

Vegetable Melanin

Vegetable Melanin: Code 50102

INCI Name: Vegetable Melanin

Suggested Use Level: 1% - 3%

Applications: Anti-oxidant, hair/skin protectant, free radical scavenger, UV light absorber

Melanin pigments are widespread in the animal and plant kingdoms. Examples of plant melanins include the:

1. Black pigment in the seed coat of watermelon seeds
2. Black pigment in ripening bananas
3. Brown-black pigment of mushrooms
4. Brown pigment of date fruit

Vegetable Melanin is the dark brown pigment isolated from the fruit of the date palm (*Phoenix dactylifera*).

Date palms are cultivated in desert environments that possess the most intense sunlight radiation known on the surface of the Earth. And, the brown, low molecular weight, water-soluble **Vegetable Melanin** produced in the fruit during ripening by the enzyme tyrosinase, protects the fruit from the intense solar radiation.

Vegetable Melanin has the typical polyphenol composition of all melanins, and it is this polyphenol composition that gives **Vegetable Melanin** antioxidant and free radical scavenging properties.

Vegetable Melanin also possesses strong absorption in the UVA and visible regions of the sunlight spectrum, and is responsible for protection in these areas.



It is well known that during the biotransformation of precursors into melanins the growing melanin polymer is deposited onto a biopolymer backbone. The identity and composition of the biopolymer is dictated by the biochemical *milieu* in which the enzyme tyrosinase operates.

In the case of animal melanins the backbone is a protein matrix; in the case of the **Vegetable Melanin** the backbone is a carbohydrate matrix. Thus, **Vegetable Melanin** is composed of a carbohydrate matrix linked to a polypeptide melanin polymer.

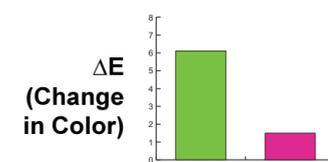
Fruit acids and simple carbohydrates that are present in the date fruit are present in Vegetable Melanin and provide multifunctionality.

The carbohydrate matrix gives **Vegetable Melanin** good film forming properties, and is responsible for the high water solubility and ease of formulation of **Vegetable Melanin**.

Vegetable Melanin Color Protection Studies

- Human hair swatches dyed with red hair-dye were used
- Natural sunlight at high humidity was used to fade hair color
- Swatches were divided into two groups:
 - Group A was treated with a formulation that contained 1% Vegetable Melanin
 - Group B was treated with the same formulation without Vegetable Melanin
- Hair color was measured before and after sunlight exposure with a Minolta Chroma Meter, and changes in color (ΔE) calculated

Color Protection Studies



Protection Of Hair From Sunlight Damage Using Vegetable Melanin:

- Bleached human hair swatches were used
- UVA lights were used to damage the hair surface
- Swatches were divided into two groups:
 - Group A was treated with a formulation that contained 1% Vegetable Melanin
 - Group B was treated with the same formulation without Vegetable Melanin
- A Dia-Stron Miniature Tensile Tester fitted with a combing attachment was used to measure and record peak combing force and total combing work on hair swatches



Dia-Stron Miniature Tensile Tester

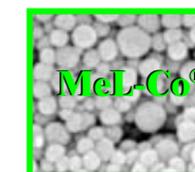
Hair Combing Studies

- 81% Protection Against Increased Peak Combing Force
- 75% Protection Against Increased Total Combing Work



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