

# Technical Brief

## Biotechnology Information for Food Safety Databases

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One of the longest running projects of NCFST's collaborative research efforts is the Biotechnology Information for Food Safety (BIFS) databases developed by Steven Gendel, Ph.D., NCFST/FDA. This project, in continuous development since October 1991, provides food scientists with direct, focused access to DNA sequence information for the identification of food-related microorganisms (initiated in 1991) and sequence databases for assessing the potential allergenicity of proteins (initiated in 1994). The databases provide access to, and independent evaluation of, published DNA sequences for the detection and identification of food-related microorganisms; allergen protein sequences; methods for assessing the potential allergenicity of new food proteins; and other technical data related to food safety. The BIFS databases are value added information resources that provide direct access to relevant technical data, data evaluation and validation of techniques for applying these data.

Dr. Gendel initiated the development of a web site to facilitate access to BIFS databases in 1995. Today, the Foodborne Pathogens section contains description and links to Hybridization Probes and PCR Primers for the detection, identification, and characterization of *Listeria monocytogenes* and various *Clostridium* species or clostridial toxins. Individual web pages have been developed for genes, that have been used as targets for the identification of *Listeria*

*monocytogenes*, and in some cases for *Listeria spp.* Web pages have also been developed for genes that have been used as targets for the identification and/or characterization of various *Clostridium* species or clostridial toxins.

These pages contain, in most cases, a graphic showing the location of the Probe

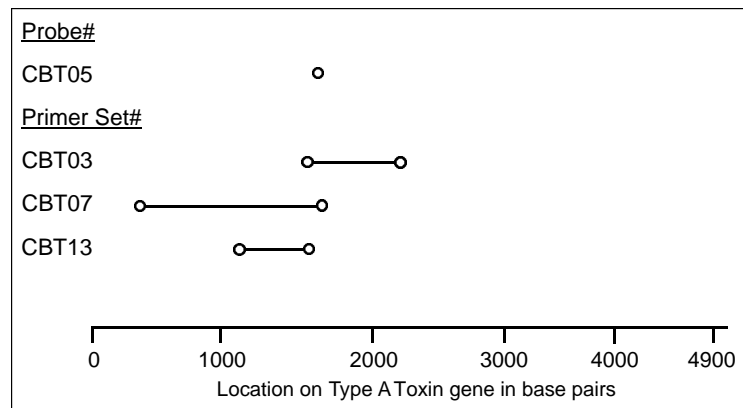


Figure 1. As seen on the BIFS web site.

and Primer (Figure 1), a link to the GenBank accession for the target gene, and tables which show probe and primer identification numbers, sequences and links to research articles on the sequence. The references are, in turn linked to the PubMed database, which provides an abstract of the article, and links to the source publication.

The Allergen Sequence Databases with references to over 900 allergen sequences is a test site for implementing recommendations developed by an international committee. This committee, established by the European Commission Joint Research Center to coordinate development of allergenic sequence databases, is examining issues such as appropriate criteria for including a sequence in an allergen database.

The Allergen section of the BIFS pages contains three databases: "Food Allergen Sequences," "Non-Food Allergen Sequences," and "Wheat Gluten Sequences," and a world wide web virtual library page. The database information on each allergen is displayed in a table format and identifies the common

name of the allergenic protein, the source organism, sequence accession numbers or identifiers for each of the reference databases, and citation information. Each accession or identifier is linked directly to the matching record in the source database. The source databases for allergen sequences are: SP-Swiss-Prot (<http://ca.expasy.org/sprot/>), PIR (<http://pir.georgetown.edu/>), and Entrez ([http://](http://www.ncbi.nlm.nih.gov/entrez/index.html)

[www.ncbi.nlm.nih.gov/entrez/index.html](http://www.ncbi.nlm.nih.gov/entrez/index.html)). A list of references is provided with each table and the appropriate references are cited in the table with the individual listings.

The BIFS databases are unique resources in the application of biotechnology and bioinformatics to food safety assurance, pathogen detection and control, microbial risk assessment, and allergenicity risk assessment. Additional information on the BIFS databases can be found in the following article:

Gendel, S. 2002. "Sequence Analysis for Assessing the Potential Allergenicity of Genetically Engineered Foods." *Annals of the New York Academy of Sciences*. 964: 87-98.

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