

Incorporating Client Dietary Supplement Use into Cancer Prevention Care

N. J. Emenaker¹, C. Lee², and L. M. Rodriguez³.

¹Nutritional Science Research Group, DCP, NCI, NIH, Bethesda, MD; ²Community Oncology and Prevention Trials Research Group, DCP, NCI, NIH, Bethesda, MD; ³Gastrointestinal and Other Cancers Research Group, DCP, NCI, NIH, Bethesda, MD.

Abstract

Background: Dietary supplement (DS) use is commonplace among adult Americans seeking to improve health and reduce disease risk, including some types of cancer. In 2019, U.S. DS sales exceeded \$48.7 billion across all Americans with over 50% U.S. adults using DS to support health and well-being. Yet, reports suggest an estimated 20-90% of oncology clients self-select DS to improve their health and mitigate treatment symptoms and toxicities.

Methods: In this study, we leveraged 2 NIH resources, NCI Physicians Data Query (NCI PDQ, 05/2020 update) and NIH Dietary Supplement Label Database (DSLDD, Version 7.0.7), to evaluate commercially available DS to assist physicians and other healthcare professionals assess critical DS information when caring for at-risk individuals along the health continuum.

Results: NCI PDQ-identified “Vitamin C”, “Probiotic”, “Melatonin”, and “Glutamine” as trending products frequently used by U.S. oncology clientele. All trending DS were currently available on the U.S. market in multiple product ingredient forms. Vitamin C was most popular trending supplement appearing predominately as ascorbic acid in > 12,000 products. Over 8,900 products exceeded > 100% (60 mg/d) U.S. Daily Value (DV) for healthy adults, including over 1,300 products > 1,000% DV established at (600mg/d) and over 100 products containing megadose levels (> 2g/d) of this nutrient. Comparatively fewer probiotic (1,416), melatonin (679), and glutamine (2,557) containing products were found. Probiotics appeared as single species probiotic microbes, probiotic microbial blends, botanicals and other microbial enhancement ingredients. Melatonin appeared more often as a single ingredient varying in dose with 1-5 mg/serving most widely available. Oral glutamine products most often appeared as the single amino acid L-alanyl-glutamine in DS, while some products contained blends of amino acid or other blends and complexes. Potential contraindications for use may exist for some products as DVs for healthy individuals are not established for most trending supplements. Our study suggests clinicians should educate their clients about potential safety issues accompanying use DS products commonly used by their at-risk and oncology clients, especially products taken at “megadose” levels (e.g., for Vitamin C) during some therapies. While glutamine, a conditionally essential amino acid often used to support post-surgical wound repair, glutamine may also support some types of tumor growth.

Conclusions: NCI PDQ and NIH DSLDD are valuable online public resource tools to assist the oncology community in assessing nutrition trends potentially contraindicated for some oncology clients. We found over 100 US marketed DS exceeded established DVs. Health care professionals are advised to assess oncology client use of those DS products exceeding 100% DV as they may be contraindicated in oncology client care.

Objectives

- To assist oncology health care providers evaluate dietary supplements (DS) commonly used by cancer patients, survivors, and those at-risk.
- To determine DS product prevalence $\geq 1,000\%$ of U.S. Daily Values for healthy adults, where available.

Background

- While over 50% U.S. adults report using DS for health and well-being, NCI Nutrition in Cancer Care (NCI PDQ) reports ~26-77%, of cancer clients and survivors use DS at including vitamin C and probiotics.¹ <https://www.cancer.gov/publications/pdq>
- Dietary Supplement Label Database (DSLDD) is a joint project between NIH ODS and U.S. National Library of Medicine (NLM) providing full manufacturer's label contents from > 90,000 U.S. marketed dietary supplement products.² <http://www.dsld.nlm.nih.gov/dsld>
- When combined, NCI PDQ and DSLDD could assist oncology researchers and health care providers assess client DS intakes.

