

# CHEMICAL CHARACTERIZATION OF DENTAL PASTES CONTAINING LATEX FROM *MACLURA TINCTORIA* (L.) GAUD. (MORACEAE)

Leticia Lopes dos Santos<sup>1</sup>  
Orlando Aguirre Guedes<sup>2</sup>  
Lucimar Pinheiro Rosseto<sup>3</sup>

## ABSTRACT

*Maclura tinctoria* (L.) Gaud. (Moraceae) is a medicinal plant popularly known as "moreira", used in folk medicine for its astringent, anti-inflammatory, and analgesic effects. Thus, this research aims to chemically characterize and compare the elements present in different paste formulations, using the combination of calcium hydroxide with *Maclura tinctoria* latex at different time periods (24 h to 6 months), as well as calcium hydroxide combined with saline solution, through laboratory analysis of scanning electron microscopy (SEM) and EDX microanalysis. The results showed that in the pastes of latex with calcium hydroxide, the Ca element remained with high peaks, not being present in the pastes of latex in its isolated form. It is concluded that *M. tinctoria* latex did not demonstrate interference in the dissociation of calcium hydroxide and in the concentration of the Ca element when compared to the calcium hydroxide paste with saline solution.

**Keywords:** *Maclura tinctoria*; traditional folk medicine; Scanning Electron Microscopy

## INTRODUCTION

*Maclura tinctoria* is a tree native to the Americas, popularly known as "moreira", which has been valued by traditional folk medicine for its medicinal characteristics, being used in different contexts to promote therapeutic benefits. It has been widely used due to its astringent, anti-inflammatory, and analgesic properties (LAMOUNIER, 2009).

Given this, there is interest in exploring its chemical properties and its application in dental pastes in detail. This analysis is essential to understand its properties and possible therapeutic effects. In this context, *Maclura tinctoria* latex stands out as a component of interest due to its reported medicinal properties.

The present study aims to chemically characterize the elements present in different paste formulations, using the combination of calcium hydroxide with 24-hour and 6-month *Maclura tinctoria* latex, as well as calcium hydroxide combined with saline solution. Furthermore, it seeks to compare the chemical characterization of these pastes associated with *Maclura tinctoria* with the calcium hydroxide paste in combination with saline solution.

---

<sup>1</sup>Discente da Universidade Evangélica de Goiás, E-mail: [leticialopesdossantos@hotmail.com](mailto:leticialopesdossantos@hotmail.com)

<sup>2</sup>Doutor em ciências da saúde (UFG), Docente da Universidade Evangélica de Goiás. E-mail: [orlandoaguedes@gmail.com](mailto:orlandoaguedes@gmail.com)

<sup>3</sup>Doutora em ciências (UNICAMP), Docente da Universidade Evangélica de Goiás. E-mail: [lucimar.rosseto@unievangolica.edu.br](mailto:lucimar.rosseto@unievangolica.edu.br)

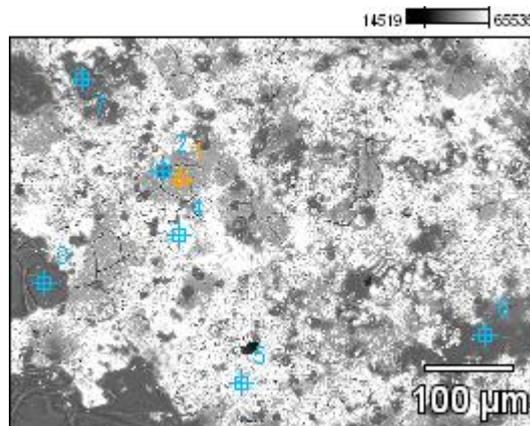
## METHODOLOGY

The latex collection occurred in Cerrado areas in the Terezópolis de Goiás region -- Goiás, so that 5 pastes could be prepared: Calcium hydroxide + *Maclura tinctoria* latex 24 hours; Calcium hydroxide + *Maclura tinctoria* latex 6 months; *Maclura tinctoria* latex 24 hours; *Maclura tinctoria* latex 6 months; Calcium hydroxide + saline solution. Fifteen tubes of 3mm by 5mm were made, using a caliper and a nº 15 scalpel blade. 3 tubes for each paste group were placed on a polished glass plate and with the aid of a nº 24 spatula, they were filled with small portions of the pastes to be evaluated. The groups underwent laboratory analysis through scanning electron microscopy (SEM) and EDX microanalysis for identification of the particles present.

