Microwave Bacterial Transformation

This is a quick method for transformation of *E. coli* with plasmidic DNA.

Requirements:

a) Programable, household microwave oven.

b) Fridge with freezer.

c) Isolated plasmidic DNA (approx. 10ng for 100uL of cells are fine).

d) *E.coli* cell culture.

e) Autoclaved fresh LB media or 2xYT
(I leave the protocol for preparing it 2xYT in the addendum)

f) Autoclaved purified water.

g) Autoclaved plastic 1.5ml micro tubes (eppendorf), but you can use tall plastic 12cm capped tube if you have them.

h) Incubator, dry heat bath or a warm place around 37°C where you can grow your cells.

i) Sterile, petri dish poured with LB media + selection antibiotics (check the resistance of your plasmids)

j) Plastic, glass or metal cell spreader, torch, bunsen burner, kitchen torch, alcohol lamp or if fancy enough, laminar flow hood.

The first step is check your microwave power output, check your original manual to estimate the maximum wattage output. According to it, you will have to adjust the output wattage between 150-180 to 300-340 watts approximately.

For example, my microwave maximum (100%) output is 800W, and I only have 5 options according to the power presets available in the programing menu: 100%, 80%, 60%, 40% and 20%. This means the power outputs can break down in the following way:

100% ————— 800W
80% ————— 640W
60% ————— 480W
40% ————— 320W
20% ————— 160W

Check your microwave if you have preset limits or if you can adjust power in a wider range or shorter intervals, but most of the time the low power output set will be required.

if you can't reach out your manual or you don't know the maximum output of your microwave unit, check this link and follow the instructions, so you can more or less estimate its wattage:

https://www.epicurious.com/expert-advice/how-to-find-adjust-wattage-power-of-microwave-oven-article

Once you know how to select the power of your microwave, let's continue with the protocol:

1.- Grown cell cultures to log phase (OD_{600} 0.5) or early stationary phase (OD_{600} 1.0)

2.- Centrifuge them and resuspended in 1:1 LB/water and transferred to a clean sterile 1.5ml micro-tube in aliquots of 100uL.

3.- Add the plasmid you want to transform (10ng per 100uL of cells)

4.- Transfer you tube(s) to a cooler or plastic bag and place them in the freezer (-20ºC) for 1-3 minutes. Do not keep them in the freezer longer than 5mins.

5.- Select power output of the microwave to 100W or 200W or a maximum of 300W (approx.) Place your tubes in the microwave, select time accordingly for 1minute (100W) or 30sec (300w) and press START

6.- Take out your tubes and add up to 1ml of LB or 2xYT media, incubate 1hr at 37°C.

7.- Plate your cells on the corresponding selective media (LB + agar + antibiotics), and controls, and incubate accordingly (37ºC or the suggested temperature, not all plasmids grow well at 37ºC, check the referred literature)

References:

You can read about the original methods from the following authors, this is a tested adaptation of the literature cited below:

R. Fregel *et al*, Letters in Applied Microbiology 46 (2008) 498–499

V.T. Tripp *et al*, J Chem Biol (2013) 6:135–140

Addendum:

2X YT Media Recipe (1000 ml)

1. Measure ~900ml of distilled H_2O.
2. Add 16g Bacto Tryptone.
3. Add 10g Bacto Yeast Extract.
4. Add 5g NaCl.
5. Adjust pH to 7.0 with 5N NaOH.
6. Adjust to 1L with distilled H_2O.
7. Sterilize by autoclaving.