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CONCENTRATION OF SOLUTIONS APPLIED TO THE FOOD PRODUCTION CHAIN AS A THEME OF IN- DEPTH TRAINING IN ENGINEERING, TECHNOLOGY AND EXACT SCIENCES IN THE NEW EDUCATION SYSTEM MEDIUM

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Abstract: This paper proposes the theme of the food production chain as an in-depth study in high school teaching material. The material reviews the concentration of solutions and applies this knowledge to the tolerable limits according to ANVISA's resolution. It also investigates possible contamination in the food production chain. Finally, the material proved to be effective in working on skill EMIFCG01 of the scientific investigation axis. **Keywords:** food, concentration, new secondary education.

INTRODUCTION

Law 13415 of February 16, 2017 establishes a new curricular arrangement for secondary education, the composition of which is now defined by the National Common Curricular Base (BNCC) and the Training Itineraries (IFs). With this new format, the possibilities for creation and innovation for education networks become a reality, especially considering the structuring axes of the IFs, which are: Scientific Research, Creative Processes, Intervention and Sociocultural Mediation and Entrepreneurship.

The BNCC establishes the essential knowledge for all students, while the IFs build on this knowledge by areas of knowledge or in integrated areas, such as the unification of natural sciences and mathematics. With a view to deepening the General Formation (GF) knowledge established by the BNCC's skills, the author of this work prepared teaching materials for the 2nd grade of a private institution in Belo Horizonte, throughout 2023, whose name for this deepening was Itinerary of Engineering, Technology and Exact Sciences, which is made up of the curricular components of Physics, Chemistry and Mathematics.

The aim of one of these Chemistry teaching materials from the Training Itinerary was to deepen knowledge of solution concentrations in the food production chain, understanding

and investigating how possible contamination can occur, as well as analyzing concentration limits for some contaminants.

METHODOLOGY

In constructing this material, the methodology adopted was a review of percentage concentrations; common concentration (g/L); molar concentration (mol/L); diluted concentration measures such as part per million (ppm); part per billion (ppb) and part per trillion (ppt). In addition, work was done on the types of contamination: physical, biological and chemical contamination, as well as examples of contaminant limits, according to Resolution RDC, N 42 of August 29, 2013. In addition, the investigation of possible contamination in the food production chain, from production on farms to contamination during processing and improvement; in distribution (wholesaler/exporter); in marketing by shopkeepers, retailers and marketers; and at the end of the production chain, including contamination during food preparation and by the final consumer.

RESULTS AND DISCUSSIONS

This didactic material makes it possible to work on the skills of the structuring axis Scientific Investigation, such as skill EMIFCG01, considering the identification, processing, selection and analysis of data on contamination limits, as well as possible contamination in the food production chain.

An interesting comparison of data was related to the amount of citric acid present in orange juice, where it was considered at a concentration of 1.3% m/m and compared with the limit of 0.05 ppm of cadmium (0.05 mg/kg) in orange juice. When the ppm concentration was converted to a percentage concentration, the value was $5 \cdot 10^{-6}$ % m/m of Cd, showing how contaminant limits in food are very dilute.

FINAL CONSIDERATIONS

Finally, it can be inferred that the subject of food contamination in the production chain makes it possible to study knowledge of the concentration of solutions, especially for more dilute values, such as parts per million. This topic demonstrates the responsibility of professionals involved in the food production chain and the importance of taking care throughout this process.

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