

BACTERIAL FLORA OF MARINE FISH DOMA (SCIAENIDS) (Small Spp.) FROM BOMBAY COAST

S. S. PAWAR AND N. G. MAGAR

Department of Biochemistry, Institute of Science, Bombay.

Marine fish doma (*Sciaenids*) (Small spp.) from Bombay coast was studied for total bacterial counts on the surface and gut. Large number of *Micrococcus* species (77.4%) were found whereas few species from *Achromobacter*, *Bacillus*, *Bacterium*, *Flavobacter*, *Pseudomonas* and *Sarcina* were noted,

INTRODUCTION

Spoilage of fish is usually brought about by autolysis, oxidation and bacterial activity.

In any case the bacterial spoilage has the most conspicuous influence upon the decrease in keeping quality. Zobell and Upham (1944) found that there was generally a similarity between the bacterial flora responsible for the spoilage of fish and that existing in its marine environments. Beatty and Collins (1939) and Collins (1941) investigated the spoilage of marine fish. Green (1949) and William (1952) studied the bacteriology of shrimp. Shaikhmahmud and Magar (1956) in their studies on the bacterial flora of Bombay Prawns observed that entire course of spoilage of prawns depended on the bacterial flora inhabiting the prawns.

There are various species of marine fish available along the Bombay coast but

the data regarding the microflora are very meagre. The present work was therefore planned to study the microflora inhabiting the surface and gut of the marine fish, doma (*Sciaenids*) (Small spp.) from Bombay Coast.

MATERIAL AND METHODS

Fish required for studies were collected from Government of India deep sea fishing Centre, Colaba, Bombay. The marine fish doma 5 to 6 in number (*Sciaenids*) (Small spp.) were individually put in sterile wide mouth bottle and brought to the laboratory from aboard the trawler where the fish remained after the catch for an hour or so without refrigeration or ice. Each bottle was opened under aseptic condition and the area of one square inch was marked on the body of fish by a sterile divider. This area was very carefully rubbed off as clean as possible with sterile cotton swabs. The swabs were collected in 100 ml. of

sterile distilled water with intermittent gentle swirling to ensure suspension of the microorganisms. The fish was then cut open dorsally by a longitudinal cut with a sterile pair of scissors and the gut was removed and was cut opened as aseptically as possible and mixed with sterile distilled water as above. These bacterial suspensions were diluted serially and plated by the usual pour plate method using tap water nutrient agar and sea water nutrient agar for each diluted suspension. The viable counts were taken after incubating the plates for 72 hours at 33°C. The bacterial counts were ascertained by repeating the above procedure several times. In order to determine the bacterial flora inhabiting the fish surface and gut a number of representative colonies as distinguished from shape, size and colour was isolated from the plates and transferred aseptically on nutrient agar slants.

The following media were used to study the comparative growth of the microbes and to differentiate the various biochemical characteristics.

1. Nutrient agar containing fresh water and aged sea water.
2. Nutrient broth prepared in water, sea water and 3% NaCl.
3. Potato slants.
4. Litmus milk medium.
5. Tryptone broth.
6. Nitrate broth.
7. Various carbohydrate media.
8. Gelatin agar and gelatin slants.
9. Starch agar medium.

RESULTS AND DISCUSSION

Total bacterial counts taken from the surface and gut are incorporated in Table I and number of each genera included put in Table II.

It is evident from Table I that fish surface contains large amount of microorganisms whereas gut contains very small number of microorganisms. The surface of the fish contains a large number of microorganisms because the surface is exposed to the surroundings and most of the bacteria are carried on the surface. It was also observed that sea water agar gave a better growth of organisms as against tap water agar. Several difficulties were encountered while classifying microorganisms according to Bergey's Manual (Bergey's Manual of determinative Bacteriology). Out of 62 cultures isolated, a large majority belonged to the *Micrococcus*, which constituted about 77.4 per cent of the total isolates and remaining constituted only 22.6 per cent. The different species recorded were as follows:

MICROCOCCUS	ACHROMOBACTER
1. <i>M. flavescens</i>	1. <i>A. aquamarinus</i>
2. <i>M. mucotaciens</i>	2. <i>A. candicans</i>
3. <i>M. cereus</i>	3. <i>A. liquefaciens</i>
4. <i>M. mucofaciens</i>	4. <i>A. litorale</i>
5. <i>M. pikowskyi</i>	
6. <i>M. corallinus</i>	BACILLUS
7. <i>M. species</i>	
8. <i>M. subcitreus</i>	1. <i>B. species</i>
9. <i>M. rosaceus</i>	
10. <i>M. luteus</i>	
11. <i>M. perflavus</i>	
12. <i>M. aurantiacus</i>	
13. <i>M. varians</i>	
14. <i>M. candicans</i> .	
BACTERIUM	
1. <i>M. marinopiscosus</i>	
2. <i>B. species</i>	
FLAVOBACTERIUM	PSEUDOMONAS
1. <i>F. amocontactum</i>	1. <i>P. ambigua</i>
2. <i>F. aquatile</i>	2. <i>P. striata</i>
SARCINA	
1. <i>S. lutea</i> .	

TABLE I. TOTAL BACTERIAL COUNT

Sample Number	Locality	Surface *		Gut @	
		Sea Water	Tap Water	Sea water	Tap water
1.	Colaba Bunder	3.7×10^5	1.2×10^5	9.1×10^5	4.8×10^3
2.	Colaba Bunder	2.0×10^6	1.4×10^6	8.4×10^3	5.0×10^3
3.	Colaba Bunder	3.4×10^5	1.9×10^5	7.3×10^3	3.4×10^3

* Expressed per square inch of the surface.

@Entire gut.

Each value represents the mean of 4-5 different values.

TABLE II DISTRIBUTION OF BACTERIA ACCORDING TO GENERA
IN THE GUT AND SURFACE OF THE FISH

Name of the Genera	Total number of isolates recorded from each genera
<i>Micrococcus</i>	48
<i>Achromobacter</i>	4
<i>Bacterium</i>	3
<i>Bacillus</i>	3
<i>Flavobacter</i>	2
<i>Pseudomonas</i>	2
<i>Sarcina</i>	1

Most of the *Micrococcus*, *Bacillus*, *Flavobacter* were found to be chromogenic in nature and usually produced all shades of yellow, cream and pink pigments. *Achromobacter* included the organisms having the property of indole and H₂S production which reflected their role in the spoilage of fish.

It was noted that majority of the organisms was of the proteolytic types which indicated their high spoilage potential.

The present flora of the fish studied was comparable to that reported by Bhat and Albuquerque (1953), Jadhav (1961) and Shaikhmahmud (1958) from Bombay and Venkatraman and Sreenivasan (1954) from Malbar respectively on Bombay ducks, pomphrets, prawns and mackerel.

The investigation of the flora inhabiting the surface of fish indicated the types of organism occurring in the surroundings of the animal.

SUMMARY.

Bacterial flora of the marine fish *doma* (*Sciaenoids*) (Small spp.) from Bombay Coast was studied. Total viable counts were recorded. Total bacterial counts on the surface were quite large in number as against gut. 62 cultures were isolated and identified to the nearest species described in Bergey's Manual. Large number of *Micrococcus* species were found whereas few species of the following genera *Achromobacter*, *Bacillus*, *Bacterium*, *Flavobacter*, *Pseudomonas* and *Sarcina* were noted.

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