National Survey of State Regulation of Wild Mushroom Foraging for Retail Sale

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Abstract
An online national survey examined the regulatory approaches of 49 states toward wild foraged mushrooms intended for retail sale. A twenty-one question survey was sent to 50 state agencies, with 49 responses (98% response rate). The results indicated six different regulatory approaches to regulating wild foraged mushrooms at retail. These approaches include not allowing sale; identification by the state of approved wild mushroom experts certified via training; licensing of wild mushroom sellers; consumer advisory in the retail food establishment; identification of mushrooms by a wild mushroom expert with state verified credentials; or variance on a case-by-case basis. Study recommendations include the development of a guidance document by the Conference for Food Protection (CFP) and the Association of Food and Drug Officials (AFDO); increased collaboration among states to develop and share approaches for certification of wild mushroom identifiers; developing a registry and common criteria to determine qualifications of wild mushroom experts; and a comprehensive national index of edible species.

Keywords: foraged wild mushrooms, regulatory approaches, wild mushroom expert, mushroom identification, mushroom guidance resources, retail food
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**Background**

A possible result of the increasing popularity of foraging wild mushrooms has been the increase in reported cases of mushroom poisoning (Wolf-Hall, C., 2009). Most literature related to mushroom exposures and poisonings are clinical case reports, with few studies characterizing the epidemiology of exposures (Jacobs, Von Behren, & Kreutzer, 1996; Nordt, Manoguerra, & Clark, 2000; Mrvos, swanson-Biearman, & Krenzelok, 2007). Over 5,000 species of mushrooms are presumed to be found worldwide; only 20–25% have been named; and about 3% of these are poisonous (Gonmori & Yoshioka, 2003). Many of these poisonous wild mushrooms look similar in appearance to edible species of wild mushrooms. The American Association of Poison Control Centers reported 8,601 cases of mushroom poisonings in 2004 with five fatalities (Watson et al., 2005). About 80% of mushrooms involved in these cases were unidentified. An estimated guess of mushroom poisonings from foraged wild mushrooms at retail would most likely be anywhere from 10-30%, although no studies in the literature have cited any epidemiologic data. Overall, there appear to be 20-30 cultivated edible species and 15 wild edible species that are commonly collected for commercial sale and many more wild, non-commercial edibles (Kuo, 2007; Chang, 2009; Lincoff, 2010). Public health concerns related to food safety arise when commercial foragers of wild mushrooms pick toxic, “look-alikes” of edible species and offer them at retail.

Limited state and local laws exist to regulate the sale of foraged wild mushrooms. Some states have followed the guidance for regulating foraged wild mushrooms based
on the U. S. Food and Drug Administration (FDA) Food Code. In Georgia, the Rules and Regulations for Food Service (Georgia Food Code Chapter 290-5-14), which is based on the 2005 FDA Food Code, states that “mushroom species picked in the wild shall be obtained from sources where each mushroom is individually inspected and found to be safe by an approved mushroom identification expert” (FDA, 2005; Georgia Department of Public Health [DPH], 2007). However, the codified text in Chapter 290-5-14 does not define who is an approved wild mushroom expert for the purpose of identifying safe species of foraged wild mushrooms. In addition, the Food Code does not clearly address traceability of foraged wild mushrooms from field to the consumers’ plate in retail food establishments. The purpose of this study was to examine the existing regulatory approaches of the state agencies that regulate foraged wild mushrooms at retail in the U.S. and to provide recommendations to states regarding the regulation of foraged wild mushrooms offered for retail sale.

**Problem Statement**

There is no published research in peer-reviewed food safety literature regarding regulatory approaches used by state food safety agencies related to foraged wild mushrooms at retail in the United States.

**Research Questions**

1. What are the existing regulatory approaches regarding foraged wild mushrooms sold at retail in the United States?
2. What resources do state food safety agencies have available for them to identify edible mushrooms that are foraged from the wild and offered at retail in the United States?
Methodology

The Association of Food and Drug Officials (AFDO) Directory of State and Local Officials (DSLO) was used to identify contacts. Initial phone calls were made to these contacts to determine which agencies are responsible for wild mushrooms at retail. A survey was then delivered by a web-based software program to the appropriate agencies. The survey consisted of 21 questions that were reviewed and revised based on input from AFDO’s Wild Mushroom Subcommittee and the International Food Protection Training Institute (IFPTI). The survey asked how foraged wild mushrooms at retail were regulated; the reasons, if appropriate, for lack of regulation; the requirements for retail operators; and resources available for identification of foraged wild mushrooms. A follow-up telephone call was made to those participants who had not responded to encourage participation.

