackman , 1967) Among these Eicosapentaenoic acids (EPA) and Docosahexaenoic acids (DHA) are typically found in the fish muscles and they have so many health benefits. They lower the risk of coronary heart diseases, Hypertrigliceridaemia, rheumatoid arthritis and exhibit anti-inflammatory action [20], [77 -79], They are also vital for brain development particularly for the early development of vision and cognitive functions [80] Previous studies also proved that they are effectively used.
27	***Gerres vaigiensis***	**Gerres – Alchetron**	poly unsaturated fatty acids(PUFAs) namely EPA (eicosapentaenoic acid) and DHA (docosahexaenoic acid.[81]	The fat content of this fish ranges from 0.2% to 25%. PUFA from this species are vital for appropriate growth of children and prevent coronary heart disease. Particularly for deprived populations, fish and fish products are often the only source of animal protein for the poorest people. [81]
28	***Chiloscyllium griseum***	**Grey bamboo shark**	Taurine [26]	It improves the pain reducing effect in Arthritis, Rheumatism, inflammation of joints .
29	***Rhizoprionodon acutus***	**Milk Shark**	Taurine [26]	In India, consumption of this sharks meat enhance lactation in breastfeeding women . [82].
30	***Pseudotriacanthus strigilifer***	**Long-Spined Tripod Fish**	Proteins	Improve general health .

CONCLUSION

The present investigation was carried out on medicinally important marine fish accessibility along the Mallipattinam coastal waters to identify and quantify. Fishes were collected using stratified random sampling method and they were identified up to species level by using the FAO identification sheet. A bulk collection of fish was made along the coastal line of Mallipattinam and totally 30 species belonging to 25 families and 29 genera of marine fishes were identified over a 6 months study period from October 1, 2020 to March 11, 2021. Generally this entire species were normally available in all the season along the Mallipattinam coastal waters. The present study revealed the commercially important occurrence of marine fish species along the Mallipattinam landing centre, Mallipattinam coastal waters, southeast coast of India.

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