Methods

DSLDD is a collaborative project between NIH ODS and the U.S. National Library of Medicine (NLM) providing full manufacturer's label contents from U.S. marketed dietary supplement products.*

Searchable DSLDD contents include currently available on U.S. market DS products (On Market), discontinued products (Off Market), or products reported consumed by most recent U.S. National Health and Examination Survey (NHANES) participants.

To assess DS use during oncology client care, we conducted DSLDD quick and advanced product searches (version 7.0.7) for on market DS reported most used by the NCI Nutrition in Cancer Care (PDQ) – Health Professional Version. Specifically, DS products containing “Vitamin C”, “Probiotic”, “Melatonin”, or oral “Glutamine” as an ingredient name on the product label. Common alternate ingredient spellings and synonyms were also included.

*Disclaimer: All information contained in the Dietary Supplement Label Database comes from dietary supplement labels. The dietary supplement label may not have met the then current nor meet current U.S. Food and Drug Administration (FDA) regulations. The presentation of dietary supplement label information is not an endorsement or guarantee of accuracy by the Office of Dietary Supplements or the National Library of Medicine, both part of the National Institutes of Health, U.S. Department of Health & Human Services.

Results

We found wide variation in DS product composition and dose levels marketed to U.S. consumers.

Vitamin C Products. Over 12,800 DS contained ≥ 1 mg “Vitamin C” alone or in combination with minerals or botanical blends (Figure 1). “Vitamin C (ascorbic acid)” appeared in > 8,500 DS products while ascorbyl palmitate, calcium ascorbate and mixed/unspecified ascorbates ingredient forms appeared in 4,040 DS products. Over 8,900 “Vitamin C” DS contained $\geq 100\%$ of U.S. Daily Values (DV, 60mg) for healthy adults³ (Figure 2), while 1,372 DS contained $\geq 1,000\%$ DV (600mg).

Figure 1. U.S. Dietary Supplements Containing Any Ingredient Form of Vitamin C (Ascorbic Acid) per Manufacturer's Ingredient Label Data.

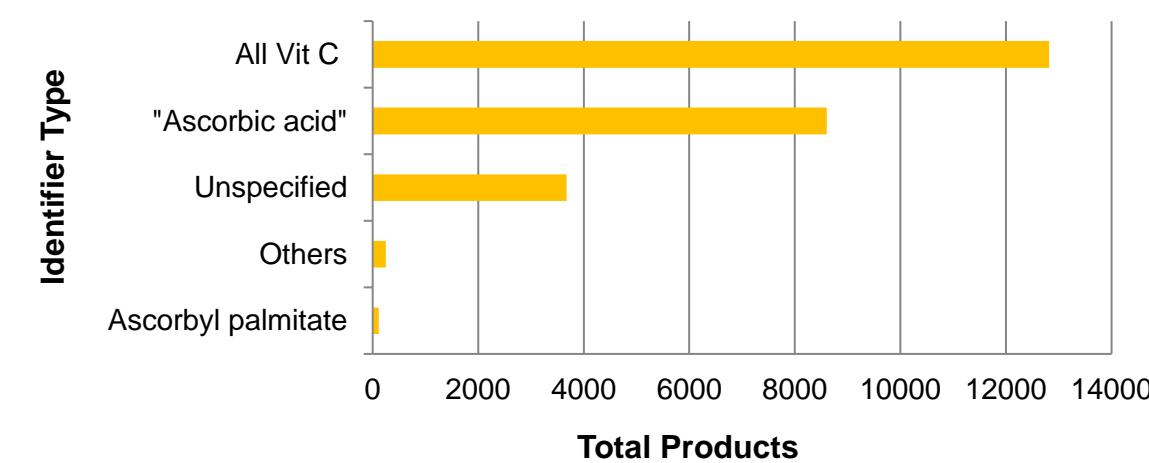
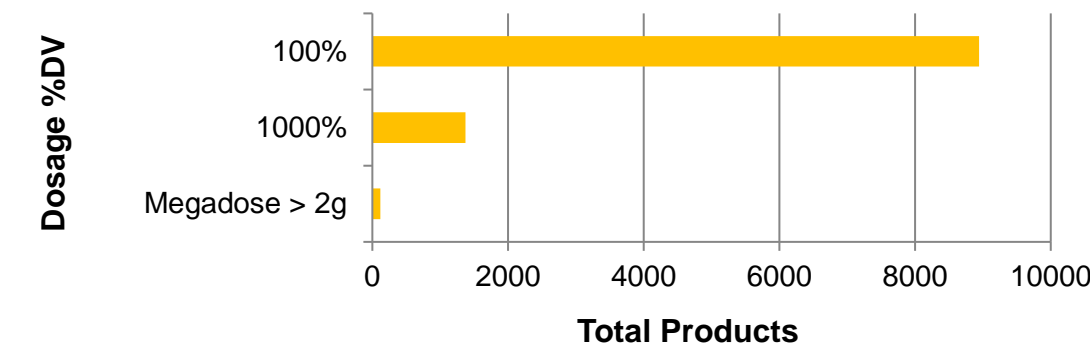


