

# EFFECTIVENESS OF ADDING HOME BLEACHING TIME WITH 10% CARBAMIDE PEROXIDE: LITERATURE REVIEW

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**Abstract.** Changes in the color of teeth to become darker are a lot of complaints by the public. Bleaching is a whitening treatment for teeth that have changed color. Home bleaching is a bleaching that can be done at home under the supervision of a dentist using 10% carbamide peroxide for a period of more than 2 weeks. The purpose of this study was to determine the effectiveness of 10% carbamide peroxide as a home bleaching agent with an extended period of time against tooth discoloration. This type of research is Literature Review using Google Scholar, Web of Science, and Pubmed using keywords that have been carried out, obtaining 9 articles that match the research criteria. The results showed that 10% carbamide peroxide with an application of more than 2 weeks gave effective and stable results, but the effect was also greater. The use of 10% carbamide peroxide as a home bleaching agent with an additional effective time for discoloration was seen based on a literature review.

**Keywords:** home bleaching; 10% carbamide peroxide; increased bleaching time; tooth discoloration.

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## INTRODUCTION

Tooth discoloration is a common complaint by the public. The discoloration makes a person uncomfortable, therefore it is necessary to have a whiter teeth whitening treatment that is whiter than before with aesthetic goals ([Luque-Martinez et al., 2016](#)). Teeth whitening or *bleaching* has now become a *trend*, namely in *office bleaching* and *at home bleaching* ([Abusteit et al., 2022](#)). Materials that are often used are hydrogen peroxide and carbamide peroxide ([Llena et al., 2020](#)).

Carbamide peroxide has the advantage of being able to give a greater white color effect on the teeth, and a lower risk of sensitivity and gingival irritation ([Rezende et al., 2019](#)). Carbamide peroxide can be used at a concentration of 10%-37% ([L Darriba et al., 2019](#)). A safe and effective concentration used according to the *American Dental Association* (ADA) is a concentration of 10%. These concentrations can be used in *at-home bleaching* ([Rea et al., 2019](#)). Carbamide peroxide 10% can be used as *home bleaching* with a usage time of 2-8 hours per day for 2 weeks. The 2 weeks is the time according to the manufacturer's instructions for using *home bleaching* ([De Almeida et al., 2012](#)); ([Kossatz et al., 2012](#)).

The results *bleaching* with 10% carbamide peroxide as *home bleaching* gave better color results than before, no pain and no other complaints ([Serraglio et al., 2016](#)); ([Markowitz, 2010](#)). Carbamide peroxide 10% can be used as *home bleaching* within 2-3 weeks by

producing a better and more stable color. The longer the treatment duration from *home bleaching*, the better the results ([Oh et al., 2017](#)); ([He et al., 2012](#)).

Based on the above background, researchers are interested in studying and reviewing the use of 10% carbamide peroxide as *home bleaching* with additional time for tooth discoloration in a *literature review*. This study aims to determine the effectiveness of using 10% carbamide peroxide as home bleaching with the addition of time to tooth discoloration.

## METHODS

The study was in the form of a literature review by collecting data on the use of 10% carbamide peroxide as *home bleaching* against tooth discoloration with an extended period of time. The data presented in this article were obtained from previous research using the keywords carbamide peroxide 10% "OR" "*carbamide peroxide 10%*" AND "*home whitening*" OR "*home bleaching*" AND "*Additional bleaching time*" OR "*long treatment duration bleaching*" AND "*tooth discoloration*" OR "*bleaching*". Then a literature search of journals and scientific articles was carried out for the last 10 years (2011-2021) through the *Pubmed*, and *Web of Science*, then *screening research articles* to eliminate duplication or *article* the same *the database* used, the *research article* was in accordance with the inclusion criteria (Indonesian and English articles, *full text*), assessing the quality and feasibility of the articles obtained, and determining the

research article to get a solution to the research problem then concluded.

obtained 7 articles related to the use of 10% carbamide peroxide as *home bleaching* with an extension of time. The data are presented in Table 1.

