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# SPAIN & GUYANA

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**FEATURED STUDENTS:**

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LONG ISLAND UNIVERSITY

# SPAIN 2023

## PHARMACY CLASS OF 2023

***MINNA ABDELAZIZ***

***AMAN KAUR***

# SPAIN AT A GLANCE

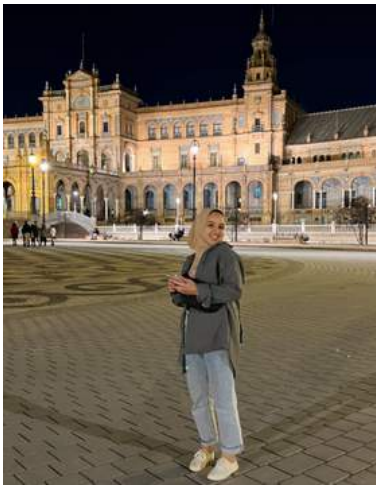
## WORK CULTURE

Besides the professional growth we experienced during the international rotation, we had the opportunity to witness and learn a lot about Spanish culture. For four weeks, we were completely embedded in a new space, speaking a new language, and interacting with different people.

On the first day on-site, we both were invited to join our coworkers for breakfast at around 10 am. The labs closed and all our coworkers would walk to a nearby cafe and enjoy their meal together. It was extremely important for everyone there to pause and enjoy that meal together. We observed this break was necessary not only to eat but more importantly, to bring the team closer together. They would share their weekend experiences, talk about their families, and even ask us questions about our future plans in America.

## FOOD CULTURE

During our tapas tour and farewell dinner with our preceptor Marian, the meals we ordered were all meant to be shared. In American culture, it's more common for meals to be individualized, but in Spain, most of these decisions are made with the larger group. We both really enjoyed this, not only because it was similar to what we grew up with, but more so because it opened a communal conversation and tightened the connection between us and whomever we were with.



With such a late breakfast time, it was also very common for the rest of the day's meals to be pushed later something we saw for the first time in Spain.The earliest dinner would start at around 8pm and could be as late as 10pm or 11pm. Most restaurants have a period where they close between lunch and dinner, from around 5pm-8pm – which definitely called for some adjustments on our end for what we had been accustomed to in America.

# ARABIC INFLUENCE

MINNA ABDELAZIZ

Expanding on our cultural experience in Spain, we also observed something we didn't expect at all: the influence of Arabic culture and cuisine on Spanish culture (specifically coming from Morocco). As someone with an Arabic background, I was at first shocked, and then thrilled at the fact that I was able to see, hear, and taste something familiar in our home away from home. I would walk through the streets and hear Quran playing from tiny shops. The second we'd enter the shops, I was speaking to the shop owners in Arabic and actually met a few Egyptian owners (the country where my family is from). We visited a few different Moroccan and Lebanese restaurants that became our go-to dinner spots because of the familiarity. After going on our Granada City Tour with the Studies in Spain program, we were able to learn about the role of the Muslim empire in Granada, and these influences started making sense. This was an element of Granada we didn't expect to see, made us a little more comfortable being there, and added an extra dimension to the city's beauty and our experience there.

# RELAXED LIFESTYLE

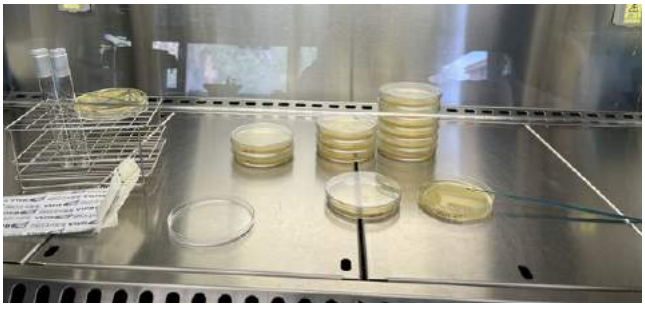
**Having been in pharmacy school in Brooklyn for the past 6 years has equipped us to live fast-paced lives and always be on the move. However, we had no warning that we would have to slow our roll once stepping into Granada. The locals describe their city as a big town given its quaint size and great hospitality. Working at research centers, you'd naturally assume people worked late hours and even worked on the weekends. But it is quite the contrary; once the workday is done with, the people of Granada truly embody the notion of maintaining a work-life balance. Restaurants are never lacking patrons and meeting for happy hours after work is a normal activity regardless of which day in the week it is. Saturday nights are busy and hectic which leads to slow Sunday mornings. The lifestyle in Granada contrasts much with typical urban cities, but especially an uber-metropolitan one such as New York.**

