

**Effect of various pH of lactic and citric  
acids on fluoride release from two different  
fluoride emitting restorative materials**

***Thesis***

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**Rasha Ramadan Basheer Ali**

**B.D.S.**

**Faculty of dentistry  
Ain Shams University**

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# **Supervisors**

**Dr. Moukhtar Nagy Ibrahiem**  
*Professor of Operative Dentistry,  
Former Dean of Faculty of Dentistry,  
Ain Shams University*

**Dr. Omaima Hassan Ghallab**  
*Lecturer of Operative Dentistry,  
Faculty of Dentistry,  
Ain Shams University*

## **CONTENTS**

	<b>Page</b>
<b>Acknowledgement</b>	<b>i</b>
<b>Dedication</b>	<b>ii</b>
<b>List of Figures</b>	<b>iii</b>
<b>List of Tables</b>	<b>iv</b>
<b>Introduction.....</b>	<b>1</b>
<b>Review of Literature.....</b>	<b>3</b>
<b>Aim of the study.....</b>	<b>26</b>
<b>Materials and Methods.....</b>	<b>27</b>
<b>Results.....</b>	<b>39</b>
<b>Discussion.....</b>	<b>86</b>
<b>Summary and Conclusions.....</b>	<b>98</b>
<b>References.....</b>	<b>100</b>
<b>Arabic Summary .....</b>	<b>1</b>

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## **Dedication**

*I could never be grateful enough to my husband who helped me a lot to find the time to work on my research.*

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## **List Of Figures**

<i>(Figure 1): The Photac-Fil Quick Aplicap capsules.....</i>	<i>page 29</i>
<i>(Figure 2): The F2000 .....</i>	<i>page 29</i>
<i>(Figure 3): The specially designed Teflon mould.....</i>	<i>page 33</i>
<i>(Figure 4): The electronic sensitive balance.....</i>	<i>page 33</i>
<i>(Figure 5): The labeled and numbered glass tubes containing the specimens.....</i>	<i>page 33</i>
<i>(Figure 6): The pH meter connected with a glassy electrode.....</i>	<i>page 35</i>
<i>(Figure 7): The fluoride ion-selective electrode connected to a pH ion-selective electrode meter.....</i>	<i>page 35</i>
<i>(Figure 8): The environmental scanning electron microscopy.....</i>	<i>page 37</i>
<i>(Figure 9): Bar chart different weight changes of the two materials after storage in saline for different immersion periods.....</i>	<i>page 40</i>
<i>(Figure 10): Bar chart showing different weight changes of the two materials after storage in lactic acid for different immersion periods.....</i>	<i>page 43</i>
<i>(Figure 11): Bar chart showing different weight changes of the two materials after storage in citric acid for different immersion periods.....</i>	<i>page 46</i>
<i>(Figure 12): Bar chart showing different weight changes of the three solutions with (RMGI).....</i>	<i>page 51</i>
<i>(Figure 13): Bar chart showing different weight changes of the three solutions with (PMRC).....</i>	<i>page 55</i>
<i>(Figure 14): Bar chart showing the mean Fluoride ion concentrations in the two materials after storage in saline.....</i>	<i>page 56</i>

*(Figure 15): Bar chart showing the mean Fluoride ion concentrations in the two materials after storage in lactic acid.....page 58*

*(Figure 16): Bar chart showing the mean Fluoride ion concentrations in the two materials after storage in citric acid.....page 60*

*(Figure 17): Bar chart showing the mean Fluoride ion concentrations in the three solutions with (RMGI).....page 63*

*(Figure 18): Bar chart showing the mean Fluoride ion concentrations in the three solutions with (PMRC).....page 66*

*(Figure 19): SEM photographs of RMGI material surface after immersion in saline. [x1000]*

- a. Immediately fabricated*
- b. One day*
- c. One week*
- d. Two months*

*.....page 72*

*(Figure 20): SEM photographs of RMGI material surface after immersion in lactic acid (pH 2). [x1000]*

- a. Immediately fabricated*
- b. One day*
- c. One week*
- d. Two months*

*.....page 73*

*(Figure 21): SEM photographs of RMGI material surface after immersion in lactic acid (pH 3). [x1000]*

- a. Immediately fabricated*
- b. One day*
- c. One week*
- d. Two months*

*.....page 74*

***(Figure 22): SEM photographs of RMGI material surface after immersion in lactic acid (pH 4). [x1000]***

- a. Immediately fabricated***
- b. One day***
- c. One week***
- d. Two months***

.....***page 75***

***(Figure 23): SEM photographs of RMGI material surface after immersion in citric acid (pH 2) [x1000]***

- a. Immediately fabricated***
- b. One day***
- c. One week***
- d. Two months***

.....***page 76***

***(Figure 24): SEM photographs of RMGI material surface after immersion in citric acid (pH 3). [x1000]***

- a. Immediately fabricated***
- b. One day***
- c. One week***
- d. Two months***

.....***page 77***

***(Figure 25): SEM photographs of RMGI material surface after immersion in citric acid (pH 4) [x1000]***

- a. Immediately fabricated***
- b. One day***
- c. One week***
- d. Two months***

.....***page 78***



*(Figure 26): SEM photographs of PMRC material surface after immersion in saline. [x1000]*

- a. Immediately fabricated*
- b. One day*
- c. One week*
- d. Two months*

.....page 79

*(Figure 27): SEM photographs of PMRC material surface after immersion in lactic acid (pH 2). [x1000]*

- a. Immediately fabricated*
- b. One day*
- c. One week*
- d. Two months*

.....page 80

*(Figure 28): SEM photographs of PMRC material surface after immersion in lactic acid (pH 3). [x1000]*