**RESULTS AND DISCUSSION**

Based on the results of the literature search that has been carried out, I

**Table 1.** Results of literature review

Materials	Procedural	Research Results	Reference
Carbamide peroxide 10%	Using 10% carbamide peroxide applied using a <i>custom tray</i> for 2 hours a day. Consists of 50 respondents with group A (2 weeks) and group B (3 weeks).	Daily application for 3 weeks produces a better effect than 2 weeks. This effect is seen as soon as 1 to 6 months later. The results of the treatment look better and more stable.	[Darriba] <sup>5</sup>
Carbamide peroxide 10% and 20%	100 participants aged 18-42 years were studied using <i>bleaching</i> with application using a <i>custom tray</i> for 2 hours every night for 3 weeks. While measurements in the participant's clinic were carried out by the application of 35% or 38% hydrogen peroxide according to the manufacturer's instructions for use. Then evaluated before, 1 week of treatment, 2 weeks of treatment, 3 weeks of treatment and 2 weeks of post-treatment.	The use of 10% and 20% carbamide peroxide which is done at home and 35% and 38% of hydrogen peroxide which is done in the clinic has the same effectiveness in teeth whitening	[Basting] <sup>8</sup>
• - Carbamid e peroxide 10% • - Hydrogen	techniques <i>bleaching</i> . technique <i>Home bleaching</i> : the patient is made a <i>custom tray</i>	The results obtained were bleaching on the same bleaching	[Moghadam] <sup>9</sup>

Materials	Procedural	Research Results	Reference
Peroxide 38%	with carbamide peroxide gel applied every 4 hours a day for 2 weeks. <i>In office</i> hydrogen peroxide is applied according to the manufacturer's regulations. Then measured sensitivity, color change and color stability 2 weeks during treatment, 1, 3 and 6 weeks after treatment.	technique and tooth sensitivity was obtained after the application of <i>bleaching</i> on both but the white color returned faster in the <i>power bleaching technique</i> , and the color returned to its original color in both techniques after 6 months of application.	
1. - Carbamide peroxide 10%	31 participants who have used carbamide peroxide using <i>a night guard</i> that is used at home using 10% carbamide peroxide applied for 6-8 hours for 2-6 weeks. Then an evaluation was carried out after 6 weeks.	The use of 10% carbamide peroxide in <i>nightguard vital bleaching</i> had low side effects such as gingival inflammation, pulp inflammation, external root resorption and no evidence of malignancy and no soft tissue pathological signs were found, and the patient was satisfied with the treatment after 17 years. .	[Boushell] <sup>10</sup>
•- Carbamide peroxide 10% •- Hydrogen Peroxide 10% and 16%	50 participants who were <i>bleached</i> using the <i>split mouth bleaching</i> , participants were divided into 2 groups using carbamide peroxide and 2 other groups using hydrogen	There is a statistically significant degree of color change. After 45 days of treatment the patient was satisfied with the results, there was no gingival	[Bernardon] <sup>11</sup>

Materials	Procedural	Research Results	Reference
	<p>peroxide 10% and 16% application of this material every 2 hours a day for 3 weeks, then measured 15, 30, 45 and 180 post-treatment.</p>	<p>irritation, carbamide peroxide 10% can cause sensitivity compared to carbamide peroxide 16% and 15%. Because 16% carbamide peroxide contains potassium nitrate.</p>	
<p>Carbamide peroxide 10%</p>	<p>60 smokers and 60 non-smokers were measured for color change with the condition that the teeth were A2 or darker. Then <i>bleaching</i> with 10% carbamide peroxide for 3 hours a day for 3 weeks. Then the color evaluation was carried out using a <i>shade guide</i> and a spectrophotometer. Evaluations were carried out before, during, after (1 week to 6 months) and then sensitivity measurements were made using a <i>sensitivity analog scale</i>.</p>	<p>Smokers and non-smokers showed a significant color change since one week after the application of 10% carbamide peroxide with an application time of 3 hours a day for 3 weeks statistically measured using a spectrophotometer. The side effect of this whitening is that the teeth become sensitive.</p>	<p>[De Geus]<sup>12</sup></p>
<p>Carbamide peroxide 10% and 15%</p>	<p>Smokers and non-smokers showed a significant color change since one week after the application of 10% carbamide peroxide with application time of 3 hours a day for 3 weeks statistically measured using a</p>	<p>There was no difference in color change in the four teeth whitening ingredients, namely hydrogen peroxide (7.5% and 9.5%) and carbamide peroxide (10% and 15%). However,</p>	<p>[De la Pena]<sup>13</sup></p>

Materials	Procedural	Research Results	Reference
	<i>spectrophotometer.</i> The side effect of this whitening is that the teeth become sensitive.	there are differences in the increase in brightness (L*) and hue (h*) after application as well as a decrease in chromaticity (C*).	

