



ABSTRACT

Polypodium leucotomos is widely available as an oral supplement and has been shown to exhibit photoprotective properties which might provide adjunctive benefit when used along with topically applied sunscreens. However, data are lacking with the majority of *Polypodium leucotomos* formulations (including extracts) related to their quantitative and qualitative polyphenol content and specific photoprotective properties. This article reviews results from a study of six different *Polypodium leucotomos* extract formulations, comparing their polyphenol and excipient contents and specific photoprotective properties. Consistency was observed primarily with one specific brand of *Polypodium leucotomos* extract oral capsules, which is also supported by a large body of published evidence.

KEYWORDS: *Polypodium leucotomos*, photoprotection, antioxidant

Polypodium Leucotomos Extract (PLE): New Study Gives Evidence-based Insight into “Ain’t Nothing Like the Real Thing”

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Over the years there has been an increase in educational initiatives to promote evidence-based publications and presentations. At face value, the concept sounds intuitive and appears to be noble in its academic intent. However, it is a double-edged sword depending on how evidence is rated and what methodology is used to interpret what constitutes sound evidence. What has always been contradictory to the concept of accurate evidence is the ongoing and ubiquitous practice of using generic names rather than brand names in continuing medical education (CME) presentations, or at least to be very restrictive regarding the use of brand names in order to avoid any perception of bias and/or promotion of a product or device. In fact, the true evidence is the discussion of data with reference to what was actually used to treat subjects in a study and to be clear on what was actually used, as it cannot be assumed that all formulations are the same for a variety of sound scientific reasons. Regardless of how anyone feels about how publications or presentations should be carried out, no one can argue against facts based on accurate details.

A cogent example of the importance of specifying the brand formulation based on scientific validity is with oral *Polypodium leucotomos* (PL) extract (PLE). There are many peer-reviewed and indexed publications of *in-vitro* and *in-vivo* studies that support several diverse biologic effects of PLE that provide adjunctive photoprotective properties specific to use of an over-the-counter (OTC) oral brand formulation of PLE (Heliocare Capsules in the

United States or Fernblock outside of United States; Ferndale Laboratories, Ferndale, Michigan); the reader is referred to several references, a few of which summarize many of the studies that have been completed to date.^{2–5,7–13} Among the biologic effects reported with this specific PLE brand are a reduction in ultraviolet (UV) light-induced erythema, reduced depletion of epidermal Langerhans cells, decrease in sunburn cells and epidermal maturation disarray, reduction in UV-induced cyclo-oxygenase-2 expression, decrease in antioxidant depletion in UV-irradiated skin, increase in p53 suppressor activity, accelerated clearance of cyclobutane dimers (deoxyribonucleic acid [DNA] damage), and decrease in human skin common deletions induced by UVA exposure.^{1–13}

The diverse photoprotective properties and resultant beneficial effects of PLE are provided by a specific collection of individual aromatic polyphenol compounds that compose the oral formulation of Heliocare/Fernblock and are present in a designated narrow range of concentrations; strict quality assurance measures are employed to control the composition of this specific formulation of PLE oral capsule from this brand.^{2–6,9–11,13} Major polyphenols that compose the Heliocare/Fernblock brand formulation of PLE (that might or might not be adequately present in other PL or PLE formulations that are available) include ferulic acid, caffeic acid, vanillic acid, p-coumaric acid, and chlorogenic acid, each in specific concentrations based on

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proper harvesting of carefully selected leaves of the PL fern.^{2-5,9}

This commentary summarizes information that supports the idea that evidence-based scientific accuracy requires the brand formulation to be specified. Gonzalez et al¹⁴ conducted a comparative *in-vitro* study of six different PLEs that revealed differences in antioxidant moieties and photoprotective effects; methodologies used in the study included high-performance liquid chromatography (HPLC), antioxidant assays, and cellular viability assays. The results showed that different PLEs confer varied antioxidant and photoprotective capacities at the cellular level based on outcomes using cellular viability assays and the emergence of DNA damage markers after UV light exposure. Different PLE extracts vary in their quality, their source from various parts of the PL fern (directly affecting polyphenol content), and the amounts of different polyphenol antioxidant moieties; in addition, they are dissimilar in excipient content and do not demonstrate equivalence in testing results that support photoprotective effects. The net effect among the different PLEs tested is variability and inconsistency in antioxidant and photoprotective properties after UV exposure among these different PLEs, showing that all PLE formulations are not created equal! The results of the study from Gonzalez et al and others support the antioxidant polyphenol content and photoprotective properties of the oral brand PLE formulation of Heliocare/Fernblock, which has been supported by several publications as mentioned above.

There might be other quality PLE formulations in the marketplace, but the developers of these formulations need to conduct their own research to provide evidence of photoprotective properties and efficacy. As clinicians, it is important to base our recommendations for adjunctive photoprotection products on the best scientific evidence we have, rather than on hopeful speculation when the evidence is not there.

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