Figure 2. U.S. Vitamin C (Ascorbic Acid) Dietary Supplements Meeting or Exceeding U.S. Daily Value (DV) Currently Established at (60mg/day).

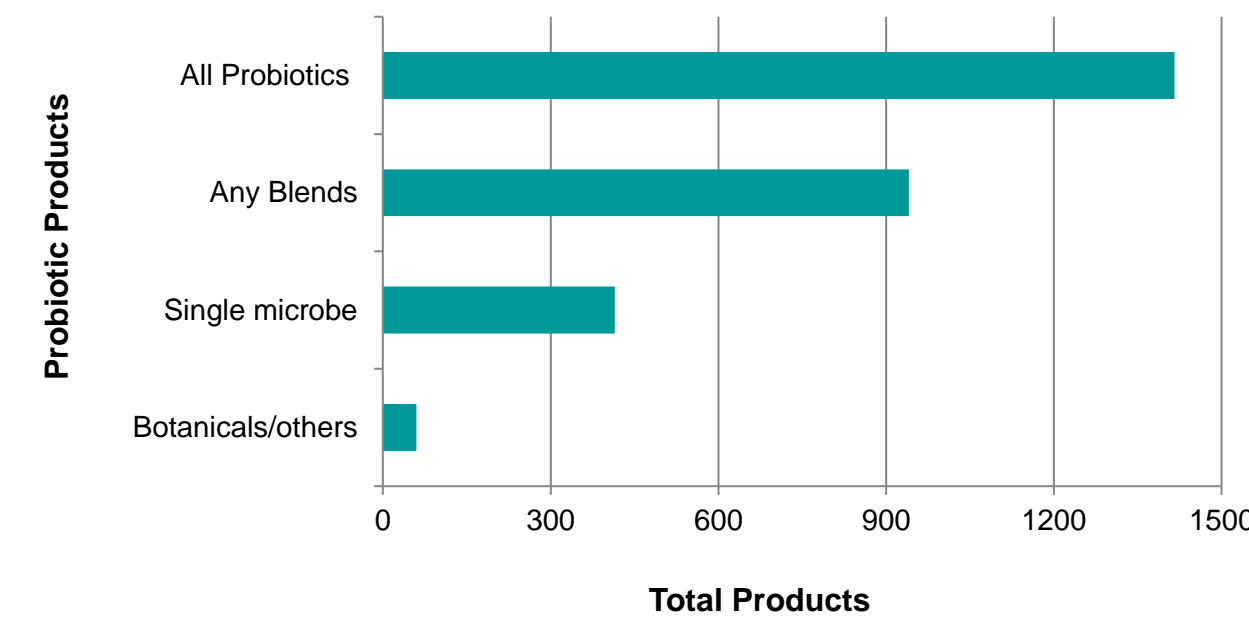


Results (Continued)

Over 100 DS contained “megadose” levels $\geq 3,333\%$ DV (≥ 2 g) potentially interfering with some radiation therapies.

