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"BIOCHEMICAL PROFILE OF COMMERCIALLY IMPORTANTFISHES: *SARDINELLA LONGICEPS, STOLEPHORUS INDICUS* AND *SECUTOR INSIDIATOR* FROM COASTAL WATERS OF KARWAR, KARNATAKA."

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Abstract

From the time immemorial Fishes are known to be the one of the cheapest and rich source of protein and other essential nutrients required for the human beings. The knowledge of proximate biochemical composition of fishes is fundamentally important for the application of different processes like postmortem changes, fish quality etc. the study was carried out to determine the biochemical composition of three types fishes, *Sardinella longiceps, Stolephorus indicus* and *Secutor insidiator* of Arabian Sea, Uttara Kannada Karnataka. The protein content in *Sardinella longiceps* (3.68 mg/gm) was observed highest when compared with the *Secutor insidiator (*2.5mg/gm*)* and *Stolephorus indicus* (0.64 mg/gm).The Fat percentage was observed highest in *Sardinella longiceps* 2.6% per gm followed by 1.2% per gm in *Secutor insidiator and 0.8% per gm in Stolephorus indicus,* whereas percentage of Moisture was observed highest in *Sardinella longiceps* 26.5% per gm followed by 20% per gm in *Secutor insidiator and 19% per gm in Stolephorus indicus* and the percentage of Ash was observed highest in *Sardinella longiceps 14.2*% per gm followed by 5.2% per gm in *Secutor insidiator and 4% per gm in Stolephorus indicus.* The fat, moisture and the ash content in the fishes was observed higher percentage in *Sardinellalongiceps* when compared to that of *Secutor insidiator and* least was observed in *Stolephorus indicus*. The biochemical composition of these organisms are influenced by factors such as from thesurrounding environment, diet, and absorptive capability, and they are essential for maintaining fish health and ensuring food safety for human consumption.

Keywords: Karwar, Fish protein, *Sardinella longiceps*, *Secutor insidiator, Stolephorus indicus*

Introduction

Fish are a crucial component of human diets worldwide, providing essential nutrients such as high-quality proteins like omega-3 fatty acids, vitamins (particularly D and B2), calcium, phosphorus, and iron (Food and Agriculture Organization of the United Nations, 2020). The nutritional value of fish varies significantly among the species, influenced by factors such as habitat, diet, and physiological state (Kause et al., 2016). This variability underscores the importance of understanding the biochemical composition of different fish species to assess their nutritional value and potential health benefits.

Fish are recognized as a vital source of nutrients, particularly high-quality protein, essential fatty acids, and micronutrients (Tilstone et al., 2015). The nutritional composition of fish varieswidely among species, influenced by factors such as habitat, diet, and life stage (Kause et al., 2016). Pelagic species, for instance, tend to have higher levels of omega-3 fatty acids due to their diet and active lifestyle (Tocher, 2003).

The Arabian Sea, is rich in marine biodiversity, hosts a variety of fish species that are importantfor both local and international markets. The biochemical composition of fish, including protein, fat, moisture,

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and ash content, is a critical determinant of their nutritional value. Proteincontent is essential for muscle building and repair, while fat provides energy and essential fattyacids (Bogard et al., 2015). Moisture content affects the texture and shelf life of fish, and ash content indicates the mineral content (Venugopal, 2009).

Sardinella longiceps, commonly known as the oil sardine, is a small pelagic fish found in the Indian Ocean. It is an important commercial species, valued for its high oil content and nutritional profile (Srinivasan et al., 2016). *Secutor insidiator*, or Indian scad, is another commercially important species known for its flavor and texture (Silva et al., 2017).

Among these, *Sardinella longiceps* (oil sardine) and *Secutor insidiator* (Indian scad) are commercially valuable species found along the coast of Uttara Kannada, Karnataka. These speciesplay a significant role in the local economy and diet, yet there is a paucity of information regarding their biochemical composition and nutritional value.