Research shows that the presence of 10% carbamide peroxide can make teeth whiter with an extended period of time. The color of the teeth in each individual varies from white to brownish yellow and becomes darker with age ([Riani et al., 2015](#)). Tooth discoloration or tooth discoloration can be caused by several factors, including intrinsic and extrinsic factors. Intrinsic factors include systemic causes, metabolism, genetics, while extrinsic factors include food, drink and drugs 13.

*Bleaching* is a procedure for whitening teeth to be whiter than before using chemicals for aesthetic purposes ([Cvikl et al., 2016](#)). Chemicals that can be used as *bleaching* hydrogen peroxide 16. and techniques *Bleaching* are divided into two, namely *in office bleaching* and *at home bleaching* ([Syafriadi & Risa, 2011](#)).

Carbamide peroxide has a safe and effective concentration as a *home bleaching* with a concentration of 10%. *Bleaching* done at home has the advantages of being safe, relatively easy to do, affordable prices, and a high percentage of success. Haywood and Heyman used home bleaching for the first time with the application of 10% carbamide peroxide gel on a night guard for 7 hours within 14 days giving effective. Longer treatment can provide better *bleaching* and

also improve color stability.

The effectiveness of 10% carbamide peroxide as home *bleaching* has been carried out by Darriba with the results of *bleaching* at week 3 with application 4 hours a day carried out at home giving better results and the white effect produced is much more stable than at week 2. The use of 10% carbamide peroxide for 1.5 months at home used for 2 hours every day provides effective results with success rates of 82% for 3 years, and 42% for 10 years.

Side effects caused by increasing treatment time vary. These side effects can affect the hard tissues of the teeth and soft tissues. Side effects on hard tissue, decreased calcium, phosphate, phosphorus contained in enamel minerals, degradation of enamel, demineralization of teeth which can affect the structure of the hardness and roughness of the enamel surface which can cause caries, and easy fracture of teeth ([Anwar & Tjokro, 2018](#)). Other side effects such as tooth sensitivity caused by the penetration of peroxide through the enamel and dentin tubules to the pulp. To reduce this sensitivity, a desensitizing agent can be applied to the bleaching material before or during the *bleaching treatment* 11.

Side effects on soft tissues such as gingival irritation and mucosal irritation. This

is due to an error in the use of the *costume tray* (*custom tray chemicals bleaching*). To

## CONCLUSIONS

The use of 10% carbamide peroxide as a *home bleaching agent* with increasing effective time against tooth discoloration. The results *bleaching* with 10% carbamide peroxide as *home bleaching* gave better color results than before, no pain and no other complaints. Carbamide peroxide has a safe and effective concentration as a *home bleaching* with a concentration of 10%. Longer treatment can provide better *bleaching* and also improve color stability. *bleaching* at week 3 with application 4 hours a day carried out at home giving better results and the white effect produced is much more stable than at week 2 statistically measured using a *spectrophotometer*. The use of 10% carbamide peroxide for 1.5 months at home used for 2 hours every day provides effective results with success rates of 82% for 3 years, and 42% for 10 years.

However, with increasing time, the resulting effect is getting bigger. Side effects on hard tissue, decreased calcium, phosphate, phosphorus contained in enamel minerals, degradation of enamel, demineralization of teeth which can affect the structure of the hardness and roughness of the enamel surface which can cause caries, and easy fracture of teeth. Other effect sensitivity caused by the penetration of peroxide through the enamel and dentin tubules to the pulp. gingival irritation and mucosal irritation is also effect for soft tissue. To reduce these

reduce these side effects, it is necessary to adjust the individual tray so as not to press the soft tissue.

side effects, it is necessary to adjust the individual tray so as not to press the soft tissue, to reduce this sensitivity, a desensitizing agent can be applied to the bleaching material before or during the *bleaching treatment*.

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