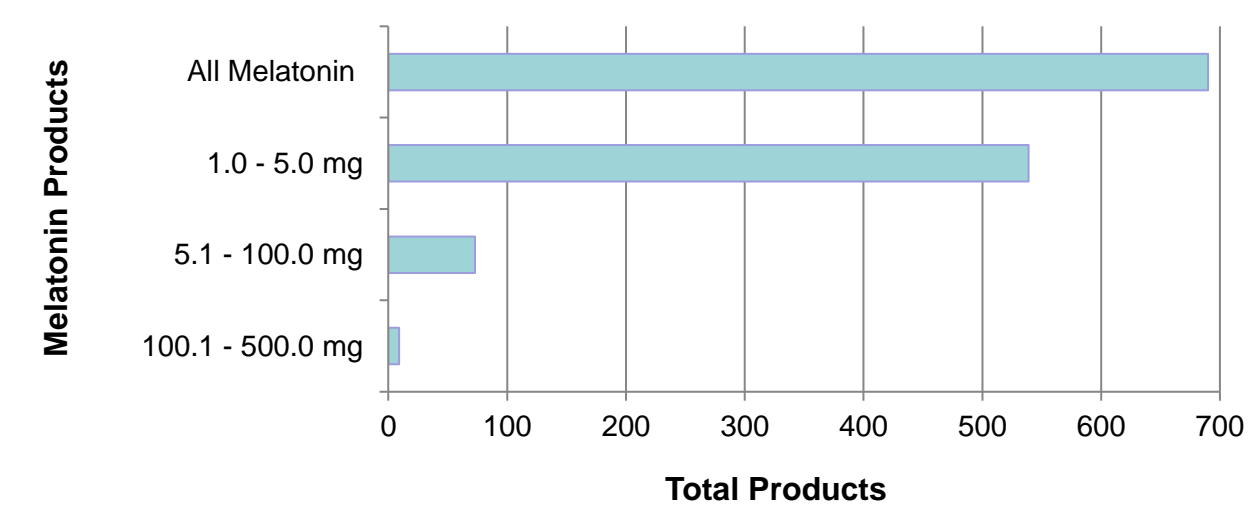
Probiotic Products. Over 1,400 DS contained a “Probiotic” ingredient ≥ 1 mg as single species probiotic microbes, probiotic microbial blends, botanicals and other ingredients. (Figure 3). Most probiotics contained a single microbe, such as Bacillus, Bifidobacterium or a blend, Lactobacillus (data not shown).

Figure 3. U.S. Dietary Supplements Containing Any Form of Probiotic per Manufacturer's Ingredient Label Data.



