In search of developing a self disinfecting alginate impression material, the present study conducted to evaluate the mixing characteristics of commercially available alginate dental impression material with three distinct disinfectant solutions. Four commercially available alginate powders were selected as A: Tropicalgin, B: Cavex CA 37, C: KROMOPAN, D: United Alginate. Disinfectant solutions also were selected as I: Isopropyl alcohol 70%, II: Hydrogen peroxide-6%, III: Povidone- Iodine-10%. The mixing procedure was standardized by choosing a consistent manufacturer recommended powder to liquid ratio for all type of test materials. From the result obtained, it is observed that consistency suitable for impression making was obtained only with 6% hydrogen peroxide and 10 % povidone iodine for all types of alginate powders. A sandy like consistency, which is not suitable for dental impression, was obtained with isopropyl alcohol for all four types of alginate.

**KEYWORDS**

Alginate, Impression Material, Disinfection, Consistency

1. **Introduction**

Irreversible hydrocolloid impression material, alginate is developed in the year 1930s and has been a “material of choice” for making diagnostic and/or primary impression since ages [1]. Alginate is common due to the ease in manipulation and cost effective with acceptable degree of accuracy. However, hydrocolloid impression materials show imbibition of blood and saliva, which can cause infectious impression [2]. These contaminated alginate impressions may spread infectious disease such as hepatitis B, tuberculosis, herpes and AIDS to the persons involved in handling the same [3]. Therefore, it is recommended to disinfect all surfaces that splashed or touched with human body fluids [4]. Disinfection procedures such as disinfectant immersion/ spraying is usually employed to eliminate possible routes for transmission and cross contamination of the infectious diseases [2-5]. Alginate is prone to distortion after disinfection procedure [5]. Disinfection refers to the destruction of pathogenic organisms physically or chemically. A variety of disinfectants are available for destroying the pathogenic microorganisms of dental impression by immersion or spraying technique [6]. However, the effect of mixing these disinfectant solutions with alginate powder have not studied much. Therefore, the present study focussed on the manipulative characteristics of some of the competent disinfectants employed in dentistry.

2. **Materials & Methods**

2.1 **Materials**

Four commercially available alginate powders and disinfectant liquids were taken as A, B, C, D and I, II, III

A: Tropicalgin (Lot no. 193014, Zhermack clinical, Itali),
B: Cavex CA 37 (Lot No. 150501, Cavex Holland BV, Holland)
C: KROMOPAN (Lot No. 225451, Vannini Dental industry, Itali)
D: United Alginate (Lot No. EOT 243D0, Major prodotti Dentari SpA. Itali)
I: Isopropyl Alcohol 70% (Batch No.9N628B9, Greencross incorporated, Philippines)
II: Hydrogen Peroxide- 6% (Batch No. 08001116, Suncare Pharma, KSA)
III: Povidone- Iodine-10% (Batch No. 70100 Avalon Pharma, KSA)

2.2 **Methods**

Control and test groups were set for the study. Water chose as the liquid medium for control group. Three different types of commercially available disinfectants (I, II &III) were considered as the liquid mediums for test groups. Rubber bowl and curved stainless steel spatula used for manipulation. Plastic measuring scoop and cylinder opted for the proper measurement of powder and liquid. The ratio was taken as 7.5gm powder and 24ml of liquid as per the manufacturer recommendation. The mixing qualities of all four different types of alginate powders with control and test solutions were established. An ideal mix of alginate would be smooth creamy and will not drip off from the spatula when the mix is raised [7], resultant mixes were graded as follows by observing the final mix. 2= Excellent (glossy surface and no dripping material out of spatula), 1= good (no glossy surface and no dripping), 0= bad (sandy consistency)

3. **Results:**

Figure 3.1 Quality of the final mix of control and test groups

**Images and Figures:**

- Figure 3.1: Quality of the final mix of control and test groups
Isopropyl alcohol is a colourless, volatile liquid has three carbon, eight hydrogen and one oxygen atoms (CH₃CHOHCH₃) [6]. The solubility of alginate in a solvent is highly depends on pH, ionic strength and gelling strength of the solvent [16-17]. However, it is reported that if the alcohol content is more than 30% in the liquid medium, alginate powder cannot get dissolved. Alginate shrinks at high pH. Therefore, no ions will be released for the reaction to occur [18]. The present study agrees with this concept because all four varieties of alginate were unable to mix well with isopropyl alcohol (Figure 3.2).

Hydrogen peroxide is a very pale blue liquid becomes colourless in dilution. It is slightly more viscous than water. It is a weak acid and has strong oxidizing properties. Unstable hydrogen peroxide gets decomposed readily as oxygen and water with release of heat accelerated the reaction procedure and a smooth mix obtained in the present study upon spatulation indicates the possibility of mixing alginate impression material with hydrogen peroxide disinfectant liquid [8-10].

Povidone Iodine 10% compromises 90% of water and 8.5% povidone and remaining iodine [19]. The result obtained implies that povidone iodine liquid mixes similar to that of control group may be due the water content in it. Therefore the present study agrees with other researchers suggest that the alginate powder can dissolve easily in aqueous and aqueous based solutions rather than any other liquid medium [16-17, 19].

3. Conclusion:
Isopropyl alcohol cannot be used as a medium for mixing alginate powder. Hydrogen peroxide and povidone – iodine are suitable for mixing alginate powder to obtain the self-disinfecting impression. Because of the brown colour of povidone- iodine, chromatic alginites didn't show colour change during setting. However other properties must be measured to understand the feasibility of these disinfectants as a liquid medium in alginate manipulation.

REFERENCES