

## Microbiological analysis of wild-caught SC shrimp vs farm-raised imported shrimps

By

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The objective of this project was to assess and differentiate SC shrimps from imported shrimp based on microbiological safety. Total twenty one shrimp samples were analyzed for total bacterial counts, resistant bacteria to ceftriaxone, tetracycline, and chloramphenicol, coliforms, *Escherichia coli*, *V. parahaemolyticus*, *Listeria*, and *Salmonella*. Thirteen farm-raised imported shrimp samples in frozen condition were purchased from supermarket chain stores or seafood outlets and analyzed within three days of purchase. The wild-caught South Carolina fresh and frozen samples were purchased either from Charleston or from local distributors and analyzed on the same day.

The statistical analyses of the obtained results show that there was insignificant ( $p < 0.05$ ) difference between the total bacterial counts of wild-caught South Carolina shrimp samples and farm-raised imported samples. Total bacterial counts of any of the samples did not exceed the International Commission on Microbiological Specifications for Foods recommended limits of  $1 \times 10^7$  CFU/g.

Among isolates from TSA plates, the resistance rates of the isolates from farm-raised imported samples to chloramphenicol, kanamycin, nalidixic acid and tetracycline were greater than the resistance rates of isolates from wild-caught South Carolina samples. Most isolates from imported shrimp samples were resistant to multiple antibiotics.

In wild-caught South Carolina shrimps, *Vibrio parahaemolyticus* was detected in one sample and was resistant only to ampicillin. Another *Vibrio* spp. isolate was detected in one wild-caught South Carolina sample and was not resistant to any one of the nine antibiotics tested. Both *Listeria* and *Salmonella* were absent in wild-caught South Carolina samples.

In farm-raised imported shrimp samples, *Vibrio vulnificus* was detected in one sample and was resistant to two antibiotics, i.e., nalidixic acid and trimethoprim. *Salmonella* spp. was detected in one of the farm-raised imported samples and was resistant to 4 antibiotics- ampicillin, ceftriaxone, gentamicin and streptomycin. *Listeria ivanoii* was detected in two farm-raised imported samples. One strain was resistant to ampicillin, nalidixic acid, tetracycline and trimethoprim, and another strain was resistant to six antibiotics, i.e., ampicillin, ceftriaxone, chloramphenicol, nalidixic acid, tetracycline and trimethoprim. *Listeria innocua* was detected in one of the farm-raised imported samples and was resistant to both ceftriaxone and nalidixic acid.

The antibiotic resistant profiles of bacterial isolates showed the occurrence of multiple antibiotic resistances in imported shrimp sample isolates, suggesting the possible use of antibiotics in raising shrimps in these countries.