# SOC Medium

Catalogue No. AS-1428

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## Product Information

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| **Product name** | SOC Medium (dehydrated base) |
| **Catalogue number** | AS-1428 |
| **Other names** | S.O.C. Medium; SOC Broth; Super Optimal broth with Catabolite repression |
| **Product type** | Dehydrated molecular biology culture medium (glucose-free base) |
| **Usage** | 28.09 g in 980 mL, plus 20 mL of sterile 1 M glucose after autoclaving |
| **Final pH** | 7.0 ± 0.2 at 25 °C |
| **HS code** | 3821.00 |

## Intended Use

SOC Medium is used for the outgrowth of *Escherichia coli* after chemical transformation or electroporation. The glucose-free base can also be used as SOB for growing cells before making them competent. For laboratory microbiological testing, quality control and research use only. Not intended for direct use in food, human or veterinary therapeutic applications, diagnosis, or consumption.

## Summary and History

Hanahan (1983) developed SOB and SOC while optimising plasmid transformation of *E. coli*. Outgrowth in SOC gives more transformants than outgrowth in LB, and SOC is now the standard recovery medium in most cloning protocols.

## Mode of Action

Tryptone and yeast extract supply amino acids, vitamins and nucleotides for rapid recovery. Glucose provides a readily used energy source, and magnesium supports membrane and ribosome function. Low salt limits osmotic stress while cells repair their membranes and express the plasmid resistance gene.

## Typical Formula (per litre of final SOC)

| Ingredient | g/L | Concentration | Function |
|---|---|---|---|
| Tryptone (pancreatic digest of casein) | 20.0 | 2% | Amino acids and peptides |
| Yeast extract | 5.0 | 0.5% | Vitamins, nucleotides, growth factors |
| Sodium chloride | 0.5 | 8.6 mM | Low ionic strength |
| Potassium chloride | 0.186 | 2.5 mM | Potassium source |
| Magnesium sulfate (anhydrous) | 2.4 | 20 mM | Magnesium source |
| **Dehydrated base total** | **28.09** | | Suspend in 980 mL |
| Glucose (added after autoclaving, not in powder) | 3.6 | 20 mM | Energy source |

Hanahan's original SOC supplies 20 mM $Mg^{2+}$ as 10 mM $MgCl_2$ plus 10 mM $MgSO_4$; AS-1428 supplies it as $MgSO_4$. Formula may be adjusted to meet performance requirements.

## Preparation

- Dissolve 28.09 g of powder in 980 mL of purified water.

- Autoclave at 121 °C for 15 minutes.
- Cool to below 50 °C.
- Aseptically add 20 mL of sterile 1 M glucose (18% w/v), sterilised separately by 0.2 µm filtration. Do not autoclave glucose together with the base.
- Mix and dispense aseptically. Final volume: 1 L.

## Typical Transformation Outgrowth

- After heat shock or electroporation, add 250 µL to 1 mL of room-temperature SOC to the cells.
- Incubate at 37 °C for 1 hour with shaking at about 225 rpm.
- Spread on selective agar plates and incubate overnight at 37 °C.

## Quality Control

| Organism / test | Inoculum (CFU) | Incubation | Expected result |
|---|---|---|---|
| *Escherichia coli* K-12 ATCC 10798 | 10–100 | 37 °C, 18–24 h | Good growth |
| Uninoculated medium (sterility) | — | 37 °C, 48 h | No growth |

## Limitations

- SOC is not selective. Plate onto media containing the appropriate antibiotic after outgrowth.
- The medium is formulated for *E. coli*; it is not intended for yeast transformation recovery.
- Transformation efficiency depends mainly on the competent cells, DNA and protocol.

## Storage and Shelf Life

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| **Dehydrated base** | Store at 15–25 °C in a dry place with the container tightly closed. Use before the expiry date on the label. |
| **Prepared SOC** | Store at 2–8 °C, or in single-use aliquots at −20 °C. Discard if cloudy. Validate the storage period in-house. |
| **Signs of deterioration** | Caking, discolouration or moisture absorption in the powder. |

## References

- Hanahan D. Studies on transformation of Escherichia coli with plasmids. J Mol Biol. 1983;166(4):557–580.
- Green MR, Sambrook J. Molecular Cloning: A Laboratory Manual. 4th ed. Cold Spring Harbor Laboratory Press; 2012.
- Inoue H, Nojima H, Okayama H. High efficiency transformation of Escherichia coli with plasmids. Gene. 1990;96(1):23–28.