Present study aims to determine and compare the biochemical compositions of *Sardinellalongiceps, Stolephorus indicus* and *Secutor insidiator*, focusing on protein, fat, moisture, and ash content. By understanding these parameters, this research provides valuable insights into the nutritional profiles of these species, contributing to the knowledge of their dietary benefits andpotential applications in food processing and marketing.

Materials and Methods

Sample Collection

Fresh specimens of *Sardinella longiceps, Stolephorus indicus and Secutor insidiator* were collected from the Landing center of Karwar, Uttara Kannada, Karnataka. Immediately after collection, the fishes were placed on ice and transported to the laboratory for further analysis.

Figure 1: Sardinella longiceps

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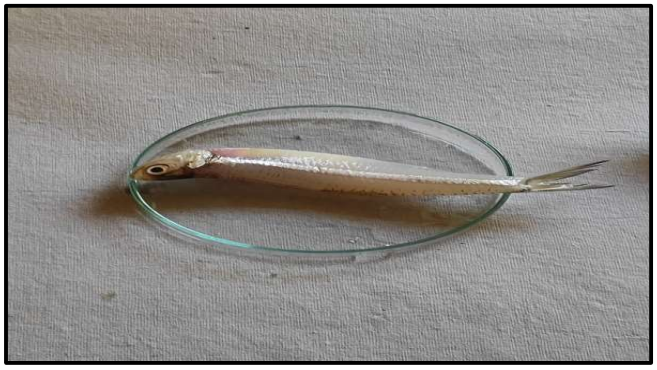

Figure 2: Stolephorus indicus

Figure 3:Secutor insidiator

Sample Preparation

The fish were cleaned, gutted, and filleted. Excess water was removed by patting the filletsdry with paper towels. The fillets were homogenized using a food processor to ensure uniformity for analysis.

Proximate Analysis

1. Moisture Content: The moisture content was determined by drying a known weight ofthe fish sample in an oven at 105°C until a constant weight was achieved.
   Calculation: The moisture content was calculated as the percentage of weight lossduring drying.

$$Percentage\ of\ Moisture = \frac{Weigh\ \ loss}{Original\ Weight\ of\ Sample} \times 100\text{rotein}$$ Content:

The Lowry's method involves digesting the fish muscle sample in concentrated sulfuric acid, distilling the ammonia formed, and titrating it against a standard acid solution to determine the nitrogen content, which is then multiplied by aconversion factor to calculate the protein content.

2. Fat Content

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$Units/gm = \frac{(\mu mol\ tyrosine\ equivalent\ released)\times(11)}{(0.1)\times(60)\times(2)}$Method: The Soxhlet extraction method was used to extract fat from the fishsamples using petroleum ether as the solvent.

- Calculation: The fat content was determined by weighing the extracted fat andexpressing it as a percentage of the original sample weight.

$$Percentage\ of\ Fat = \frac{Weight\ of\ Residue}{Original\ Weight\ of\ Sample} \times 100$$

3. Ash Content
    - Method: The ash content was determined by incinerating the dried fish samplein a muffle furnace at 550°C until a constant weight was achieved.
    - Calculation: The ash content was calculated as the percentage of the residue weight after incineration.

$$Percentage\ of\ Ash = \frac{Weight\ of\ Fish}{Original\ Weight\ of\ Sample} \times 100$$

Result and Discussion

The study was aimed to determine the biochemical composition of *Sardinella longiceps, Stolephorus indicus, and Secutor insidiator* from the Arabian Sea, specifically focusing on protein, fat, moisture, and ash content.The results of the study indicated that *Sardinella longiceps* had the highest protein content, with a highest value of 3.68 mg/gm, followed by *Secutor insidiator* with 2.5 mg/gm, and *Stolephorus indicus* with the lowest protein content at 0.64 mg/gm (Fig.4). The fat, moisture, and ash content were also observed to be highest in *Sardinella longiceps* compared to *Secutor insidiator*, with *Stolephorus indicus* having the least percentage of these components (Fig.6-8). The Fat percentage was observed highest in *Sardinella longiceps* 2.6% per gm followed by 1.2% per gm in *Secutor insidiator and 0.8% per gm in Stolephorus indicus* (Fig.6). These results are consistent with the nutritional profiles of pelagic fish species, which are known to have high protein and fat content due to their active lifestyle and diet (Tocher, 2003). The high protein content in *Sardinella longiceps and Secutor insidiator* makes them valuable sources of high-quality protein for human consumption. The protein is essential for muscle building and repair, while the fat provides energy and essential fatty acids, including omega-3fatty acids, which are beneficial for heart health and cognitive function (Tilstone et al., 2015).

