



Title: Evaluation of the adsorption capacity of glyphosate in a microbial cellulose composite

Authors: TREJO-ESPINOSA, María de Jesus, VADILLO-RAMOS, Andrea Lilian, ORTIZ-MARTÍNEZ, Mónica and ALONSO-SEGURA, Diana

Editorial label RINOE: 607-8695

VCIERMMI Control Number: 2023-02

VCIERMMI Classification (2023): 261023-0002

Pages: 08

RNA: 03-2010-032610115700-14

MARVID - Mexico

Park Pedregal Business. 3580-
Adolfo Ruiz Cortines Boulevard –
CP.01900. San Jerónimo Aculco-
Álvaro Obregón, Mexico City
Skype: MARVID-México S.C.
Phone: +52 | 55 6159 2296
E-mail: contact@marvid.org
Facebook: MARVID-México S. C.
Twitter: @Marvid_México

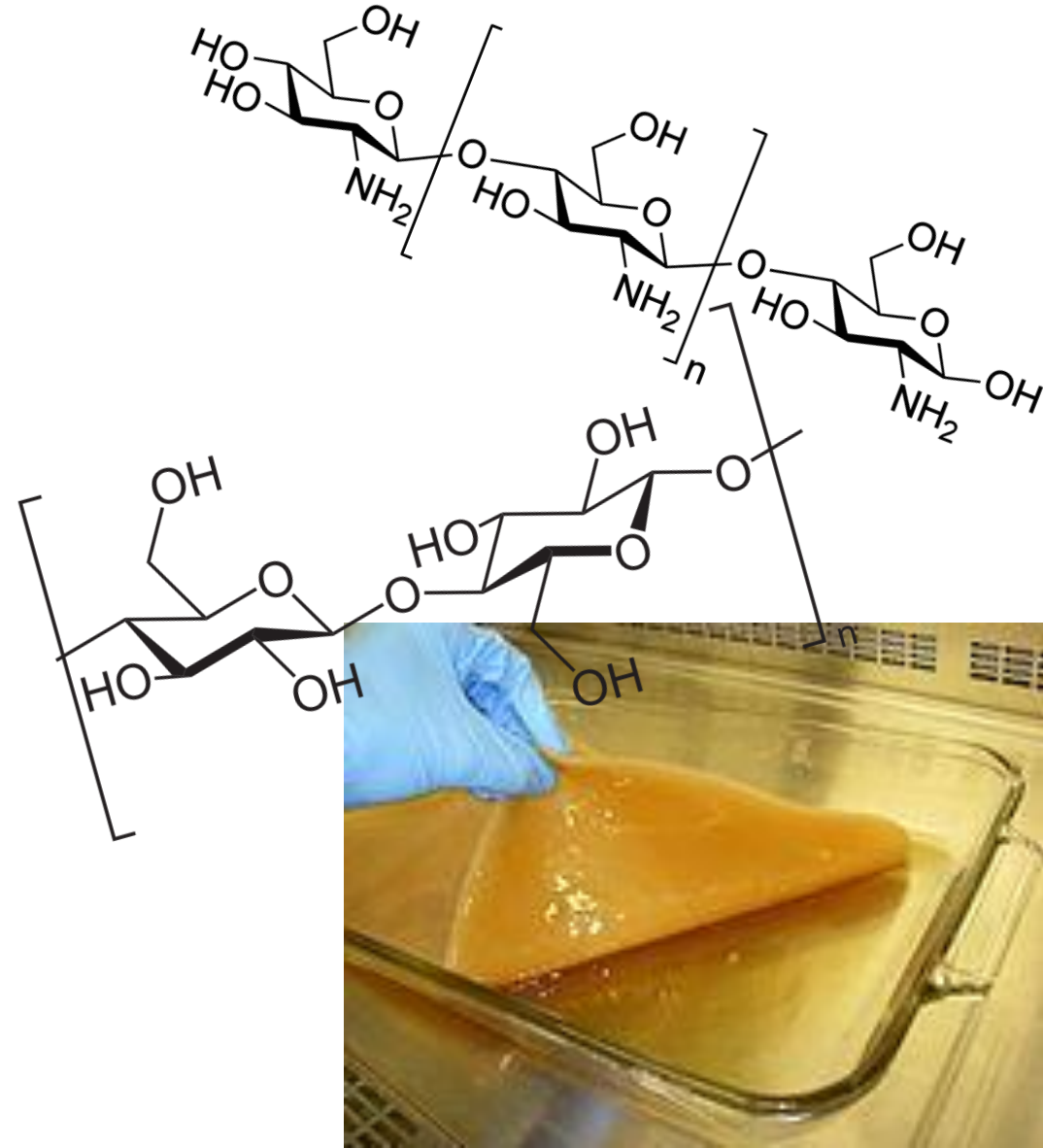