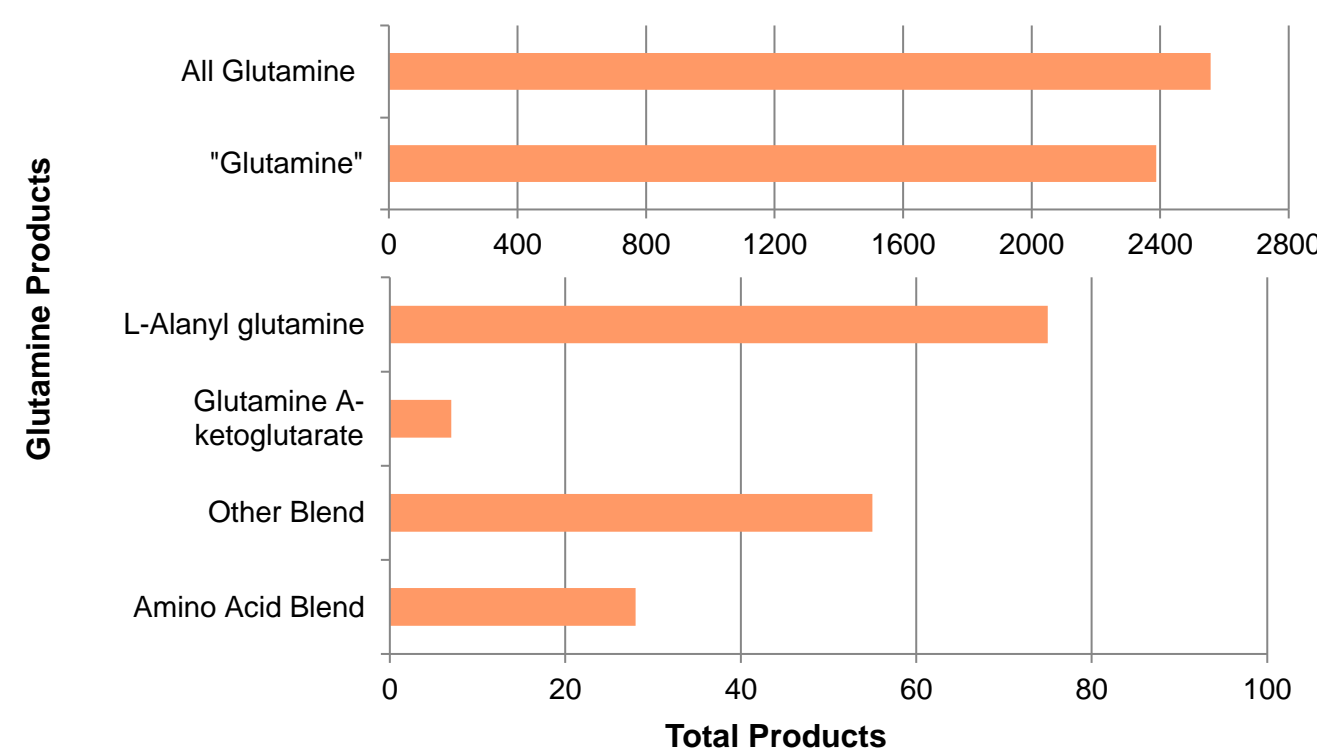
Melatonin Products. “Melatonin” as an ingredient appeared at ≥ 1.0 mg in 690 DS products and varied greatly in DS currently available in the U.S. marketplace (Figure 4).

Figure 4. U.S. Dietary Supplements Containing Any Form of Melatonin per Manufacturer's Ingredient Label Data.



Glutamine Products. “Glutamine” appeared at ≥ 1.0 mg in 2,257 DS products often as single amino acid or as amino acid blends and/or complexes (Figure 5).

Figure 5. U.S. Dietary Supplements Containing Any Form of Glutamine per Manufacturer's Ingredient Label Data.



Discussion

- Wide variation exists across DS on market in the U.S.
- Safe ingestion levels are not available for all DS sold in the U.S. (e.g., melatonin).
- Health care providers may benefit from using DSLDD to assess client DS use practices along the cancer continuum.
- High ingestion levels of some DS could cause detrimental effects for some clients (e.g., megadose vitamin C and radiation therapy, high oral glutamine and increased tumor growth⁴).
- Studies are needed to determine if DS may benefit some at-risk individuals (e.g., MTHFR C677T mutation carriers and breast and ovarian cancer risk reduction).
- Most DS appear safe for healthy adults, but additional research is needed to determine whether some DS can be safely used by those in the cancer treatment phase.

Conclusion

Over 100 DS exceeded recommended levels that may interfere with client health care. DSLDD may assist the oncology community assess trending DS use in at-risk individuals while identifying harmful DS to avoid during some cancer treatments.

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