# ANTIOXIDANT STUDIES

AMAN KAUR

Prior to my international research rotation, I had never before come across antioxidant studies or understood their significance of them. One of the primary research groups at CSIC mainly focused on analyzing the antioxidant activity of all kinds of foods that make up the Spanish Mediterranean diet. As someone who is new to antioxidant research, this rotation is an opportunity to learn more about it with the help of my preceptor Isabel Sequir and the laboratory team. Isabel is a pharmacist by training but has spent her professional years as a researcher.

The first question I had at CSIC was why did antioxidant activity warrant inquiry and research. The concept of antioxidants refers to substances that have the capacity to either directly find or indirectly prevent the formation of pro-oxidant molecules. The formation of pro-oxidants is associated with reactive oxygen species (ROS). In plants, the main source of ROS is in the chloroplast which is the most important organelle for ROS generation. For animals, the ROS production takes place in the mitochondria. Due to these differences, the cells/organelle/tissues ultimately have different kinds of antioxidant machinery to overcome the deleterious effects of their internal ROS levels and production.



Antioxidants have garnered immense interest from the public due to their many benefits, such as anti-aging and anti-inflammatory effects. Antioxidants are utilized in a wide variety of areas such as food, cosmetology, pharmacology, and medicine.

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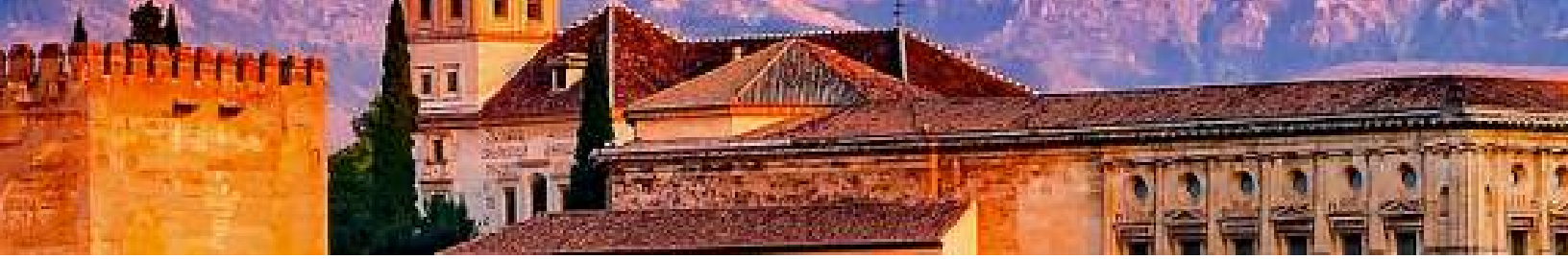

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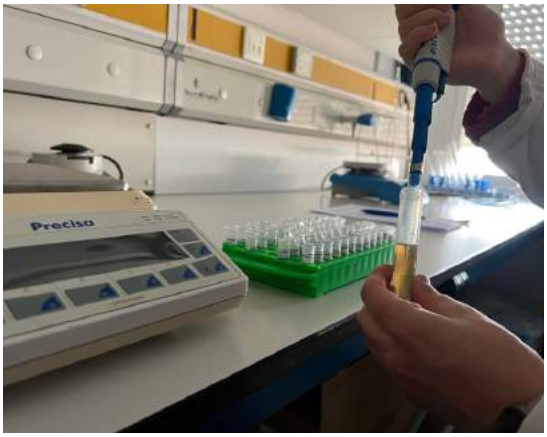