Results

Forty-nine states responded; in nine states (18%), two food safety regulatory agencies have jurisdiction (Florida, Georgia, Louisiana, Mississippi, Montana, North Carolina, South Carolina, Utah, and Virginia) and in 18 states there is no regulation (36%). Most regulation occurs in the South (39% of the 31 regulated states), followed by the Midwest (32%), the West (16%), and the Northeast (13%). Twelve (39%) of the 31 states that do regulate identified morels and chanterelles as the most common types of foraged wild mushrooms sold at retail.

Of the states which regulate, 45% use the 2009 FDA Model Food Code. The study did not find any association with the adoption of a specific version of the Food
Code by a state and its specific regulatory approach related to foraged wild mushrooms at retail. However, this study did find six distinct approaches to regulation.

1) Three states do not allow the sale or service of foraged wild mushrooms at retail as they regard foraged mushrooms as coming from an “unapproved source”: Delaware, Kentucky, and Louisiana.

2) Four states do allow the sale or service of foraged wild mushrooms at retail if the product was identified as safe by an “approved wild mushroom expert”—a person certified after training: Iowa, Michigan, North Carolina, and South Carolina. All of these states except for North Carolina had a state-recognized and approved training program e.g., in Michigan, a third party provides training and certification related to wild mushroom “experts.”

3) Seven states allow the sale or service of foraged wild mushrooms at retail if the mushrooms were provided by a “licensed wild mushroom seller”: Kansas, Missouri, Montana, Nebraska, Rhode Island, Washington, and Wisconsin. The “licensed wild mushroom seller” is required in these states to ensure compliance with the regulatory requirements related to foraged wild mushrooms.

4) Only one state, Alaska, relied on consumer advisories in retail food establishments for ensuring the safety of sale or service of foraged wild mushrooms at retail.

5) Seventeen states allow the sale or service of foraged wild mushrooms at retail if they are identified by an “approved wild mushroom expert” with credentials verified by the state: Alabama, Colorado, Florida, Georgia, Indiana, Kansas, Minnesota, Missouri, New Mexico, New York, North Carolina, North Dakota, Ohio, Oklahoma, Pennsylvania,
Tennessee, Virginia, and West Virginia. In all of the states, persons who consider themselves to be a wild mushroom expert due to qualifications and experience may be reviewed by the state and may or may not be approved. Note that all of these states have no set standards for being a wild mushroom expert except for Colorado, Indiana, Kansas, Minnesota, Missouri, and Pennsylvania.

6) The respondent from one state, Utah, indicated that their state would allow the sale or service of foraged wild mushrooms in retail food establishments by use of a variance on a case-by-case basis.

Please refer to Table 1 for more information on the types of regulatory requirements for retail sale and service of foraged wild mushrooms among states who regulate foraged wild mushrooms at retail.

Table 1

*Types of Regulatory Requirements for Retail Sale of Foraged Wild Mushrooms Among the 31 States Who Regulate Wild Mushrooms at Retail*

<table>
<thead>
<tr>
<th>Regulatory Requirements</th>
<th>Yes (%)</th>
<th>No (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have restrictions to limit the volume of wild mushroom species</td>
<td>5 (16%)</td>
<td>26 (84%)</td>
</tr>
<tr>
<td>Require records to be maintained by harvester of wild mushroom species</td>
<td>8 (26%)</td>
<td>23 (74%)</td>
</tr>
<tr>
<td>Maintain a list of safe wild mushroom species</td>
<td>7 (23%)</td>
<td>24 (77%)</td>
</tr>
<tr>
<td>Maintain a list of approved wild mushroom experts</td>
<td>7 (23%)</td>
<td>24 (77%)</td>
</tr>
<tr>
<td>Have criteria for approval of wild mushroom experts</td>
<td>10 (32%)</td>
<td>21 (68%)</td>
</tr>
</tbody>
</table>
Table 2 identifies specific regulatory criteria that operators of retail food establishments must comply with in regards to the sale and service of foraged mushrooms at retail.

Table 2

*Regulatory Requirements for Retail Operators for Sale or Service of Foraged Wild Mushrooms at Retail*

<table>
<thead>
<tr>
<th>Regulatory Requirements</th>
<th>Yes (%)</th>
<th>No (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Notify health authorities prior to selling wild mushrooms at retail</td>
<td>2 (6%)</td>
<td>29 (94%)</td>
</tr>
<tr>
<td>Inform customers of risk of consuming wild mushrooms in their establishments</td>
<td>2 (6%)</td>
<td>29 (94%)</td>
</tr>
<tr>
<td>Maintain written buyer specifications of wild mushrooms for traceability purposes</td>
<td>5 (16%)</td>
<td>26 (84%)</td>
</tr>
<tr>
<td>Purchase wild mushrooms from a permitted/licensed wild mushroom seller</td>
<td>5 (16%)</td>
<td>26 (84%)</td>
</tr>
<tr>
<td>Other</td>
<td>3 (10%)</td>
<td>28 (91%)</td>
</tr>
</tbody>
</table>

Note: This is among the 31 states that regulate the sale or service of foraged wild mushrooms at retail.