The Moisture percentage was observed highest in *Sardinella longiceps* 26.5% per gm followed by 20% per gm in *Secutor insidiator and 19% per gm in Stolephorus indicus* (Fig.8). The moisture content of the fish affects their texture and shelf life, with higher moisture contentpotentially leading to a shorter shelf life if not properly processed (Venugopal, 2009).

The Ash percentage was observed highest in *Sardinella longiceps 14.2*% per gm followed by 5.2% per

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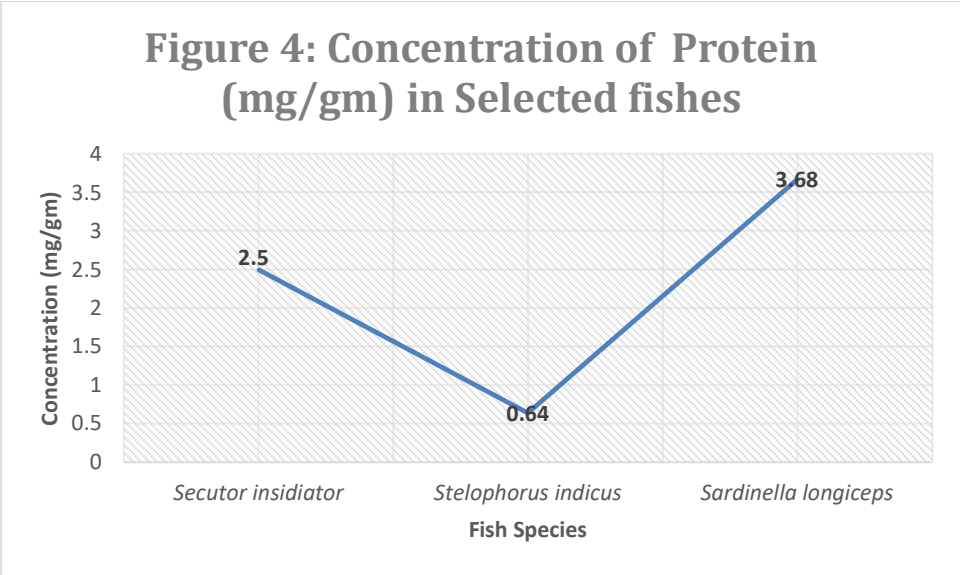
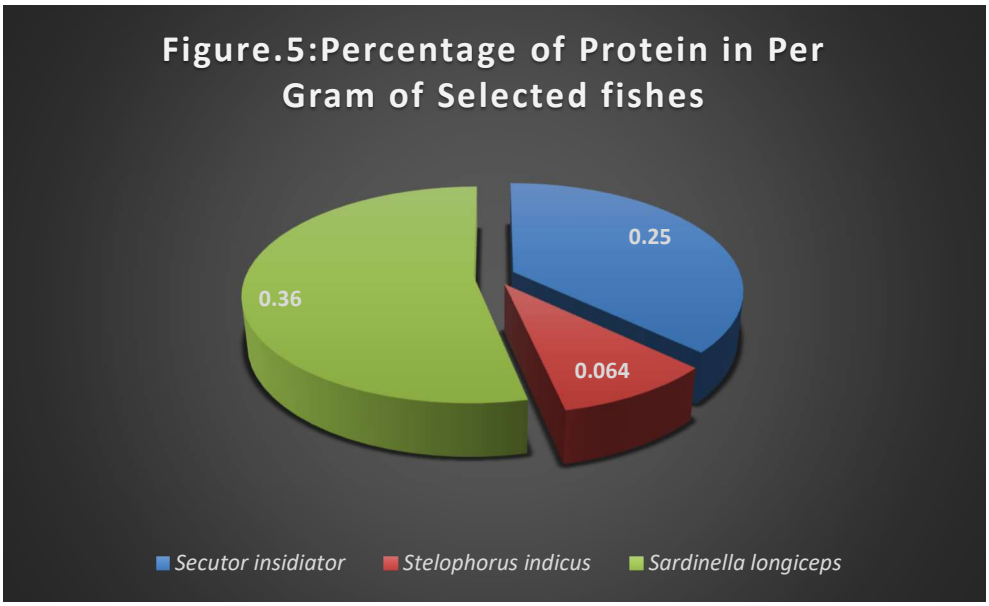
gm in *Secutor insidiator and 4% per gm in Stolephorus indicus* (Fig.7). The ashcontent, which indicates the mineral content of the fish, is also important for human nutrition,as it includes essential minerals such as calcium, phosphorus, and iron (Food and Agriculture Organization of the United Nations, 2020). The variability in biochemical composition among the species studied is likely due to differences in their environment, diet, and absorptive capabilities. These factors are crucial for maintaining fish health and ensuring food safety for human consumption (Bogard et al., 2015). The present findings suggest that *Sardinella longiceps* is a rich source of protein and other nutrients, which is valuable information for understanding the nutritional profiles of these fishspecies and their potential health benefits. The study contributes to the knowledge the dietarybenefits of these species and their applications in food processing and marketing, which is important for consumers.





