Collagen alternatives from plants.

Within the personal care and cosmetics industry, use of the term “plant collagen” has become widespread. The plant and vegetable substitutes for animal collagen are frequently hydrolysed wheat proteins[1] - used for their perceived safety benefits[2]. Typically, hydrolysed wheat proteins are manufactured from insolubilized total flour proteins or from gluten[3]. These protein sources are a complex mixture of soluble and insoluble materials which then require hydrolysis to overcome insolubility issues. Therefore direct comparisons to native animal collagen are tenuous at best.

Hypersensitivities to Wheat Proteins

There have been multiple reports of hypersensitivities to wheat and or food proteins within scientific literature[12345]. Cases reported relate to both previous food allergies and primary sensitization to components within cosmetic products. The increasing use of plant and food proteins in cosmetics has lead some investigators to suggest a clear and accurate identification of food allergens in cosmetic and topical products and to establish the potency of these allergens [45].

Existence of hydroxyproline and glycine rich proteins in plants

Mammalian collagen is rich in both hydroxyproline and glycine residues which give rise to its characteristic properties. Glycoproteins with similar amino acid content have been described in various plants. However, some of these proteins are predicted to have different secondary and tertiary structure to the helical structure of collagen. In addition, proline hydroxylation occurs less readily in plant cells[67]. Therefore even recombinant collagen produced in plant systems has a tendency towards reduced thermal stability compared to when produced from mammalian sources.

To make an accurate comparison with mammalian collagen sources, such as OVICOLL®, a true “plant collagen” would require a rich source of a scientifically proven collagen

plant homolog and a purification regime established that would yield a near homogenous, high purity product, as is conducted for OVICOLL® and other mammalian collagen sources. As far as Colltech is aware no such plant protein homolog to collagen or process to purify it exists.

[1] Sanchez-Perez, J , Sanz T and Garcia-Diez A. Contact Dermatitis. 2000 Jun;42(6):360.

[2] Pecquet, C, Lauriere, M, Huet, S and Leynadier F. Contact Dermatitis. 2002 Feb;46(2):123.

[3] Laurière, M, Pecquet, C, Bouchez-Mahiout, I, Snégaroff, J, Bayrou, O, Raison-Peyron, N and Vigan, M. Contact Dermatitis. 2006 Jun, 54(6). 283-289.

[4] Hann, S, Hughes, M and Stone N. Contact Dermatitis. 2007 Feb;56(2):119-20.

[5] Codreanu, F, Morisset, M, Cordebar, V, Kanny, G and Moneret-Vautrin DA. Allerg Immunol (Paris). 2006 Apr;38(4):126-30.

[6] Wu, H, de Graaf, B, Mariani, C and Cheung, AY. Cell Mol. Life Sci. 2001, 58(2001):1418-1429.

[7] Ringli, C, Keller, B and Ryser, U. Cell Mol Life Sci. 2001, 58(2001):1430-1441.