

FLAVOR AND TEXTURE COMPARISON OF HYBRID STRIPED BASS
(*Morone saxatilis/chrysops*)
AND RED SNAPPER (*Lutjanus campechanus*)

L.S. Andrews, R.M. Grodner, J.A. Liuzzo
Department of Food Science
L. Dellenbarger and A. Schupp
Department of Agricultural Economics
Louisiana Agricultural Experiment Station
Louisiana State University Agricultural Center
Baton Rouge, LA 70803

The increasing consumption of seafood in the United States (1) has encouraged the development of new seafood products by the aquaculture industry. One of the newer aquaculture species, hybrid striped bass, is the object of much attention by aquaculture promoters (5). Information regarding consumer acceptance of hybrid striped bass could be beneficial when developing marketing strategies for this new aquaculture species.

Hybrid striped bass is a cross between striped bass and white bass. This new species has gained much attention recently and most sea grant universities have it under study with production occurring predominantly in the Middle Atlantic region of the United States. "At least two farms, one in California and one in North Carolina, are now harvesting product" (5). Hybrid striped bass is fairly cold tolerant and has many of the characteristics of saltwater finfish.

Market acceptability of new aquaculture species depends on the acceptability of flavor and texture attributes associated with what consumers consider good fish flavors and tenderness. Obviously, consumer acceptability of new products has a direct impact on the economic outcome of any food industry. The primary objective of this study was to establish flavor and texture descriptors for the hybrid striped bass, and secondly, to compare these descriptors to those of another popular saltwater finfish, red snapper.

MATERIALS AND METHODS

Volunteer sensory panelists were selected from undergraduate students, graduate students, faculty and staff in the College of Agriculture, Louisiana State University. Eight panel members were selected from potential panelists screened for their ability to identify and distinguish intensities of various control flavors and textures and for their frequent finfish consumption. Previous sensory and/or consumer panel studies involving seafood were reviewed (2)(4)(6) to provide input into planning and conducting training sessions for the eight-member panel and to establish the evaluation criteria for the actual evaluation sessions. Following established procedures, the panel was trained using red snapper as the control fish. Procedures outlined by Meilgaard, et al. (3) were followed, during three training sessions, to assist the panel members in identifying the kinds and intensities of flavors and textures present in the red snapper. Training in recognizing good fish flavor and texture in the red snapper was used in rating the overall acceptability of the unknown samples.

Three formal sensory panel sessions were held, with each panel member evaluating unidentified duplicate samples of both hybrid striped bass and red snapper finfish using a randomized complete block design. The sensory room was lighted with red light to reduce the influence of flesh color on the flavor evaluation. Each panel booth was equipped with evaluation forms, cooked samples, expectorant cups, water and scissors (for opening plastic bags). The identities of all the fish samples were unknown to the panelists.

The hybrid striped bass used in the evaluation was pond reared by the Fisheries Department at the Louisiana State University. Red snapper was purchased from a local seafood specialty store. All products were filleted, wrapped, frozen and stored in a -20°C freezer until use. Just prior to testing, the fillets were removed from the freezer (cut while in frozen state) into approximately 3 cm squares and sealed individually in 4" x 4" polyethylene bags.

All fish fillet samples (sealed in polyethylene bags to retain moisture and flavor) were cooked in a boiling water bath (100°C) for 8-9min, optimum cooking times for texture was determined for both species prior to actual panel sessions. Cooking times longer than 8-9 min for these two species resulted in a drier and tougher meat protein structure. Each of the samples was clearly labeled with random numbers and presented in random order to the panelists. Each panelist rated all samples for flavor, juiciness, texture, and overall acceptability using a 0-9 hedonic scale. The hedonic acceptability scale ranged from 0 - highly unacceptable to 9 - highly acceptable. In addition, the panelists were asked to record specific flavor and texture attributes identified in each sample. The panel results were used to determine mean values for the panel as a whole and also with the panel divided into two groups based on their preference and consumption of fresh or salt water finfish.

Freshly thawed hybrid striped bass filets and red snapper were also breaded in a "Cajun" style fish fry breading and pan fried in pure vegetable oil (175°C) for 3-5 min until golden brown. Samples of breaded and fried hybrid striped bass and red snapper were rated for overall acceptability by the panel following the final session of evaluating boil-in-bag samples.