An example of the use of antioxidants can be seen with the preservation of produced food. In modern times, foods are protected and preserved by edible films and coating. Further improvements to the protective function of these edible films and coating can be made by incorporating antioxidants. During my time at CSIC, I had the opportunity to meet research professionals with unique backgrounds, such as my direct preceptor Isabel Sequir. Much of Isbael's notable work revolves around antioxidant studies. Isabel and her work speak volumes to how transferable the skillset that we acquire from pharmacy school really is and how important it is to continue research on antioxidant activities, as it can be highly beneficial in various fields including medicine. Learning about Isabel and her professional journey prompts someone like myself to wonder if these unique opportunities are available here in the United States for pharmacists.

The research center I was assigned to was a government funded research facility. Most research projects were conducted at the University of Granada are in service of studying the local agriculture and livestock in Granada and the surrounding southern Spain region. A trend among most, if not all, research initiatives at the University is to identify how they can provide or create beneficial interventions to further promote growth and abundance in their agriculture and livestock. My conjecture is that these unique research opportunities in nutrition and animal studies were pioneered by the local government's priority in preservation of their rural areas. In the United States, especially in metropolitan cities such as New York, animal and agricultural research is mostly scarce or can be found being studied in institutions elsewhere. Being able to personally see pharmacists practice is such unique and unexpected roles showcases how the skillsets we develop in pharmacy school can be manipulated in various ways and build a foundation for an individual to be successful in any professional aspirations they pursue.

# COMMUNITY PHARMACY PRACTICE IN SPAIN

FUN FACT:

Spain has very loose rules for prescriptions. Codeine and birth control pills can be purchased without a prescription.

As pharmacy students, we have all either worked at a chain pharmacy or shopped at one. They're super convenient and carry a various assortment of products aside from medications. This, however, is not the case in Spain. All pharmacies in Spain are privately owned and they do not allow the establishment of chain pharmacy corporations. Pharmacies in Spain are strictly for medication and some hygiene, beauty, and baby products. Pharmacies are much smaller in size in comparison to those in the United States due to this very reason. Only a handful of products are kept in the over-the-counter area for patrons to view and purchase.

The main purpose of pharmacies is to dispense medications and provide necessary guidance through counseling. Even though Spanish pharmacies lack the efficiency of purchasing painkillers off of the shelf, they make up for it with the efficiency of filling a prescription. Based on our conversations with the community pharmacists practicing in Granada, this allows for the pharmacist to spend more time on the patient and their medication needs, rather than acting as a cashier or a salesperson.

Spanish pharmacies are also very low-cost. They are one of the least expensive places in Europe for medication.