www.marvid.org

Holdings

Mexico	Colombia	Guatemala
Bolivia	Cameroon	Democratic
Spain	El Salvador	Republic
Ecuador	Taiwan	of Congo
Peru	Paraguay	Nicaragua

Introduction

STOP
GLYPHOSATE
ECI



Methodology

- Microbial cellulose synthesis
- Microbial Cellulose Composite p
- Crosslinkage process

Table 1. Reagents for the preparation of the modified HS culture medium.

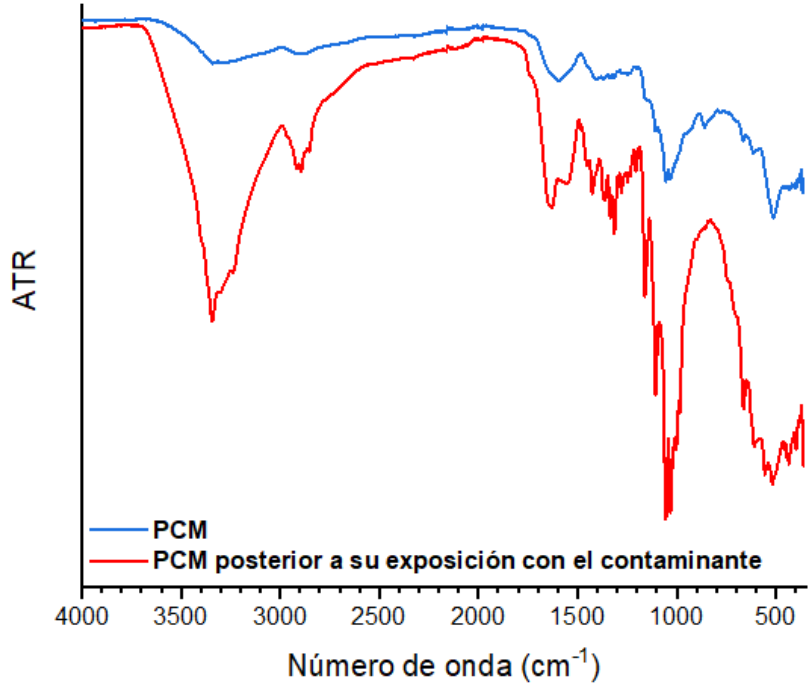
<u>Reagents</u>	<u>Mass in grams</u>
Fruit peels	120
Yeast extract	2.5
Peptone	2.5
Na ₂ HPO ₄	1.35
Citric acid	0.575
Saccharose	2.5

Results

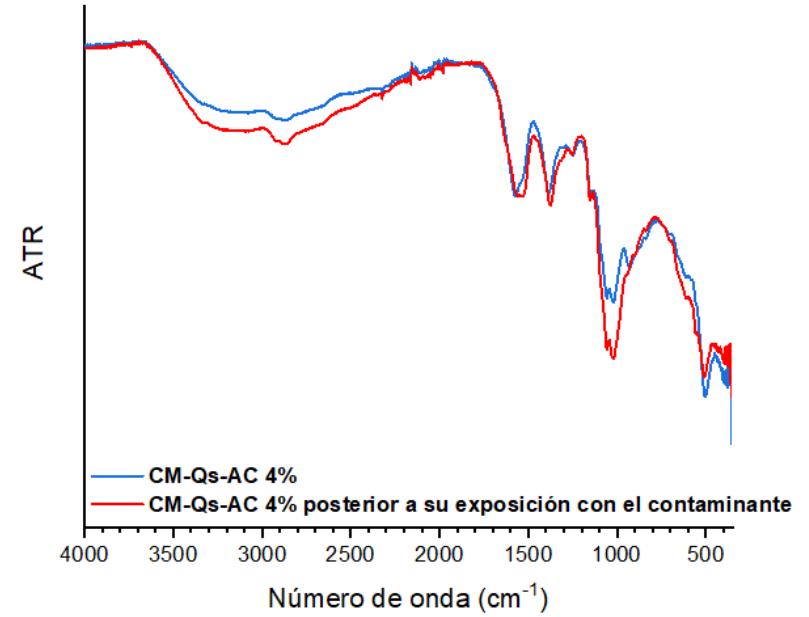
Table 2. Final concentration of glyphosate present in the samples after UV-VIS adsorption.