RESULTS AND DISCUSSION

Flavor descriptors identified by the panel for the red snapper and hybrid striped bass are presented in Table 1. All of the flavor and texture descriptors identified by the panel during the training sessions for the red snapper were also identified in the blind samples of red snapper and hybrid striped bass with the addition of pleasant, grainy, and buttery/oily identified in the hybrid striped bass only. The majority of the descriptors (mild fishy, sweet, moist, firm, etc.) were considered "good fish flavors" expected from a marine finfish such as red snapper. A few variations among panelists occurred in determining the degree of desirable fishy flavor in the boiled fish fillets. The "fishy" flavors described by the panel members, particularly those who consumed marine finfish on a regular basis, were considered good and expected flavors for fresh saltwater fish.

Overall acceptability ratings of the boiled fish samples are presented in Table 2. The overall mean acceptability scores for red snapper and the hybrid striped bass were very similar with ratings of 3.85(acceptable) and 3.18 (somewhat acceptable) respectively. When the panel scores were split into two groups

based on the panelists normal consumption of fresh or salt water fish, the acceptability of both fish species approximately doubled to around 7.00 (very acceptable) for the salt water fish group specifically.

Table 1. Flavor and texture descriptors identified in red snapper and hybrid striped bass.

| <u>Flavor related</u> | <u>Texture related</u> | <u>Miscellaneous</u> |
|-----------------------|------------------------|----------------------|
| weak fishy | flaky | nutty |
| good fishy | moist | creamed corn |
| mild fishy | firm | cardboard |
| bland | | |
| strong fishy | | |
| buttery/oily* | | |
| sweet light | grainy | |
| typical fishy | | |
| pleasant | | |

* Descriptors identified in hybrid striped bass only.

Table 2. Acceptability* Rating.

| | <u>Whole Panel</u> | <u>Ocean Fish Panel</u> | <u>Whole Panel</u> |
|---------|--------------------------|--------------------------|-----------------------|
| | <u>Unseasoned/boiled</u> | <u>Unseasoned/boiled</u> | <u>Seasoned/Fried</u> |
| HSBass | 3.18 | 7.12 | 7.89 |
| Snapper | 3.85 | 6.93 | 7.15 |

*Acceptability scores were measured on a 9 point hedonic rating scale. (9 = highly acceptable; 0 = highly unacceptable).

Acceptability ratings, by the entire panel, for the red snapper and hybrid striped bass prepared in a seasoned batter and fried were markedly higher than unseasoned samples with scores of 7.15 for red snapper and 7.89 for hybrid striped bass (Table 2).

CONCLUSION

Flavor and texture descriptors identified with hybrid striped bass were very similar to those described for red snapper. The overall flavor and texture acceptability scores rated by this sensory panel was similar for the two species. Consequently, it would appear that the farm raised hybrid striped bass could favorably compete with a popular marine species such as red snapper. The investigators recognize the limited scope of this experiment and recommend test marketing of hybrid striped bass also be conducted in other regions of the United States.

REFERENCES

1. HU, TEH-WEI. 1985. Analysis of seafood consumption in the United States: 1970, 1974, 1978, 1981. PB86-135043. NTIS U.S. Department of Commerce.
2. JOHNSEN, P.B. and C.A. KELLY. 1991. A technique for the quantitative sensory evaluation of farm raised catfish. *J. Sensory Studies*. In press.
3. MEILGAARD, M., G.V. CIVILLE, and B.T. CARR. 1987. *Sensory Evaluation Techniques*. Vol II, CRC Press, Boca Raton, FL.
4. PRELL, P.A. and F.M. SAWYER. 1988. Flavor profiles of 17 species of north Atlantic fish. *J. Food Sci.* 53:1036-42.
5. REDMAYNE, P.C. 1989. World aquaculture developments. *Food Tech.* 43 No.11:80-81.
6. SAWYER, F.M., A.V. CARDELLO, and P.A. PRESS. 1988. Consumer evaluation of the sensory properties of fish. *J. Food Sci.* 53:12-18.