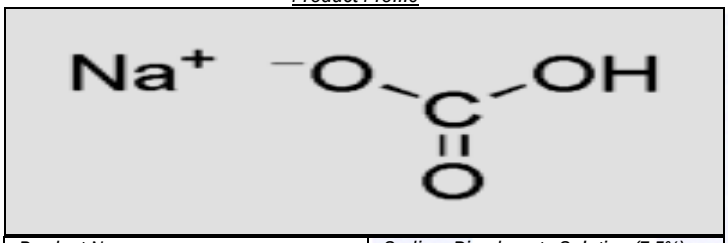
Product Profile



Product Name:	*Sodium Bicarbonate Solution (7.5%)*
Catalog Number	*03-040-1*
Unit Size Availability:	(A)500ml;(B)100ml
Formulation:	Liquid Solution
Defined Storage Conditions:	Room Temperature(15-30°)
Stability: (Under Defined Handling & Storage Conditions)	Please Refer To Product Label

Important Note! Please read the ***MSDS*** and ***Product Profile*** carefully in their entirety ***before*** using this material for possible safety precautions and potential hazards.

Product Description:

To maximize success in cell culture, the ***in vitro*** culture conditions are created to mimic the ***in vivo*** conditions of osmolality, pH, temperature and nutrition. Ions such as HCO_3^- and Na^+ among others are the major contributors to the osmolality of cell culture media. HCO_3^- levels are determined by the concentration of CO_2 in the incubator (i.e. in contact with the growth medium). Sodium Bicarbonate ($NaHCO_3$) and CO_2 buffering is probably the most popular system used which requires a CO_2 level of 5-10 %(i.e. dependent on the media utilized) and 100% humidity. This is known as an open system and the $NaHCO_3$ interacts with the medium as follows:

(1) $H_2O + CO_2 \leftrightarrow H_2CO_3 \leftrightarrow H^+ + HCO_3^-$

(2) $NaHCO_3 \leftrightarrow Na^+ + HCO_3^-$

The products of cell metabolism (i.e. mostly CO_2), and the CO_2 in the incubator atmosphere interact with the water in the medium (i.e. Equation #1). Therefore the H^+ concentration is related to the CO_2 in the atmosphere. The $NaHCO_3$ in bicarbonate-buffered medium dissociates as indicated in Equation #2. These reactions are in a reversible equilibrium, and the system ***in toto*** will have a tendency to resist change in the ratio between the component parts. When the atmospheric concentration of CO_2 is regulated, an increase in CO_2 and acidity(as indicated as (H^+) is prevented by a high HCO_3^- level achieved by the addition of $NaHCO_3$(Equation #2). Interestingly enough is another advantage in using the Sodium Bicarbonate is that the absence of either HCO_3^- or CO_2 appears to be limiting to cell growth.

Culture media are often buffered to compensate for the cellular production of CO_2 and Lactic Acid as by-products of metabolism. Traditionally, Basal Cell Culture media have been buffered by HCO_3^- (Bicarbonate). As cells grow, CO_2 evolves, the dissolved CO_2 forms a buffering system with the bicarbonate. However, if cell density is low or the cells have entered into the so-called "Lag Phase," they may not produce sufficient CO_2 to maintain optimal pH and to counter these potential problems, Bicarbonate-Buffered media require the use of incubators with a 5-10% CO_2 atmosphere. Media with low levels of bicarbonate (HCO_3^-) on the one hand, such as MEM(@1.5-2.2g/l) require ~5% CO_2;DMEM with higher levels of bicarbonate (i.e., 3.7g/L) on the other, require 10% CO_2 in order to maintain the correct pH level. The most important factor in utilizing the correct percent CO_2 is based upon the medium's bicarbonate level to maintain physiological pH, which is irrespective of cell type.

Like in the human body, Buffer systems are yet another mechanism for controlling blood pH which guard against sudden changes in body acidity and alkalinity. pH as a measure of hydrogen ion activity is intimately interrelated with Bicarbonate and Carbon Dioxide concentrations whereas the Bicarbonate can be considered as the metabolic component and the Carbon Dioxide may be seen as the respiratory component in the acid-base picture from Henderson-Hasselbalch. The pH buffer systems work chemically to minimize changes in the pH of a solution by adjusting the proportion of acid to base; the most important blood buffer involves carbonic acid and bicarbonate ions. pH is vital in maintaining homeostasis and when outside the optimal pH range, proteins may be not only denatured but also digested and enzymes lose their ability to function thereby causing untoward physiological manifestations (e.g. Acidosis/Alkalosis). The catalytic activity of enzymes is acutely sensitive in that they have an optimum pH and that their activity declines sharply on either side of the optimum. This is precisely why the biological control of the pH of cells is of central importance in all aspects of intermediary metabolism and cellular function.

Each cell can be seen as a sophisticated entity, finely tuned to carry out a precise role within the body or in the case of cell culture, ***in vitro***. Such specialization of cell function is possible only when the extracellular conditions are maintained within narrow parameters of pH, temperature, concentrations of glucose, oxygen, CO_2, osmolality and nutrition, among many other factors. These factors are especially critical and must be maintained and regulated constantly in order for the cells to function efficiently and optimally by interacting while creating a dynamic constancy to control minute fluctuations. Cells in culture lack the body's negative feedback mechanisms to correct deviations which make cell culture all the more difficult but within the realm of the possible.

Some Predominant Characteristics of Sodium Bicarbonate Solution (7.5%) include:

- § Ready-To-Use
- § Effective with Serum-Free or with Serum-Containing Medium
- § Meets USP and EPTesting Specifications
- § Suitable for Cell-Culture Applications
- § Long-Storage When Handled and Stored Properly Under Defined Conditions

Storage & Stability:

This product should be stored under specified conditions of Room Temperature (15-30°C) and used within the time frame specified on the label. Do *not* use after the expiration date. Deterioration of liquid media may be recognized by any of the following characteristics, among others including: (a). color change, (b). granulation/ clumping, (c). insolubility,(d). And/or decrease in expected performance parameters. Any material described above should not be used and therefore discarded.

Instructions/Procedure:

1) Take a bottle from the proper storage conditions at room temperature (15-30°C) and read the label.
2) Ensure that the cap of the bottle is tight.
3) Gently swirl the solution in the bottle.
4) Wipe the outside of the bottle with a disinfectant solution such as 70% ethanol.
5) Using aseptic/sterile technique under a laminar-flow culture hood, work according to established protocols.

As the selection of a nutrient medium or supplementation thereof is strongly influenced, among others, by many factors, of note are three major considerations:

- ◊ Cell Type
- ◊ Type of Culture(e.g., Clonal, Monolayer, Suspension)
- ◊ Degree of Chemical Definition

It is recommended to review the extensive literature concerning cell-culture media and its supplementation and the physiological parameters required for each specific cell-line as per their essential requirements.

Quality Control

Test	Specifications
Appearance/Description:	Clear Solution
Osmolality:	1400-1500mOsm/kg
pH:	8.0-8.2
Sterility:	Sterile

Auxiliary Products

Product Name	Catalog Number	Storage Temperature
Dulbecco's Phosphate Buffered Saline(DPBS) without Calcium and Magnesium	02-023-1	Room Temperature(15-30°)
L-Glutamine Solution 29.2mg/ml in Saline	03-020-1	-20°C
L-Alanyl-L-Glutamine Solution(A Dipeptide Substitute)	03-022-1	-20°C
Penicillin-Streptomycin Solution,10,000 units/ml Penicillin G Sodium Salt,10mg/ml Streptomycin	03-031-1	-20°C
Sodium Bicarbonate Solution (5.0%)	03-041-1	Room Temperature(15-30°)
Trypsin Solution B (0.25%),Without Calcium and Magnesium, Without Phenol Red	03-046-1	-20°C
Crystalline Trypsin Solution (0.2%) Without Phenol red	03-047-1	-20°C
Soybean Trypsin Inhibitor 50X Conc.,.5mg/ml	03-0148-1	-20°C
Sterile Culture-Grade Water	03-055-1	Room Temperature(15-30°)
Papain Cell Dissociation Solution	03-072-1	-20°C
Serum-Free Cell Freezing Medium	05-065-1	2-8°C
Note: For a list of other Antibiotics, Serum, Reagents and Supplements, please refer to our Product Catalog, Product Profiles, Product Guides and Internet Site.		

References:

1) Current Edition Merck Index
2) Biological Industries (BI)Specifications
3) Current Edition USP/E Ph
4) Martindale The Extra Pharmacopeia,28th Edition, Royal Pharmaceutical Society: London, England
5) Darling, D.C. and Morgan S.J. Animal Cells: Culture and Media, John Wiley & Sons, New York, 1994
6) Lackie, J. M. The Dictionary of Cell & Molecular Biology, Academic Press: London, 2007