Only a third (10 of 31 states) reported that they have resources to identify safe and unsafe types of foraged wild mushrooms at retail in their states: Alabama, Georgia, Kansas, Michigan, Montana, North Carolina, Pennsylvania, South Carolina, Washington, and Wisconsin. Please refer to Table 3 for more information on the different types of resources used for the identification of foraged wild mushrooms.
Table 3

*Types of Resources Used for Identification of Foraged Wild Mushrooms at Retail*

<table>
<thead>
<tr>
<th>Resources</th>
<th>Yes (%)</th>
<th>No (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approved wild mushroom identifiers who have been certified through agency-recognized training.</td>
<td>3 (6%)</td>
<td>7 (70%)</td>
</tr>
<tr>
<td>An established committee that consists of food service personnel from industry, associations (mycological &amp; restaurant), academia and commercial wild mushroom foragers</td>
<td>3 (30%)</td>
<td>7 (70%)</td>
</tr>
<tr>
<td>Extension service &amp; academia</td>
<td>3 (30%)</td>
<td>7 (70%)</td>
</tr>
<tr>
<td>Other – another agency</td>
<td>1 (10%)</td>
<td>9 (90%)</td>
</tr>
</tbody>
</table>

Note: This is among those 10 states that have resources available for identification of foraged wild mushrooms at retail.

Nine states reported that they lack the resources to identify safe and unsafe mushrooms: Delaware, Kentucky, Louisiana, Nevada, New York, Oklahoma, Rhode Island, Virginia, and West Virginia. Three other states (Florida, Ohio, and Tennessee) did not respond to the question.

Seven states maintain a list of wild mushroom experts to serve as a reference for identification and traceability of foraged wild mushrooms: Colorado, Kansas, Indiana, Michigan, Missouri, Montana, and Pennsylvania. Nebraska reported that sanitarians must consult a certified mushroom individual. The respondent for Alaska indicated that the resource for identification of foraged wild mushrooms is non-applicable because they use the option of a Consumer Advisory as an approach for regulating wild mushrooms for sale or service at retail.
Some states maintain a list of safe edible species of foraged wild mushrooms that they permit for sale or service at retail in their state: Iowa, Michigan, Montana, Pennsylvania, South Carolina, Virginia, and Washington.

**Conclusions**

The study concluded that there is great variation in the regulation of foraged wild mushrooms. In addition to the differences in regulatory approach, almost a third of the states surveyed have more than one food safety agency involved in wild mushroom regulation which, in turn, may encourage this variation.

Another conclusion of the study is that the absence of state and national data regarding the production of foraged wild mushrooms significantly limits the ability to assess the sources of risk. For example, some states have commercial foragers picking large quantities and transporting those mushrooms across state lines.

A third conclusion is that some states are in the process of revising their regulations for food service which may increase the length of time in developing standards for foraged wild mushrooms and thus influencing the regulatory approaches in those states. Another reason for the difference in regulatory approach concerns regulatory jurisdiction. Some states have jurisdictional differences for regulating food safety at retail which may account for having more than two agencies that regulate food at retail, and this may explain the difference in inspection process for foraged wild mushrooms at retail.

Finally, some states use multiple resources to identify safe species of foraged wild mushrooms, including mycological associations, academia, and the food service industry. This multiplicity of resources suggests that there may be a need to assess the
adequacy of communication and collaboration among states and their food safety partners regarding foraged wild mushrooms.

**Recommendations**

Four recommendations are suggested below given the great variation in regulation as well as the lack of national data and generally accepted best practices.

A Conference for Food Protection (CFP) and Association of Food and Drug Officials (AFDO) guidance document should be developed regarding the regulation of foraged wild mushrooms for sale or service at retail. A guidance document is clearly the single most important step forward given the great variety in regulation and a strong national demand for wild mushrooms.

States should collaborate and partner with other states and industry to recognize certification programs for approved wild mushroom identifiers. Given that mushrooms tend to be regional in nature due to geography and climate, states are likely to achieve economies of scale due to joint action in regulation.

All states might consider developing common criteria to determine qualifications for the approval of wild mushroom experts and creating a registry of approved wild mushroom experts.

All states should maintain a list of safe edible species of foraged wild mushrooms for reference purposes. This is clearly a simple step forward and one that appears of immediate use.
Acknowledgements

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References