Sample	Glyphosate concentration (ppm).	Standard deviation
PCM	125.125	± 0.005
CCM4	89.75	0
CCM6	115.05	0

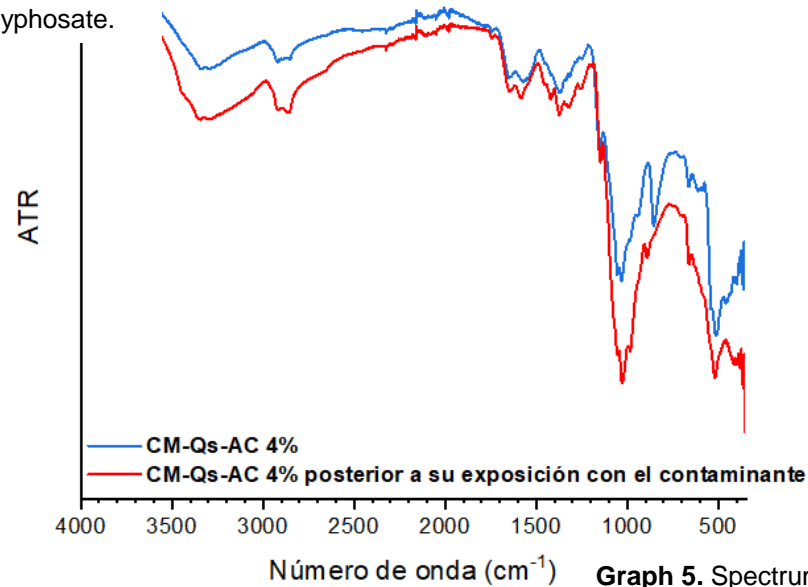
FTIR Results



Graph 4. Post-adsorption spectrum of microbial cellulose glyphosate.



Graph 6. Spectrum after commercial glyphosate adsorption with the composite



Graph 5. Spectrum after commercial glyphosate adsorption with the composite CCM4.

SEM Results

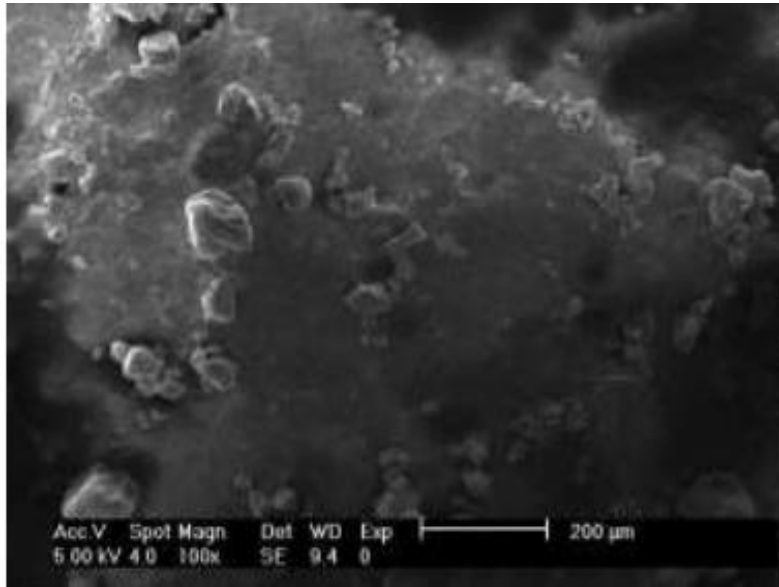


Figure 5. Micrograph of microbial cellulose powder at 100X.