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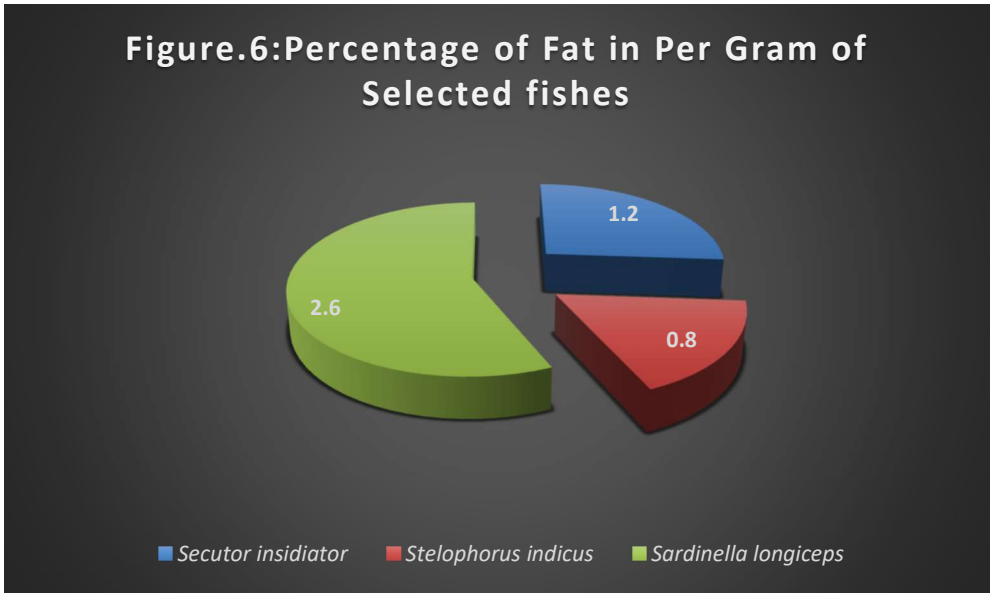