# THE ROLE OF PHARMACY IN BOTANY RESEARCH

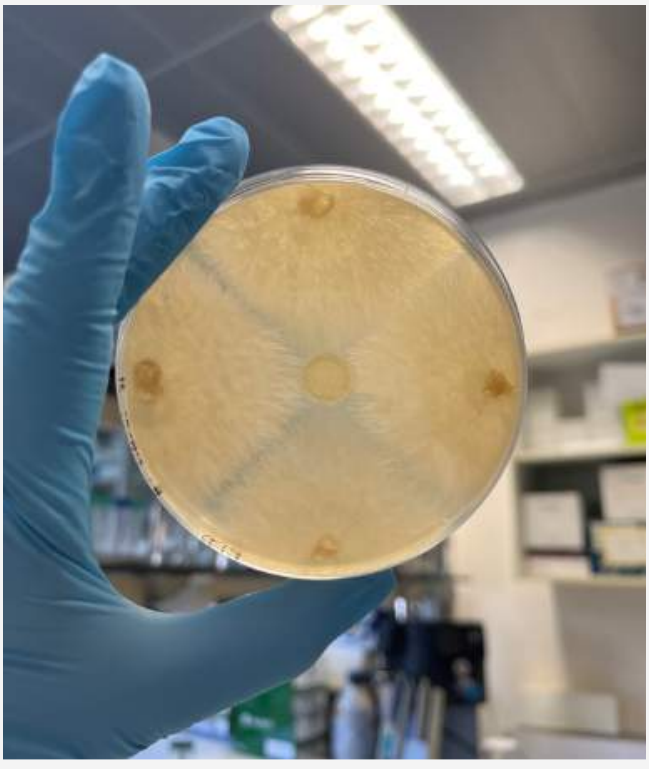
**BY: MINNA ABDELAZIZ**

Two subjects I would never have imagined fusing came together during my international rotation in Granada, Spain at the Consejo Superior de Investigaciones Científicas (CSIC): botany and pharmacy.

For close to four weeks I worked at the CSIC center in Zaidin in the microbiology/biotechnology department evaluating the antibiotic activity of Stutzerimonas stutzeri, a plant bacteria that has shown benefit against other pathogens that damage soy and corn plants in high stress high saline environments. My project went through the course of three phases: 1) evaluating antibiotic activity through the lab, 2) working with bioinformatics to evaluate antibiotic activity through the bacterial genome, and 3) evaluating any antifungal activity. Through each of these phases I realized the value of the pharmacist and grew a tremendous appreciation for our training.

During the first phase of my project, I was working to evaluate the antibiotic activity of S. stutzeri through a series of different experiments. The entire process was very microbiology heavy – I was instructed to prepare my own growth mediums and incubate the pathogens overnight. Although the project design was far from what I was used to in pharmacy practice, the overarching project goal was in line with my pharmacy training. Without antibiotics, in vitro and in vivo, bacteria will grow. Similar to the application of antibiotics in the human body, antibiotics are used in plants to inhibit bacterial growth and support a plant's health. I was able to apply my understanding of antibiotics in the pharmacy to my project at CSIC.

In the second phase, I worked with online Spanish and European databases to compare what is known of S. stutzeri's genome to proteins that exhibit antibiotic activities in other species. Again, during this stage, it was extremely helpful to be coming from a pharmacy background and knowing the differences between different antibiotic mechanisms of action. I was able to relate the sites of action for certain antibiotics to the genome breakdown on the databases. Just as certain bacteria produce beta-lactamases and beta-lactamase inhibitors, S. stutzeri has a similar mechanism of fighting off certain pathogens. Again, I found my pharmacy background to be a tool during this step, guiding me through interpreting an immense amount of information to understand its application in the larger project.



The time spent on the third phase of the project was very short in comparison to the time spent on the other phases. Similar to the role my training played in carrying out the first phase with analyzing S. stutzeri's antibiotic activity, this phase's goal was to evaluate its antifungal activity. As a pharmacist, we understand and recognize the importance of the differences between bacteria and fungi and as a result, the difference between antibiotics and antifungals.

In general, at first, I was excited to get training in a microbiology department, but I was almost confident that the research I'd be doing would be very separate from what I learned in pharmacy. However, each day I spent in the lab, I proved this point more and more wrong. I was able to see a lot of overlap between the two and I grew an appreciation for pharmacy as our training prepared me for a project even beyond our normal scope of practice. I'm extremely grateful for the opportunity and will never again underestimate the role of pharmacy in any industry.

# SPAIN X GUYANA PDP

STAY TUNED FOR OUR NEXT E-BOARD FOR 2023-2024 ON OUR LAST MEMBER MEETING ON 4/26/2033 @ 5 PM IN HS 107

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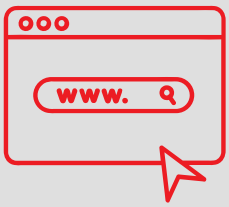


***HTTPS://LIU.EDU/PHARMACY/CURRENT-STUDENTS/STUDY-ABROAD***

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