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Short Communication

Caffenol-C: a viable alternative to conventional radiographic developer

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ABSTRACT

Current radiographic developers are considered detrimental and hence there is a constant quest for less harmful products. Caffenol-C a liquid concoction of household materials is considered as an alternative photographic developing agent. However, its usage in radiology has not been evaluated. Considering this, the present work was conducted to assess the utility of caffenol-C in processing dental radiographs. 2.6 g of instant coffee and vitamin C powder is mixed in 22.5 ml of water. Then 1.6 g of washing soda is dissolved in another 22.5 ml of water. Both the solutions are then mixed to make the final caffenol-C preparation. The preparation is then used for processing of dental radiographs and evaluated for its diagnostic quality. Radiographs developed with caffenol-C preparation showed excellent contrast and density. The optimum developing time was found to be 10 min. The present work observed that the radiographs processed with caffenol-C preparation had good diagnostic quality and thus it appears to be a viable alternative.

Keywords: Dental, Processing, Coffee

INTRODUCTION

Processing of dental radiographs require suitable agents. With the advancements in science, newer agents with increased speed of processing and high-quality images are on the rise. However, financial constraints, cumbersome preparation and hazardous constituents extrapolates the need for an alternative.

In 1995, Dr. Scott Williams proposed the usage of household materials to develop photographic film.[1,2] Since then, tea, coffee, orange juice, washing soda, wine, vanilla extract, vitamins, iron supplements etc., were experimented for developing photographs.[1,3] Amongst them the mixtures of coffee and vitamin C (called as caffenol-C) was found to highly impressive.[4,5] Considering this, the present work was conducted to assess the usage of caffenol-C in processing dental radiographs

METHODS

The following equipment's and ingredients were utilized for the preparation- measuring cup 1 nos, glass beaker- 2 nos, glass stirrer- 3 nos, 45 ml of water, 2.6 g of instant coffee, 1.6 g of washing soda and 0.25 g of vitamin C powder.

45 ml of water is divided into two equal parts i.e., 22.5 ml each and poured into two glass beakers. To the first beaker, 2.6 g of instant coffee powder, 0.25 g of vitamin C powder is added and stirred well. To the second cup, 1.6 g of washing soda is added and stirred. After ensuring that the washing soda have dissolved, it is poured into the beaker containing instant coffee and vitamin C mix. The mix is now stirred well to make the final caffenol-C preparation (Figure 1).

Processing of dental radiograph with caffenol-C is similar to the conventional method. The exposed film is dipped in

to caffenol-c developing agent, washed and fixed with regular fixing agent. The optimum time and exposure parameters are beyond the scope of this article; however, it is advisable to follow visual method of processing for better control and to obtain an ideal image.

Figure 1: Caffenol-C preparation.

RESULTS

In the present work, the optimum developing time was found to be 10 min (Figure 2). The films which were developed for 15 min appeared darker and the one developed for 5 min appeared light. Interestingly, another film developed 24 hr later for 10 min appeared light. This indicate the limited shelf life of the preparation and this is due to the absence of any preservative or buffering agent in the caffenol-C preparation.[3]

Figure 2: Radiograph processed with Caffenol-C.

DISCUSSION

Caffenol-C is a liquid concoction of instant coffee crystals, vitamin C powder, washing soda and water.[1,3,5,6] Caffeic acid in coffee is considered as an excellent reducer and thus can work well as a developing agent.[2] Vitamin C, it is considered to be hyper-additive to Caffeic acid and gets transformed to ascorbate when diluted in an alkaline medium.[2] It also improves contrast, reduces fog and aids in homogenous distribution of all ingredients. Washing soda in Caffenol-C provides alkalinity and play major role in activating the developing agent.[2] Apart from these basic ingredients few studies have suggested the addition of iodised salt/ potassium bromide to the preparation to act as a restrainer.[2]

Over the years, various methodologies have been employed for the preparation of caffenol-C and each has suggestions for maintenance of temperature, number of agitation and developing time.[2,7] The ratio of constituents used for caffenol-C preparation in this work is modified version of Matt Richardson recipe.[7]

The used caffenol-C solution can be filtered and disposed through bio-medical waste management authorities. Another alternative would be pouring the developer into a container with steel wool, this would allow the silver to bind with the wool and the residual liquid can then be discarded.[5]

The merits of caffenol-C include its easy availability, instantaneous preparation and environmental friendliness. Their demerits include lengthy processing time, residual brownish stains, lack of commercial preparation and limited shelf life, due to absence of preservatives.

CONCLUSION

Caffenol-C is eco-friendly, simple to prepare and use. It is apparent that caffenol-C can provide images that are equivalent to traditional developing agents. Through wider experimentation and practice caffenol-C can emerge as a better alternative radiographic developing agent in the future.

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