

## CELLFOOD Surface Tension Study

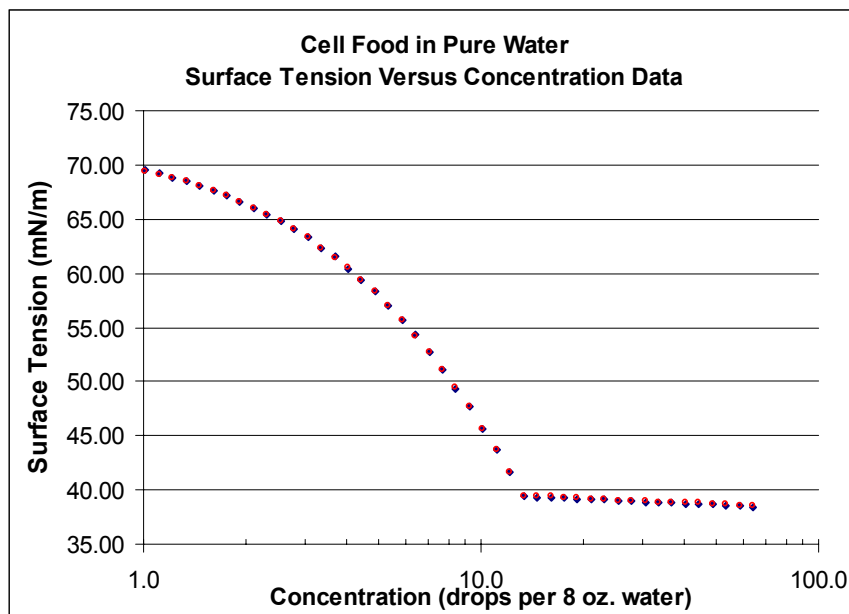
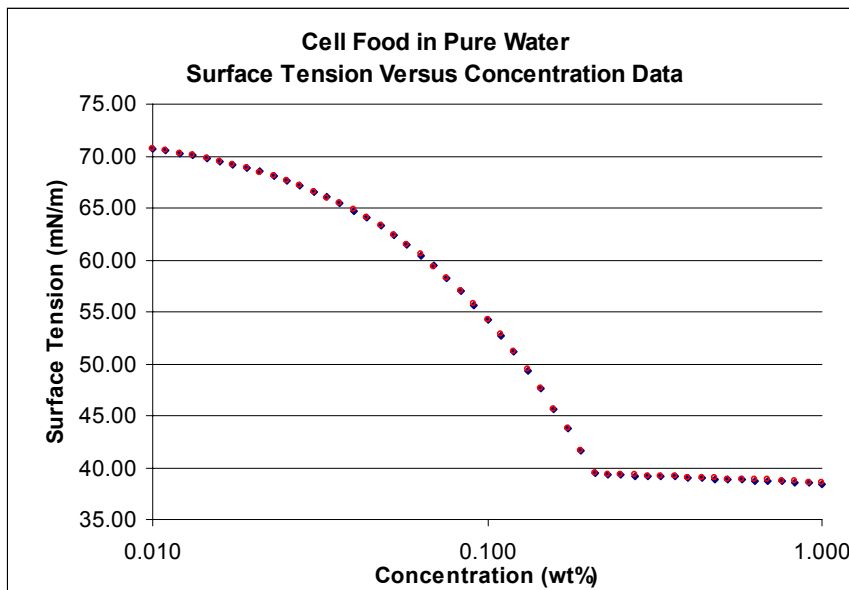
In a recent study conducted at Augustine Scientific Research Center, surface tension as a function of concentration of CELLFOOD® in a glass of water was measured using a Kruss Processor Tensiometer K100 with automated dosing.

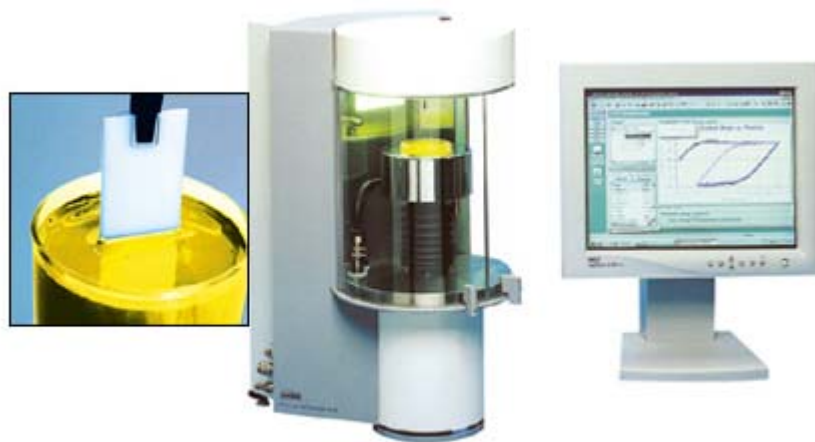
The surface tension of ordinary tap water is approximately 73 mN/m (dynes/cm). The surface tension of extracellular body fluids is much lower at approximately 40 mN/m (dynes/cm). This low surface tension is critical to healthy cellular function, absorption of nutrients, and the removal of harmful toxins. A higher liquid surface tension causes the surface to act like a stretched elastic membrane inhibiting absorption while increasing molecular resistance.

Surface tension of the tap water (control) was calculated to measure 72.8 mN/m (dynes/cm). Two separate controlled dilution experiments were conducted simultaneously; one as drops per 8 oz. of water, and the second as %wt stock solution of CELLFOOD®. The results were statistically identical—in both tests, CELLFOOD® was shown to reduce surface tension to 40 mN/m (dynes/cm), the same surface tension of extracellular body fluids.

It was observed by Christopher Rulison, Ph.D., that using Avogadro's multiplication number of  $6.02 \times 10^{23}$  molecules/mole gives the value of 51 billion active molecules per square millimeter at the surface of a glass of water containing 8 drops of CELLFOOD®.

Dr. Rulison also noted regarding the molecular dimensions of CELLFOOD® (4-7 nanometers in size), "if we figure a standard molecular radius of gyration as  $(\text{length})^{3/2}$  then your enzymes and amino acids could be expected to occupy between  $4^{3/2} = 8.0$  sq. nanometers and  $7^{3/2} = 18.5$  sq. nanometers each at the surface. However, since a square nanometer = 1012 sq. nanometers, each of the 51 billion molecules at the surface has 19.6 sq. nanometers of free space – more than is necessary for complete rotation." An unfortunate but common necessity for nutritional supplement manufacturers known as denaturing (packing 3-5 times the amount of protein at a surface than a radius of gyration argument would follow) is often required to assist with absorption. Because of the specific hydrophobic residues and small molecule surfactants, CELLFOOD® can pack in surface spaces upwards of 50 to 100 times below its radius of gyration in water; denaturing is not necessary due to its amphipathic nature.





ADVANCING SURFACE SCIENCE

#### Technical Data K100

■ Measuring range	1 - 1000 mN/m
■ Measuring resolution	0.001 mN/m
■ Measuring rate	max. 50 values/sec
■ Weighing range	210 g +/-0.01mg
■ Lifting speed	0.099 - 450 mm/min
■ Position resolution	0.1 µm
■ Maximum lifting range	appr. 100 mm
■ Temperature range	-10 to 130°C
■ Temperature resolution	0.1°C
■ Temperature measurement	Pt100 in thermostatable jacket, optional a second Pt100 within the sample vessel
■ Measuring methods	Wilhelmy Plate method