

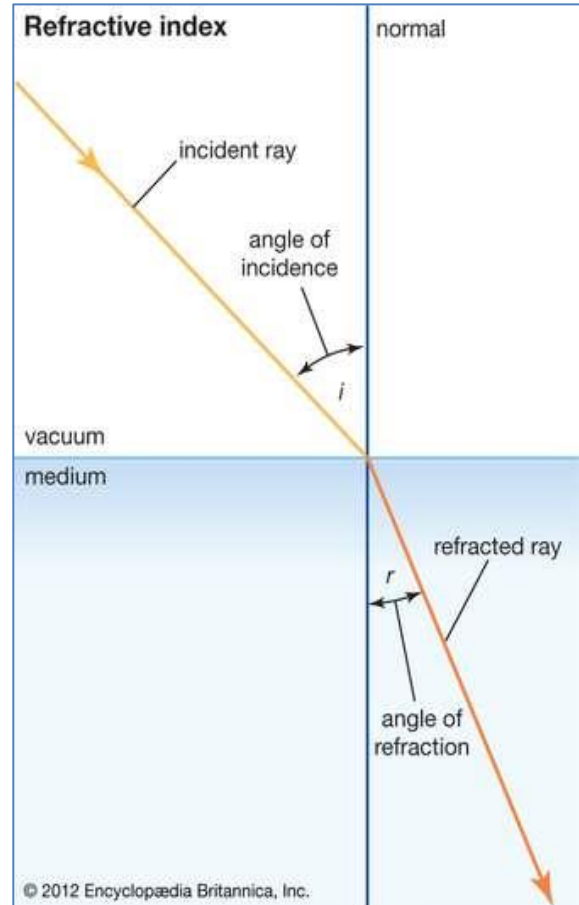


## Refractive Index and Total Solids of Extracellular Matrix (ECM) Solutions and Buffers

Refractive index, also called index of refraction, measures of the bending of a ray of light when passing from one medium into another. If  $i$  is the angle of incidence of a ray in vacuum (angle between the incoming ray and the perpendicular to the surface of a medium, called the normal) and  $r$  is the angle of refraction (angle between the ray in the medium and the normal), the refractive index  $n$  is defined as the ratio of the sine of the angle of incidence to the sine of the angle of refraction; i.e.,  $n = \sin i / \sin r$ . Refractive index is also equal to the velocity of light  $c$  of a given wavelength in empty space divided by its velocity  $v$  in a substance, or  $n = c/v$ .

In optics, the refractive index of a material is a dimensionless number that describes how fast light travels through the material. It is defined as where  $c$  is the speed of light in vacuum and  $v$  is the phase velocity of light in the medium.

Refractive index is most commonly used to measure the concentration of a solute in an aqueous solution.



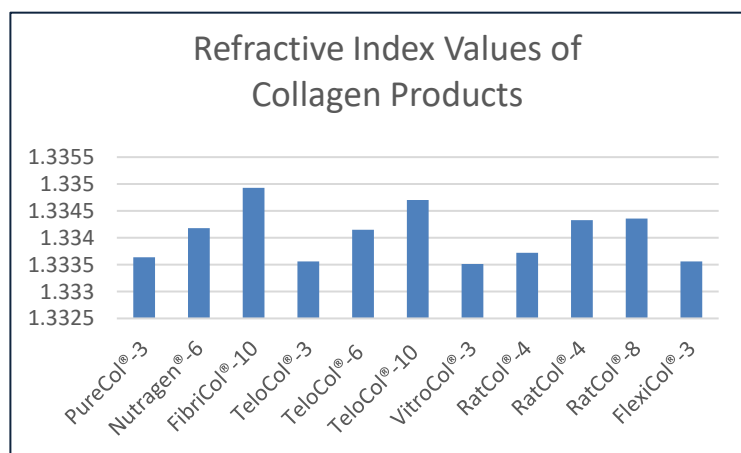
The refractive index of a solution can be used to compare and characterize particular solutions. Here we test and report the refractive indices of several collagen solutions and buffers typically used with collagen products. A Leica AR-600 refractometer is used for performing this testing. Purified water is used to calibrate the equipment and when measured has a refractive index value of 1.33279 – this is the value reported in literature. A percent solids value was also collected which describes total solid material in solution as a percent of total weight. Collagen samples were tested as acidic solutions along with some commonly used buffers and diluents. Samples were tested and reported as average values in Table 1. These values are depicted in Graph 1 and Graph 2.



Table 1:

Collagen Products	Buffer	Concentration (mg/ml)	Catalog No.	Refractive Index	Percent Solids
PureCol®, Type I bovine atelo-collagen	13 mM HCl	3	5005	1.33364	0.46
Nutragen®, Type I bovine atelo-collagen	13 mM HCl	6	5010	1.33418	0.84
FibriCol®, Type I bovine atelo-collagen	13 mM HCl	10	5133	1.33493	1.35
TeloCol®-3, Type I bovine telo-collagen	13 mM HCl	3	5026	1.33356	0.40
TeloCol®-6, Type I bovine telo-collagen	13 mM HCl	6	5225	1.33415	0.81
TeloCol®-10 Type I bovine telo-collagen	13 mM HCl	10	5226	1.33470	1.19
VitroCol®, Type I human atelo-collagen	13 mM HCl	3	5007	1.33351	0.37
RatCol®, Type I rat tail tendon, telo-collagen	20 mM acetic acid	4	5153	1.33372	0.51
RatCol®, Type I rat tail tendon, telo-collagen	200 mM acetic acid	4	5056	1.33433	0.93
RatCol®, Type I rat tail tendon, telo-collagen	20 mM acetic acid	8	5279	1.33436	0.96
FlexiCol®, Type I porcine telo-collagen	13 mM HCl	3	5169	1.33356	0.40
Reagents/Buffers		Concentration			
Phosphate buffered saline		1X		1.33455	1.09
Phosphate buffered saline		10X		1.34886	10.67
Acetic acid		200 mM		1.33363	0.45
Acetic acid		20 mM		1.33287	0.08
HCL		13 mM		1.33288	0.07
DG Water				1.33279	0

Graph 1:



Graph 2:

