

## A Review of Clinical Trials Conducted With Oral, Multicomponent Dietary Supplements for Improving Photoaged Skin

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### Summary

Although the FDA does not require documentation of efficacy of dietary supplements, prospective clinical studies, including randomized controlled trials, have been conducted with individual micronutrients alone and in combination with other ingredients for promoting skin health. Proposed mechanisms include antioxidation, anti-inflammation, photoprotection, collagen formation, reductions in matrix metalloproteinases, and other effects on photoaging. Literature searches were conducted to identify clinical trials assessing multicomponent dietary supplement formulations on photoaging outcomes. Sixteen studies of various nutrient and non-nutrient ingredients, including essential micronutrients (vitamins, minerals), plant extracts (polyphenols, carotenoids), and marine- or animal-derived ingredients, were identified. Studies were single center, 2-12 months in duration, primarily enrolled women, and evaluated numerous outcomes, including investigator/subject assessments and instrumental/objective measures. Methods to control for potential confounders were implemented in some studies, including limiting sun exposure, cosmetic procedures, and changes in dietary habits/body weight. Given the range of different products, clinical/methodologic heterogeneity, insufficient detail in reporting, and lack of comparable outcome measures, quantitative analysis of results was not possible.

### Results/Comments

Results of individual studies revealed significant improvements from baseline for the dietary supplement group(s) on >1 endpoint across all studies; significant differences from placebo were observed in 7 of 12 controlled studies (although only 1 study designated a prospectively defined primary endpoint). Most products had only been tested in study; confirmatory studies were rarely conducted per the publicly available literature. Meaningful assessment of dietary supplements, which typically contain nutrients found in the diet, requires unique methodologic considerations and endpoints appropriate for measuring changes that are more subtle and gradual than those observed with topical/injectable products. Although definitive conclusions could not be drawn from the existing evidence, available data are supportive of beneficial effects of oral multicomponent supplements on skin health. Confirmation of positive effects with the same formulation/endpoint from more than a single study/investigator is needed.

The evidence supporting use of oral multicomponent supplements in skin health is clinically and methodologically heterogeneous. The lack of consistent endpoints and confirmatory studies for most formulations precludes definitive conclusions about the overall effectiveness of the category. Despite the limitations, data from the identified single-center studies suggest that oral multicomponent skin health dietary supplements produced beneficial changes on photoaged skin.