



Proceedings

Probiotic: First Prescriptive Application of Probiotics in Spain [†]

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Abstract: The study of the intestinal microbiota is one of the greatest challenges in today's clinical environment. Thus, probiotics have been established as a focus for its stability, as they play a key role in its regulation. The development of an automated technique that allows the practitioners the smooth search for the optimal probiotic is postulated as the main objective of this study. Despite the existence of previous attempts at applications for this purpose, they have only been carried out for the countries of origin, preventing them from being used in others such as Spain. Therefore, a system has been developed with open, multi-platform, and free technologies, which manages to locate the optimal probiotic for each pathology.

Keywords: probiotic; microbiota; software

1. Introduction

The human microbiome is the population of all microorganisms with their genes and metabolites that colonize the body. The highest concentration of microbes is found in the intestine and is called intestinal microbiota. The flora of the microbiome has a significant impact on human health, and understanding its effects is one of the most salient challenges facing clinical care nowadays. Intake of the right amount of the appropriate microorganisms can help regenerate the composition and concentration of the microbiota, thus eliminating problems such as dysbiosis [1]. Moreover, bearing in mind the current situation with the Covid-19 pandemic disease, it has been highlighted how alterations in the microbiota may be linked to individual severity with which each patient is affected [2]. A detailed report of the SEPYP (Probióticos, prebióticos y salud) clarified that for a microorganism to be qualified as probiotic it is necessary to scientifically demonstrate that it produces beneficial effects on human health [3]. Furthermore, pharmacists and doctors themselves have started to use probiotics for certain treatments. The data and studies that have been published with clinical results for probiotics strains are beginning to be abundant to such an extent that a professional in the field cannot afford to know all the probiotic products with the clinical evidence that exists.

2. Objective

The main objective of the present work is to simplify the consultation process, so that with a simple, agile, and intuitive application, the search and consultation will be quick and effective, so that the doctor or pharmacist will have all the information available to treat and advise his patients, easily selecting the suitable product, dose, and format for a particular indication.

3. State-of-the-Art

Undeniably, the healthcare world is evolving towards a more technological environment where there are more and more applications that support clinicians in diagnosing pathologies, making decisions, and even prescribing medical treatment to ensure that the medication and its dosage is indeed recommended. The Clinical Guide to Probiotic Product application is a guide to the scientific evidence available for probiotic products that was created with published data from clinical studies for various probiotic strains. Currently, there are two released for products available and supported in Canada and United States [4,5]. Besides the information being extremely worthwhile, due to differences in the commercial products in Spain, it lacks usability.

4. Methodology

This paper presents a prescription assistance system that has been developed with the aim of providing a tool that includes the products endorsed in Spain for later consultation. The system developed has a webpage that enables remote consultation of the appropriate probiotics for a specific pathology in a very simple way (Figure 1a). Once the pathology has been selected, the available probiotics are shown, ordered by the level of evidence. In addition, the system designed is not intended to be static and has an administration panel that allows you to create, edit, or delete information of all kinds. It is also possible to access quick actions to view details, edit, or delete (Figure 1b).



Figure 1. Application developed.

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References

1. Myers, S. P. The causes of intestinal dysbiosis: A review. *Altern. Med. Rev.* **2004**, *9*, 180–197.
2. Zuo, T.; Zhang, F.; Lui, G.C.; Yeoh, Y.K.; Li, A.Y.; Zhan, H.; Wan, Y.; Chung, A.; Cheung, C.P.; Lai, C.K.; et al. Alterations in Gut Microbiota of patients with COVID-19 during time of hospitalization. *Gastroenterology* **2020**. doi:10.1053/j.gastro.2020.05.048
3. SEPyP, Probióticos, Prebióticos y Salud: Evidencia Científica. Available online: http://ergon.es/wp-content/uploads/2016/07/ergon_primeras_Manual_SEPyP.pdf (accessed on 20 July 2020).
4. Skokovic-Sunjic, D. Clinical Guide to Probiotic Products Available in Canada: 2020 Edition. 2020. Available online: <http://probioticchart.ca>(accessed on 20 July 2020).
5. Skokovic-Sunjic, D. Clinical Guide to Probiotic Products Available in the US: 2020 Edition. 2020. Available online: <http://probioticchart.ca> (accessed on 20 July 2020).



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