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Alginate stability during a time

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Original Research Article

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Abstract: Alginate impression materials are most commonly used materials to take preliminary impression during the prosthetic treatment. They have several advantages, like hydrophilic properties during the contact with saliva or gypsum, easy to dose and cheap compare to other type like silicone for example. With alginate, it is a common problem with the stability during the time especially after opening the original container. Each raw material used during the alginate production contain a small concentration of water, and after storage it catalase the reaction in solid phase. Purpose of this study was to test the alginate impression materials storage at room temperature during a time, to see the change in the mechanical properties.Seven kinds of commercial alginate were storage in plastic jars after opening the original containers during 3 months' time. One composition of alginate was prepared in laboratory condition and tested in the same conditions like market products. Before preparing this composition sample of each raw material was tested at the water concentration. Following mechanical properties of alginate were tested during the ageing time: setting time, compressive strength, recovery for deformation, strain in compressive and compatibility with gypsum. Alginate impression materials after storage have lower mechanical properties compressive strength after 3 months is reduced about 10%, setting time is shorter, permanent deformation is increasing about 10 % from original value. All the commercial materials, Heraus Alligat Chroma (Heraeus Kultzer), Aroma Fine Plus (GC) Hydrogum 5, Hydrocolor 5 (Zhermack), Kromopan (Lascod), Ypeen Premium, Elastic Cromo (Spofa) and sample X1 pass ISO 1563:1990. Alginate impression materials must be storage at original container, to protect from external humidity. After opening the package materials should be storage in plastic jars good closed. Raw material for alginate impression material production contains some water, which can change the properties of material during time.
Keywords: alginate impression material, stability, mechanical properties

INTRODUCTION

Alginate impression material was introduced in the 1940 in USA, like an alternative for agar base technique [1,2]. Alginates are naturally derived linear copolymers of 1,4-linked β-d-mannuronic acid and α-l-guluronic acid residue. Similar to them agar (which contains agarose) belong to the same family of polysaccharides origin from marine plants. Booth are referred like elastic impression materials. At the present time, hydrocolloids and synthetic elastomeric polymers are among the most commonly used materials to make impressions for the various areas of the dental arch. Alginate impression materials have a lot of advantage like hydrophilic properties, low cost, no too higher pressure on the mucosa. Because the ideal impression material doesn't exist, alginates have some disadvantages too. They don't transfer as much surface details to gypsum dies as agar or rubber impressions do, and the storage of the final impression is a critical characteristic for them [2].

Compare to the agar when during taking an impression took place physical changes (form sol to gel), alginate are going chemical reaction of crosslinking alginic acid with calcium ions. This reaction is irreversible. Such reaction took place after mixing with the water, but in the same time all of raw materials contain some percentage of water and material can absorb the moisture form the air [2,3].

Alginate impression material is delivered by the producers in the powder form. This before first opening has to be shaken to obtain the same composition of the powder in whole volume, because during the transport and storage of material some separation between particles can occur. After opening

the original package powder has to be placed in plastic jar to protect the material under the influence of humidity [3]. In some dental office such package is consuming very quickly during one two weeks but in some cases material is storage for a longer time. Each opening and closing of the jar can be potential way for water absorption. The physical, mechanical, and chemical properties of alginates may be affected by the period of time they are stored [3].

Some producer of alginate impression material to foresee this problem are making short time accelerated aging tests at higher temperatures , for example 60 days at 37C in 100% humidity or shorter time at higher temperature (US patent US 4,911,759) But the results from such investigation are no public.

The purpose of this study was to determine storage duration effect of repacked alginates from original packages to plastic jar on some mechanical properties like setting time, compressive strength, recovery for deformation, strain in compressive and compatibility with gypsum.