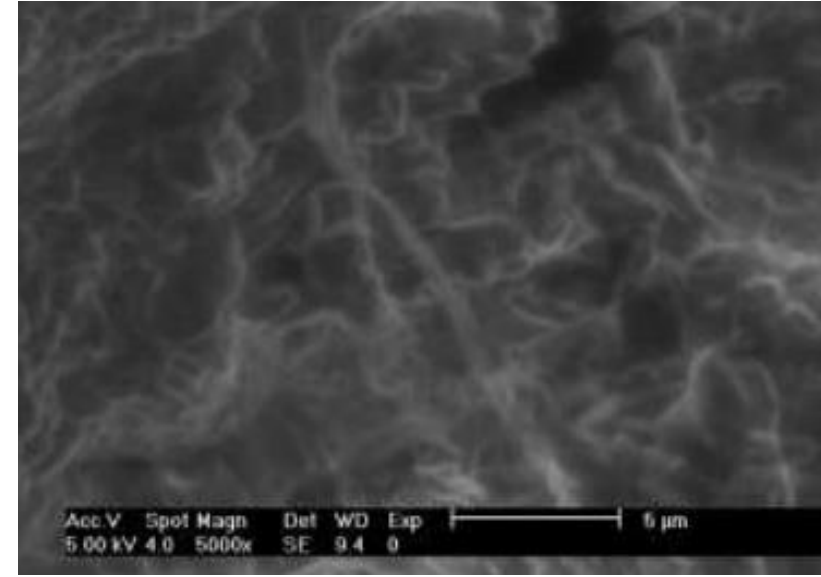


Figure 6. Micrograph of microbial cellulose powder at 5000X.

