Hydrolysed Collagen

Within the personal care and cosmetics industry, hydrolysed collagen from various animal sources is frequently used as an ingredient in premium products. Although, hydrolysed collagen is derived from native soluble collagen, there are a number of distinct differences in these products which should be considered and are discussed below.

Native soluble collagen

Native collagen occurs as a triple helical-structure in which 3 extended left-handed polyproline II like helical chains are supercoiled into a right handed triple helix. This triple helical arrangement requires a very specific amino acid sequence with glycine as every third residue. As a result, each chain consists of a repeating amino acid sequence of Glycine-X-Y, where X and Y can be any amino acid residues. However, about 20% of the amino acids in the collagen structure are the imino acids proline and hydroxyproline. This imino acid content is significantly higher than is normally observed in other proteins and is distinctive of collagen. These characteristic primary sequence features produce a protein that has a long and fibrous tertiary structure with great tensile strength enabling it to carry out its biological function as the main component of fascia, cartilage, ligaments, tendons and other connective tissues. A further feature of collagen's special structure is the unique way it binds water. Water molecules literally form a shell in an ordered fashion around collagen by building bridges between the 3 chains in each triple helix and also between different triple helixes. A key contributor to the formation of this water network is hydroxyproline[1]and a representation of this extensive water network is given in Figure 1. This demonstrates that the naturally occurring triple helix structure of collagen is essential in allowing collagen to perform its function.

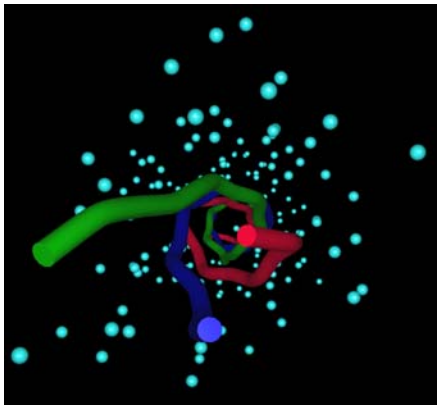

Figure 1. Water molecules (shown as light blue spheres) surround the collagen triple helix[1]

Hydrolysed Collagen

Hydrolysed collagen is manufactured from native collagen via the process of hydrolysis. Intact native collagen is taken and heated to a point where it irreversibly changes from the triple helical structure to a random disordered or denatured form. Strong chemicals or enzymes are then added to the denatured collagen, breaking it into small pieces or peptides of approximately 1/60th of its original size. Primarily this is done to increase solubility. The hydrolysis process therefore has a significant impact on collagen structure and since collagen is dependent on its structure for its function, these functions cannot be completely retained after undergoing the hydrolysis process. Therefore, hydrolysed collagen differs significantly from native collagen in both its properties and chemical composition, losing both tensile strength and hydration capability.

Summary

CollTech's OVICOLL® is a premium non-hydroylsed, non-chemically modified, native mammalian collagen whose biological properties are uncompromised compared to hydrolysed collagen sources.

References

[1] Bella J, Brodsky B and Berman H. Structure 1995 Sep 15 3:893-906