



## Effects of Pressure and Thermal Shock

Lawrence Berkeley National Laboratory Lessons Learned

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**Concern Statement:** A closed glass bottle was inadvertently pressurized and subjected to thermal shock, causing the bottle to shatter and injure a researcher.

**Applicable to:** Researchers and staff in wet chemistry labs and other chemical facilities.

**Incident:** An employee was attempting to melt in a microwave an almost full glass bottle of an agar/cell broth mixture used in plating bacterial cell cultures. The bottle was not vented during this procedure, causing the pressure inside the vessel to reach unsafe levels. The bottle was transferred to an oversized plastic container and placed under warm tap water. The combination of pressure and thermal shock caused the bottle to shatter, cutting the employee on the upper lip and finger. The employee was wearing surgical gloves and reading glasses.

**Cause:** Employee was not sufficiently trained to perform this procedure. The glass bottle was not properly vented during the heating process, and was subjected to thermal shock because it was cooled in tap water. In addition, the employee was not wearing appropriate protective equipment (i.e. safety glasses with side shields and thermal-resistant gloves).

### Recommended Actions:

- All appropriate employees should be trained to proper procedure for handling bottles filled with agar:
  - Fill bottles sparingly
  - Remove bottle tops before heating bottles. Cover the bottle openings with paper if you are concerned about contaminating the contents.
  - Allow bottles to cool in air at room temperature, rather than placing in tap water.
  
- Staff must be vigilant in wearing appropriate personal protective equipment. Staff performing this and similar procedures should wear safety glasses with side shields and loose fitting insulated gloves to protect from possible cuts and burns.



### Further Information

For additional information on safe chemical handling, contact the EH&S Industrial Hygienist assigned to your Division: [http://www.lbl.gov/ehs/assets/division\\_help\\_print.pdf](http://www.lbl.gov/ehs/assets/division_help_print.pdf).

For other lessons learned, go to [http://www.lbl.gov/ehs/html/lessons\\_learned.htm](http://www.lbl.gov/ehs/html/lessons_learned.htm).

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