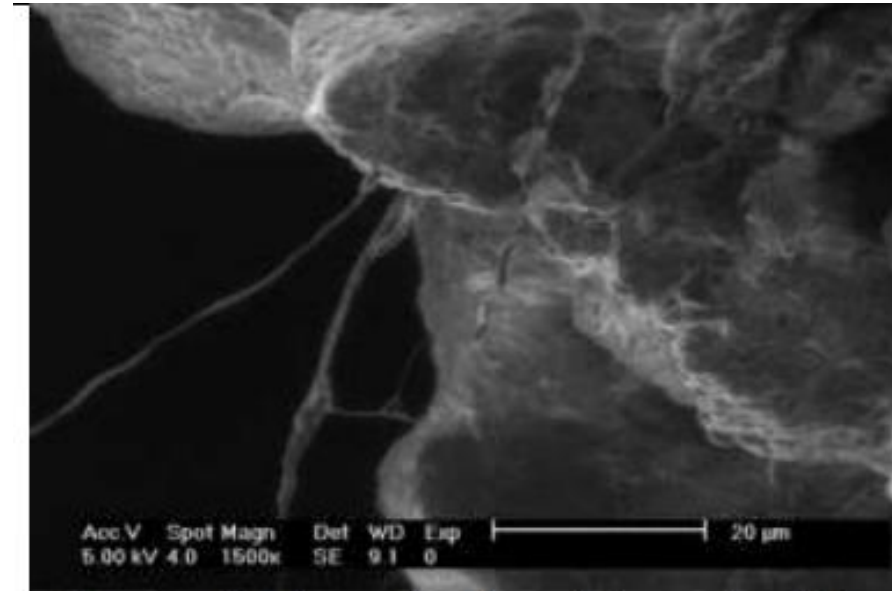


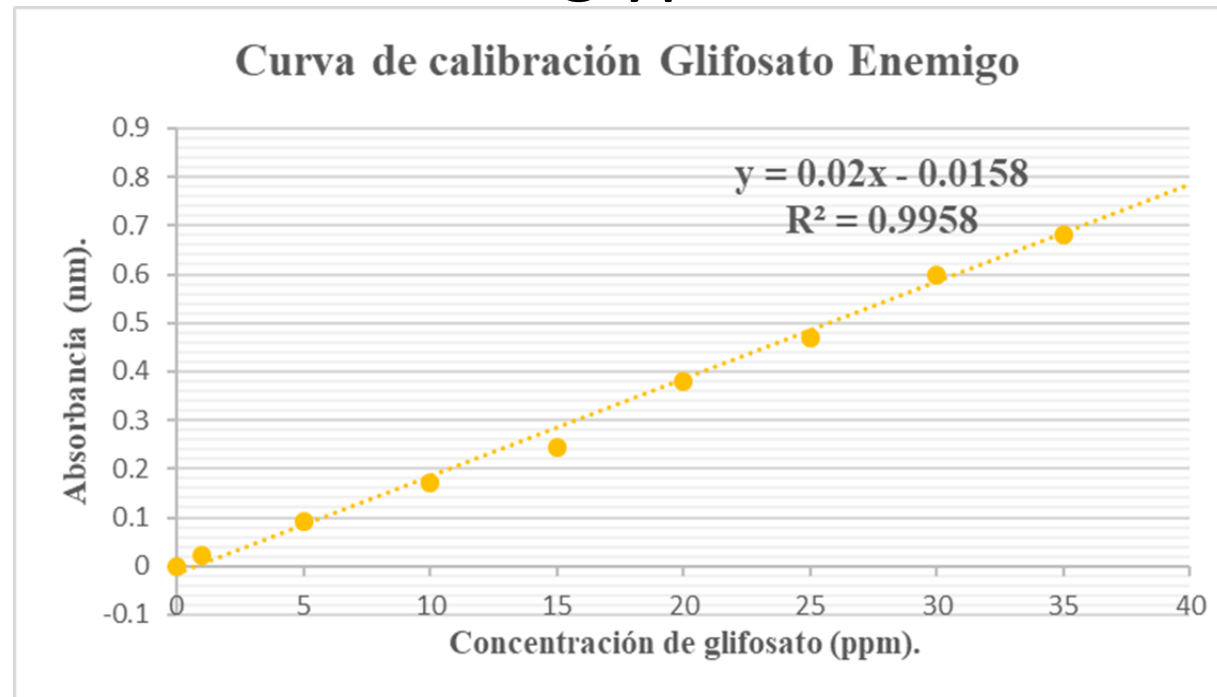
Figure 7. Micrograph of compound CCM4 a 1500X.

Annexes

1. Modified casting method.

Using Sodium Phosphate, chitosan and citric acid.

2. Calibration curve for glyphosate quantification.



Conclusions

- SEM analysis showed differences in the physical characteristics of the MC compared to de composite developed herein.
- FTIR spectra show that the treatments present the characteristic bands of MC and Chitosan.
- Further research is required to fully understand the interaction between the comercial glyphosate and MC composites.

References

Alonso, D., Gimeno, M., Olayo, R., Vázquez-Torres, H., Sepúlveda-Sánchez, J. D., & Shirai, K. (2009). Cross-linking chitosan into UV-irradiated cellulose fibers for the preparation of antimicrobial-finished textiles. *Carbohydrate Polymers*, 77(3), 536-543. <https://doi.org/10.1016/j.carbpol.2009.01.027>

Alonso-Segura, D., Hernández-García, L., Menchaca-Arredondo, J., Sánchez, M., Chamorro-Garza, B., & Garza-Hernández, R. (2021). The development and characterization of a cotton–chitosan composite for lead removal from water. *Polymers*, 13(13), 2066. <https://doi.org/10.3390/polym13132066>

Avcioglu, N., Birben, M., & Bilkay, I. (2021). Optimization and physicochemical characterization of enhanced microbial cellulose production with a new Kombucha consortium. *Process Biochemistry*, 108, 60-68. <https://doi.org/10.1016/j.procbio.2021.06.005>

Baghdad, K., & Hasnaoui, A.M. (2020). Zeolite–cellulose composite membranes: Synthesis and applications in metals and bacteria removal. *Journal of environmental chemical engineering*, 8, 104047. <https://doi.org/10.1016/j.jece.2020.104047>



© MARVID-Mexico

No part of this document covered by the Federal Copyright Law may be reproduced, transmitted or used in any form or medium, whether graphic, electronic or mechanical, including but not limited to the following: Citations in articles and comments Bibliographical, compilation of radio or electronic journalistic data. For the effects of articles 13, 162,163 fraction I, 164 fraction I, 168, 169,209 fraction III and other relative of the Federal Law of Copyright. Violations: Be forced to prosecute under Mexican copyright law. The use of general descriptive names, registered names, trademarks, in this publication do not imply, uniformly in the absence of a specific statement, that such names are exempt from the relevant protector in laws and regulations of Mexico and therefore free for General use of the international scientific community. VCIERMMI is part of the media of MARVID-Mexico., E: 94-443.F: 008- (www.marvid.org/booklets)