- a. Immediately fabricated*
- b. One day*
- c. One week*
- d. Two months*

.....page 81

*(Figure 29): SEM photographs of PMRC material surface after immersion in lactic acid (pH 4). [x1000]*

- a. Immediately fabricated*
- b. One day*
- c. One week*
- d. Two months*

.....page 82

*(Figure 30 SEM photographs of PMRC material surface after immersion in citric acid (pH 2). [x1000]*

- a. Immediately fabricated*
- b. One day*
- c. One week*
- d. Two months*

.....page 83

*(Figure 31): SEM photographs of PMRC material surface after immersion in citric acid (pH 3). [x1000]*

- a. Immediately fabricated*
- b. One day*
- c. One week*
- d. Two months*

.....page 84

*(Figure 32): SEM photographs of PMRC material surface after immersion in citric acid (pH 4). [x1000]*

- a. Immediately fabricated*
- b. One day*
- c. One week*
- d. Two months*

.....page 85

### **List Of Tables**

Table (1): Materials used in this study.....	page 27
Table (2): Experimental design for the levels of investigations.....	page 38
Table (3): Factorial design and variable interaction for the experiments of two different fluoride emitting materials .....	page 38
Table (4): The means and standard deviation (SD) values of Student's t-test for RMGI and PMRC materials after storage in saline for different immersion periods.....	page 39
Table (5): The means and standard deviation (SD) values of Student's t-test for RMGI and PMRC after storage in Lactic acid for different immersion periods.....	page 41
Table (6): The means and standard deviation (SD) values of Student's t-test for RMGI and PMRC after storage in Citric acid for different immersion periods. ....	page 44
Table (7): The means and standard deviation (SD) values, results of ANOVA and Tukey's tests for the three solutions with (RMGI).....	page 47
Table (8): The means and standard deviation (SD) values, results of ANOVA and Tukey's tests for the three solutions with (PMRC).....	page 52
Table (9): The means and standard deviation (SD) values of Student's t-test for the mean Fluoride ion concentrations in the two materials after storage in saline.....	page 57

Table (10): The means and standard deviation (SD) values of Student's t-test for the mean Fluoride ion concentrations in the two materials after storage in Lactic acid.....	page 58
Table (11): The means and standard deviation (SD) values of Student's t-test for the mean Fluoride ion concentrations in the two materials after storage in Citric acid.....	page 60
Table (12): The means and standard deviation (SD) values of ANOVA and Tukey's tests for the mean Fluoride ion concentrations in the three solutions with (RMGI).....	page 62
Table (13): The means and standard deviation (SD) values of ANOVA and Tukey's tests for the mean Fluoride ion concentration in the three solutions with (PMRC).....	page 65
Table (14): The mean differences and standard deviation (SD) values of paired t-test for the changes by time in mean weight loss of (RMGI).....	page 68
Table (15): The mean differences and standard deviation (SD) values of paired t-test for the changes by time in mean weight loss of (PMRC).....	page 69
Table (16): The mean differences and standard deviation (SD) values of paired t-test for the changes by time in mean Fluoride release of (RMGI).....	page 70

Table (17): The mean differences and standard deviation (SD) values of paired t-  
test for the changes by time in mean Fluoride release of  
(PMRC).....page 71

The increasing availability of adhesive materials and techniques has improved the capability of the restorative dentist to treat caries in a conservative manner. While amalgam continues to be used as a restorative material worldwide, its lack of innate bonding capability makes it generally unsuitable for the restoration of the minimal lesion because the achievement of adequate resistance and retention form for such an amalgam restoration may require removal of considerable amounts of sound tooth substance. The use of materials that may be bonded to tooth substance is therefore encouraged.

Since the observation that secondary caries formation was rarely associated with fluoride-containing silicate cement restorations, increasing attention has been focused on the development of various fluoride-releasing products, to be used as restorative materials, lining cements, sealants and orthodontic cements.

Fluoride is well documented as an anticariogenic agent. A variety of mechanisms are involved in the anticariogenic effects of fluoride, including the reduction of demineralization, the enhancement of remineralization, the interference of pellicle and plaque formation and the inhibition of microbial growth and metabolism <sup>(1-4)</sup>. Fluoride released from dental restorative materials is assumed to affect caries formation through all these mechanisms and may therefore reduce or prevent demineralization and promote remineralization of dental hard tissues.

Today, there are several fluoride-containing dental restoratives available in the market including glass-ionomers, resin modified glass-ionomer cements, polyacid-modified composites (compomers), composites

and amalgams. Due to their different matrices and setting mechanisms the products vary in their ability to release fluoride. However, it is assumed that the antibacterial and cariostatic properties of restoratives are often associated with the amount of fluoride released.

Glass-ionomer cements may have the benefit of fluoride release, although the effect of this on reduction of secondary caries is presently the subject of debate. These materials may have the benefit of less technique-sensitive placement as compared to resin composite <sup>(5)</sup>.

The elution of fluoride is a complex process. It can be affected by several intrinsic variables, such as formulation and fillers of the different restoratives. It is also influenced by experimental factors, such as, storage media, frequency of change of the storage solution, composition and pH-value of the storage solutions <sup>(6)</sup>.

The aqueous phase of glass ionomer cements enables fluoride ions to diffuse and to be released from the material. The matrix of resin composites is much less hydrophilic, and fluoride incorporated in the material is only released in small amounts <sup>(7)</sup>.

The initial fluoride release from all types of glass-ionomer was maximum during the first 24 hours and then decreased <sup>(8)</sup>.

The simultaneous release of fluoride and aluminum from dental materials in various acidic media must be taken into account when the anticariogenic potential is assessed <sup>(9)</sup>.