## RESULTS

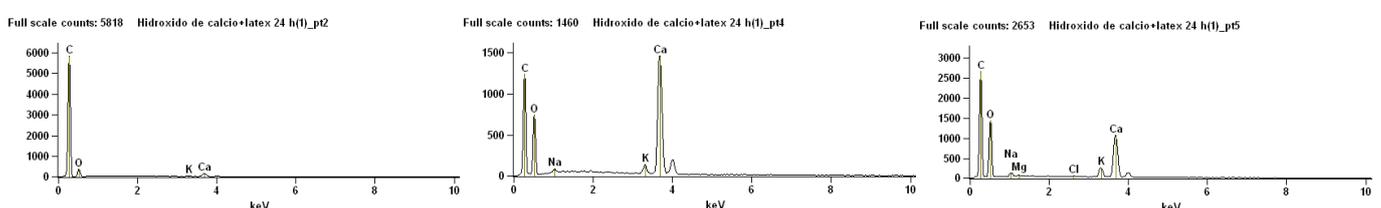
Of the five prepared pastes, the paste containing only *Maclura tinctoria* latex 24 hours did not reach the ideal consistency for performing the microscopic analysis and was excluded from the analyses. The calcium hydroxide + *Maclura tinctoria* latex 24 hours paste (Figure 1) showed high peaks of calcium (Ca) and traces of potassium (K), sulfur (S), sodium (Na), magnesium (Mg), and chlorine (Cl), showing changes in the peaks depending on the collection site for EDX microanalysis (Graphs 1).

**Figura 1.** Microscopia eletrônica de varredura da pasta de Hidróxido de cálcio + Látex de *Maclura tinctoria* 24 horas.



Fonte: Os autores, 2024.

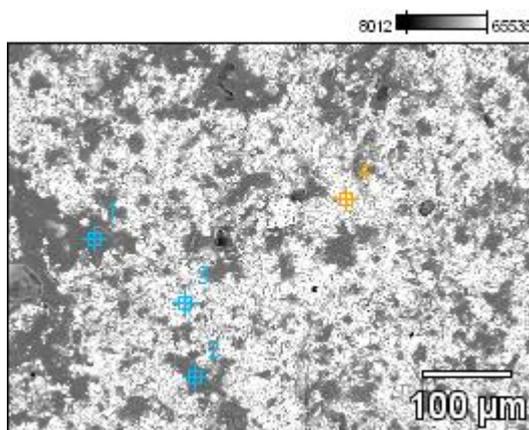
**Gráfico 1.** Microanálise por EDX da pasta de Hidróxido de cálcio + Látex de *Maclura tinctoria* 24 horas.



Fonte: Os autores, 2024.

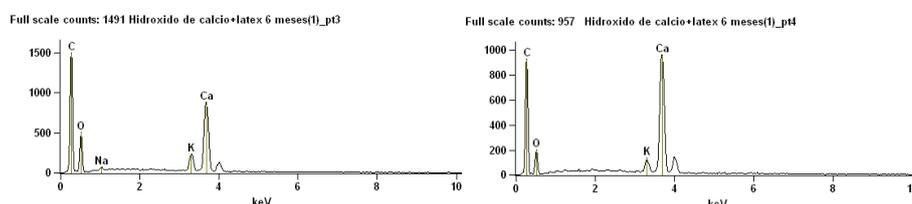
The analysis of the Calcium hydroxide + *Maclura tinctoria* latex 6 months paste (Figure 2) remained with high peaks of the  $\text{Ca}^{++}$  element and obtained traces of the elements  $\text{K}^+$  and  $\text{Na}^+$  (Graphs 2).

