

## Research Strategies Reflective Essay

As a lover of nature and plants, I am often mesmerized by lush plants, the richness of smells and sights, and the benefits plants provide us. As a scientist, I constantly wonder how their molecular structures influence the human body. Plants are an essential part of nutrition, and medicinal plants play an important role in medicine and are now contributing to manufacturing (Rastogi et al., 2016). At the same time, as society continues to progress and stress increases, many people are trying to replace their daily diets with nutrients to find a more efficient way of eating, which is something I am concerned about as a student who is often too engrossed in my studies to care about eating. In reading nutrition textbooks, I happened to discover that phytochemicals are the source of all these problems. Phytochemicals are biologically active compounds produced by plants in metabolism to protect them from external threats, thus aiding their development and reproduction (Leitzmann, 2016). Most therapies use extracts and active compounds from medicinal plants (Craig, 1999), so I think the nutrients we draw from plants in our daily lives are relevant. Based on this information, my research topic is the impact of phytochemicals contained in plant traits on human health.

After determining the general topic, I thought of many different perspectives and my prior personal experience and academic knowledge. Because my dad has diabetes, I care about future treatment options for this disease; I saw that phytochemicals can mimic the action of insulin and act as effective antihyperglycemic agents (Bacanl et al., 2019). Besides, I care about human health and started my interest in science research in high school. I have done some research about cancer and RNA, so in my daily life, I always keep my eyes out for news or notifications about cancer. I know that green tea, when used as a chemo-preventive agent with

curcumin, exhibits synergistic growth inhibition and superior antitumor effects (Saleh et al., 2023).

Moreover, antioxidants are health-promoting phytochemicals in horticultural crops; Carotenoids, vitamin C, total phenols, and chlorophyll have high antioxidant potential and help prevent many cancers, such as Bladder cancer and colon cancer (Chang et al., 2019). All this professional information tells me that phytochemicals are so significant and even more effective than vegetables and fruits; they are twice as effective in the treatment of diseases. So, I raised the following question: Why do we still need to eat various fruits and vegetables that cannot be replaced by nutrients and drugs in our daily lives? Through an interview with Professor Ghasedi, she reminded me to change the format of the research question to a more direct relationship, and I met with the librarian to try to make the questions more transparent, so the final version of my research question is: What are the health outcomes of phytochemical supplements versus fruits and vegetables?

This question lingers in my mind; once again, it was course English 299 that gave me the opportunity to get lots of helpful direction and pushed me to go deeper and conduct a research project.

In the search process, I combined two concepts often used in artificial intelligence: backtracking and depth-first search strategies. With backtracking strategies, I searched the issue in all directions, collected the most relevant articles for reading and linking, and if I found a topic with highly similar content in an article, I continued to read its work citation in depth. The depth-first search strategy was used when I met a dead end; I returned to the previous step and tried to find new resources to solve the problem.

For my question, I looked it up based on the things I needed clarification on, the definition of photochemical, and relevant use cases around me. I found that the use of phytochemicals is predominantly when the human body is not in a healthy state, which makes me wonder if the many negative effects of phytochemicals have prevented their widespread use by healthy people. In embarking on a search for phytochemical counterparts for application to healthy populations with vegetables and fruits and phytochemical supplements for health outcomes to do the analysis, I found that the literature that came up was very sparse and limited in content. Additionally, if I changed the broad search terms, the connection to the research question was lost. So I decided to make an appointment with a librarian; she taught me a critical function of PubMed is that the MESH word list, which is a tree structure with branches that refines the keywords of the article's topic, and we can check off the sub-keywords that we need or that are related to the topic of our research. Ultimately, I get most of my references from “phytochemical,” “supplement,” “nutrients,” “health outcome,” “dietary,” “chemotherapy,” “food.” Those keywords and their combinations. Another thing I was reminded of again in the research guide is that it is essential to select reliable articles. So, in this research, I paid attention to the background of the authors, the number of citations in the paper, as well as data such as the credibility of the website, the impact factor, and so on. Through these skills and content from the Nutrition 200 course and my daily observations, I completed my research project with thoughtful conclusions and explanations.

In the process of writing essays, I also came across examples of essays that I had collected that could be more relevant to the context. This is when I need to think outside the box and search for synonyms.

As a result of this research, more people will know that many articles and researchers have noted that plants contain multiple more comprehensive and efficient nutrients than supplements. I also gained much experience, including judging sources, searching directions, analyzing articles, and discovering self-interest. My long-term goal is to become a scientist, contribute to extending the human lifespan, and even develop phytochemical-related drugs to establish my own biomedical company. All those skills will inform my work moving forward!

## References

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