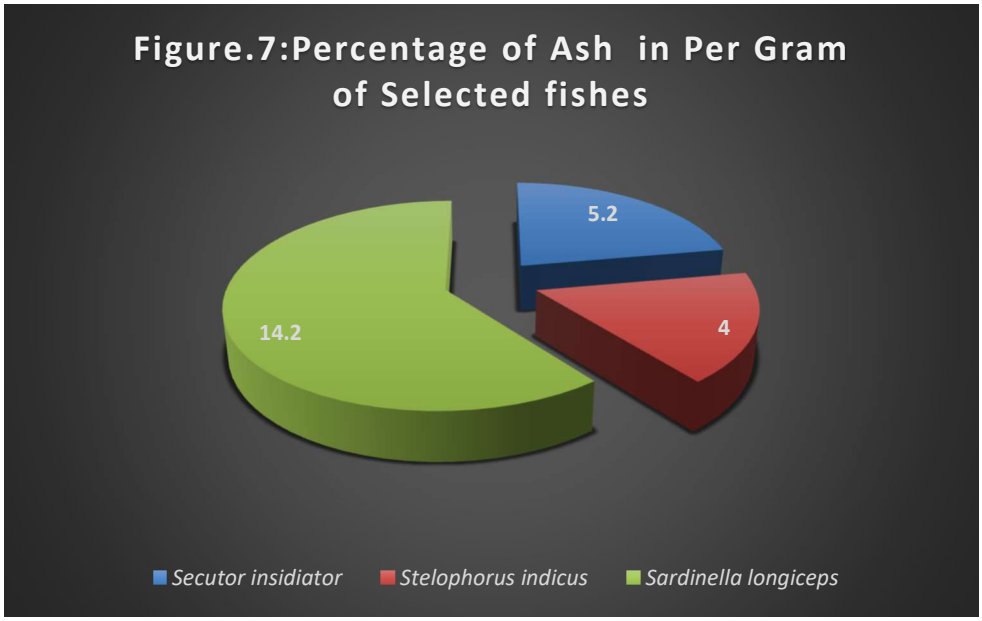

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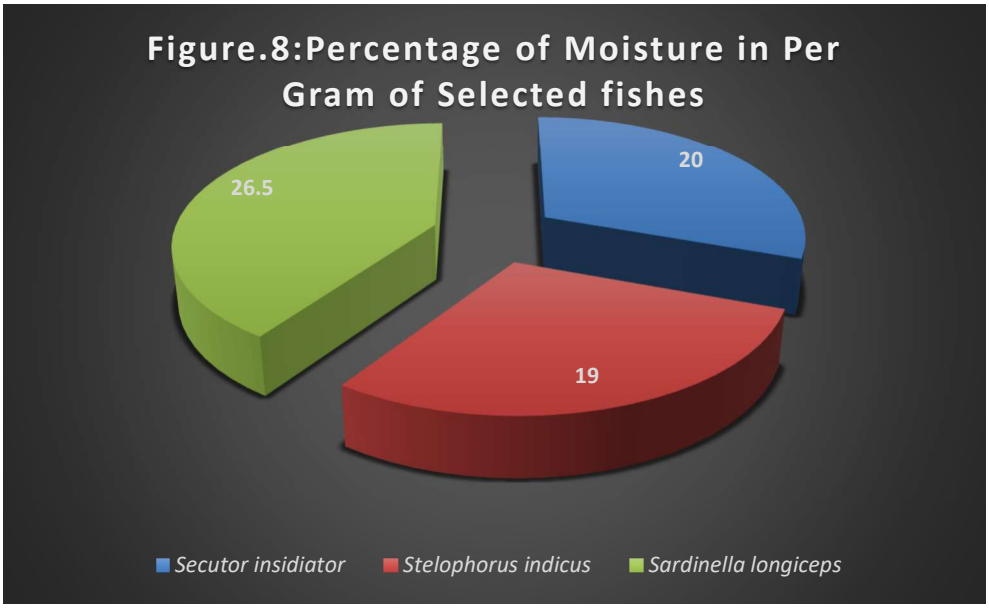

Conclusion:

The present study aims to fill the knowledge gap by providing a comprehensive analysis of the biochemical compositions of *Sardinella longiceps, Stelophrous indicus and Secutor insidiator*. The findingsunderscore the importance of Sardinella longiceps, Stelophrous indicus and Secutor insidiator in the local economy and diet of Uttara Kannada, Karnataka, and highlight the need for sustainable management practices to ensure the continued availability of these nutrient-rich fish species. The findings will contribute to the understanding of their nutritional profiles andpotential health benefits, guiding consumers, fishery industries, and policymakers in making informed decisions regarding the utilization and conservation of these valuable marine resources.

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