Risk Assessment of Laboratory Work with Chemicals (AFS 2011:19)1 (LBE)2 (MSBFS 2020:1)3

Department/Division: **Pure and Applied Biochemistry**

Operation/Activity: **Competent cell preparation**

The operation includes handling of the following chemicals, mixtures and solutions

	Chemical/Mixture/Solution	CAS No.	Amount	Indications of danger
1	diH2O	10043-52-4	100 mL	No danger.
1	50 mM $CaCl_2$ solution	10043-52-4	100 mL	Eye, skin, or mucous membrane irritation
2	$CaCl_2$	10043-52-4	500 g	Eye, skin, or mucous membrane irritation
3	Sterile glycerol	56-81-5	25 mL	Slippery area if spilled on the floor.
4	Sterile LB medium	N/A	>100 mL	No danger.

Identification of separate operations/activities that may involve the risk of accident or risk to health

	Operation/Activity	Risk/Problem	Consequence	Probability	Assessed risk	Risk-reducing measures
1	Handling E. coli plates and cultures	spills, contamination of gloves or benches	Insignificant	Possible	Moderately hazardous	Wear lab coat, gloves, and eye protection. Clean and disinfect the bench before and after work
2	Rapid cooling on ice and working at 0–4°C	contact with ice or cold tubes long time; cells warm up	Insignificant	Unlikely	Not hazardous	Check the ice box and avoid overflowing ice water; Avoid prolonged direct contact with cold metal rotors or ice water
3	Centrifugation	imbalance, rotor damage, or sample splashing during tube removal	Serious	Unlikely	Hazardous	Ensure tubes are properly closed, balance tubes carefully (important), confirm that the rotor is correctly installed before centrifugation,Monitor the centrifuge's operation closely. If any abnormal noise or vibration occurs, stop the centrifuge immediately and notify the person in charge.
4	Removing supernatant and resuspending	contaminated pipette tips, loss of cell pellets and $CaCl_2$ contact with skin or eyes	Insignificant	Possible	Moderately hazardous	Remove the supernatant slowly without disturbing the pellet, resuspend gently by careful pipetting or gentle mixing, do not vortex vigorously,If $CaCl_2$ contacts eyes or skin, rinse immediately with plenty of water and report according to lab rules
5	Preparation and sterilisation of $CaCl_2$ solution	dust may irritate eyes and skin, weighing errors, incorrect solution concentration	Mild	Not very likely	Hazardous	Wear lab coat, gloves, and eye protection during weighing and avoid inhaling dust; Confirm whether anhydrous $CaCl_2$ or $CaCl_2 \cdot 2H_2O$ is being used; Clearly label the solution with name, concentration, preparation date, and operator.

	Yes/No	Comments:
Rules for working alone has been observed	**Yes**	This experiment should not be performed alone without others being aware, especially during centrifugation and working at 0–4°C
The possibility of evacuation and ventilation/water/power failure has been taken into account	**Yes**	Stop work, close the fume hood, and in case of fire, evacuate the building and notify the laboratory supervisor.
Environmental issues have been considered	**Yes**	All materials containing live bacteria must be inactivated before disposal, reduce unnecessary waste of LB medium, plastic tubes, and pipette tips.
Special risk assessment for pregnant staff has been done	**Yes**	Pregnant staff should avoid handling any abnormal situation that may cause exposure alone.

References:

Chemical Database KLARA

Wiki

Google research

Date: 2026-06-06

Risk assessment made by:

Name: **Ruiqi Yan, iGEM 2026**

Risk assessment checked by:

Name:

1) AFS 2011:19 Chemical Hazard in the Working Environment, provisions (amanded and reprinted in 2014:5; 2014:43; 2017:4; 2018:2; 2019:9)

2) Lag (2010:1011) om brandfarliga och explosiva varor (LBE)

3) MSBFS 2020:1 föreskrifter om hantering av brandfarlig gas och brandfarliga aerosoler

Last updated 2026-07-01