**Figura 2.** Microscopia eletrônica de varredura da pasta de Hidróxido de cálcio + Látex de *Maclura tinctoria* 6 meses.



Fonte: Os autores, 2024.

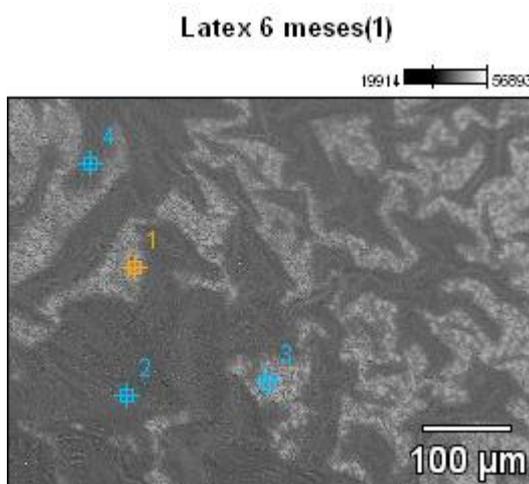
**Gráfico 2.** Microanálise por EDX da pasta de Hidróxido de cálcio + Látex de *Maclura tinctoria* 6 meses.



Fonte: Os autores, 2024.

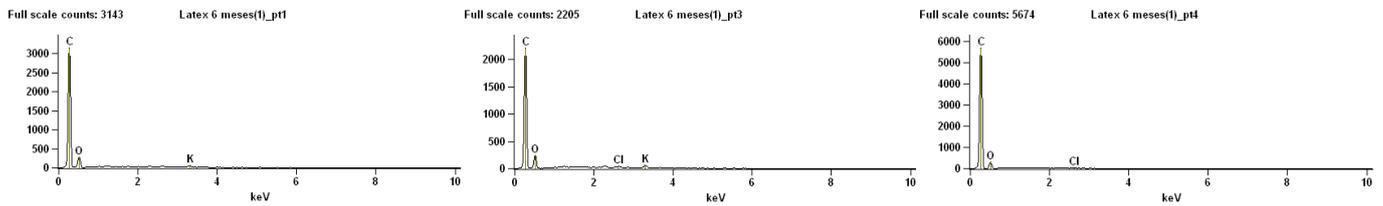
After using SEM and EDX analysis, the paste containing only *Maclura tinctoria* latex of 6 months (Figure 3) obtained only traces of the elements K and (Graphs 3).

**Figura 3.** Microscopia eletrônica de varredura do Látex de *Maclura tinctoria* 6 meses.



Fonte: Os autores, 2024.

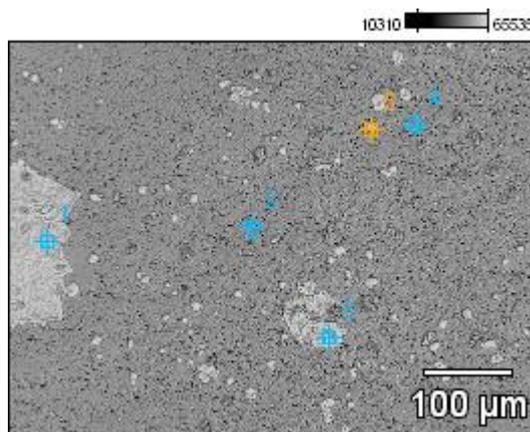
**Gráfico 3.** Microanálise por EDX do Látex de *Maclura tinctoria* 6 meses.



Fonte: Os autores, 2024.

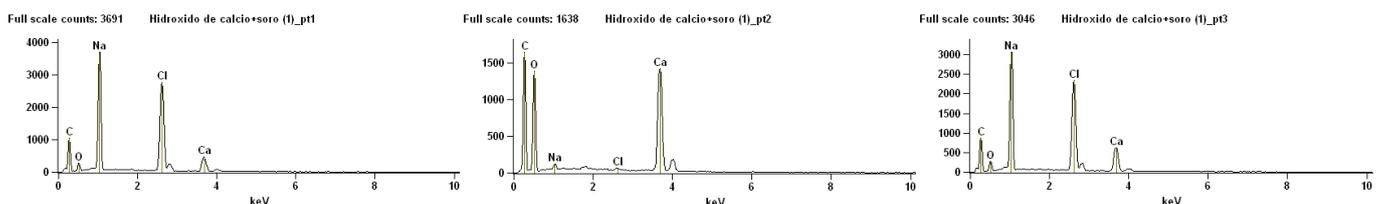
Finally, the paste containing Calcium hydroxide + saline solution (Figure 4) showed inversely proportional peaks of the elements Na and Cl in relation to the Ca element (Graphs 4).

**Figura 4.** Microscopia eletrônica de varredura da pasta de Hidróxido de cálcio + Soro fisiológico.



Fonte: Os autores, 2024.

**Gráfico 4.** Microanálise por EDX da pasta de Hidróxido de cálcio + Soro fisiológico.



Fonte: Os autores, 2024.

## CONCLUSION

The pastes analyzed by SEM with EDX microanalysis spectrum showed an irregular distribution of elements at the different collection points. In the pastes of latex with calcium hydroxide, the Ca element showed high peaks, not being present in the pastes of latex in its isolated form. However, the obtained results suggest that the association of the latex did not interfere in the dissociation and concentration of the Ca element from calcium hydroxide, being beneficial for dental purposes. For future studies, the evaluation of the properties and possible therapeutic effects of each element is suggested.

## REFERENCES

ALVARO, M.; ALEJANDRA, H.; ANTONIO, D. In vitro Antibacterial Activity of *Maclura tinctoria* and *Azadirachta indica* against *Streptococcus mutans* and *Porphyromonas gingivalis*. **British Journal of Pharmaceutical Research**, v. 7, n. 4, p. 291–298, 10 jan 2015.

AMORIM, L. F. G. et al. Antimicrobial analysis of different root canal filling pastes used in pediatric dentistry by two experimental methods. **Brazilian Dental Journal**, v. 17, n. 4, p. 317–322, 2006.

CHANG, R. et al. Atividade antimicrobiana da madeira e casca da *Maclura tinctoria* (L.) D. Don ex Steud. **Congresso Brasileiro de Química**, 2011.

DIAS, J. E.; LAUREANO, L. C. **Farmacopeia popular do Cerrado**. Goiás: Pacari, 352 p., 2009.

DINGUESLESKI, A. H.; THOMAS, G. V. Associação de agentes fitoterápicos em dentifrícios. **Associação de agentes fitoterápicos em dentifrícios Phytotherapeutic agents associate in dentifrices**, v. 13, p. 7, 1984.

ELSOHLY, H. N. et al. Antifungal chalcones from *Maclura tinctoria*. **Planta Medica**, v. 27, n. 1, p. 87–89, fev. 2001.

LAMOUNIER, K. C.; CUNHA, L. C. S.; PARRA, K. N. Atividade antimicrobiana de extratos da amoreira (*Maclura tinctoria* L.) sobre bactérias periodontopatogênicas. **Sociedade Brasileira de Química**, 2009.

MOLINA-SALINAS, G. M.; SAID-FERNÁNDEZ, S. A modified microplate cytotoxicity assay with brine shrimp larvae (*Artemia salina*). **Pharmacology online**, v. 3, p. 633–638, 2006.

SAMPAIO, F. C. Microanálise de superfície e caracterização química de cimentos endodônticos. 2013. 71 f. Dissertação (Mestrado em Odontologia) - Universidade Federal de Goiás, Goiânia, 2013.

TORRES, C. R. G. et al. Agentes antimicrobianos e seu potencial de uso na Odontologia. **Brazilian Dental Science**, v. 3, n. 2, 2000.