MATERIALS AND METHODS

Sample preparation

For the laboratory samples preparation it was used screw laboratory mixer and plastic jar (Ruzicka 91).Speed of the mixer was establish at 60 rpm. On the beginning the jar was filled with diatomic earth Celite 281 (Imerys) 150 g, propylene glycol (Sigma Aldrich) 2 g, and mint aroma (Aroco) 2g green pigment 1g. This pre- mixture was mixed during 2 minutes to proper dispersion of liquid ingredients inside the Celite, and for the protection from dust. After mixing, it was add the rest of raw materials: potassium hexafluoro titanate (Sigma Aldrich) 4.6 g, magnesium oxide (Sigma Aldrich) 3 g, calcium sulfate dehydrate (Sigma Aldrich) 13g, without sodium alginate (Protanal TA, Pronova Biopolymers) 24 g, and sodium triphosphate (Sigma Aldrich) 2g. The powder was mixed 2 minutes. In other container was mixed very carefully Na3PO4 and sodium alginate, about 1 minute. At the end the mixture of sodium phosphate and sodium alginate was added to the main container and all this material was mixed 5 minutes to obtain a good dispersion and homogeneity. For comparison of alginate impression material prepared in laboratory 7 commercial products were tested. Information are shown in Table 1

Table-1: Seven commercial products were buying form the market. Details are shown in bellow table.

Heraus	Alligat Chroma	pink	Mint	18g:40ml	130855
GC	Aroma Fine Plus	pink	Mint-fruit	16.8g:40ml	1308221
Zhermack	Hydrocolor 5	blue	mint (cool berry)	14g:30ml	164231
Zhermack	Hydrogum 5	purple	Cool berry	14g:30ml	179660
Lascod	Kromopan	pink	Fruit	18g:40ml	0163390134.2013
Spofa	Ypeen Premium	light green	mint	18g:40ml	4221310
Spofa	Elastic Cromo	pink	cherry	18g:40ml	4221215
X1	Sample	green	mint	18g;40ml	

Tests

The accuracy of an impression material is usually related to its mechanical properties: setting time, recovery from deformation, strain in compression, compressive and tear strengths [6, 7]. All commercials powders were mixed with proper quantity of destilate water according the manufacture recommendations (Table 1).

Setting time

Powders were stored in 23C during 1 day to obtain the proper temperature. After they were balance using laboratory scale KPZ 2-05-3 (KPZ Waagen) accordance with manufactures recommendation. Distillate water was measured using glass cylinder in accuracy 0.5 ml. The temperature of the water was maintained throughout the study at 23±1°C, as stated by the ADA specification. Sample made in the point 2.1 was balance 16.0g powder and 40 ml of water. Samples were handling mixed using rubber bowls and spatula during 30 seconds with grinding movement of the vessel walls [5]. On the beginning of mixing stopper was switch on. After the mixing unset material was transfer to the metal ring placed on the glass slabs, diameter 30 mm and thickness 18mm (According ADA specification number 18.). Setting time was established on the moment when glass laboratory spatula didn't adhere to surface of the material. Test was repeated free times for each material.

Samples for compressive strength and deformation

Specimens for the recovery from deformation and compressive strength were prepared as follows the procedure described by ISO 1563:1990 for Dental Alginate Impression Material. Three samples for each experiment were made. The specimens were made by filled with unset alginate mass after 30 seconds of mixing a plastic ring (12.5 mm inside diameter, and 19 mm high) on a flat glass plate and immediately covered by the second glass slab. A glass plate was then pressed on the mold to remove the excess alginate material and to form a flat smooth upper surface of the specimen. At the stated initial setting time, each specimen was separated from the split mold.

Permanent deformation

The Recovery from deformation represents the ability of the alginate material to recover after it has been deformed during removal from the mouth. Therefore, the greater the recovery from deformation, the more accurate the impression material will be [4]. The test recovery from deformation was conducted in accordance with the following time schedule where t was the initial setting time:

- The spindle of the analog micrometer (Somet), was lowered to obtain a contact with the plate on the specimen at the setting time establish with point 2.3.1 - t+ 45 seconds
- The dial indicator value for thickness of the sample was read, and was recorded at the sheet of paper when time was setting time + 55 seconds. In this way value a was detected.
- Sample was pressed with the screw about 1.9 mm during 30 seconds
- Force was removed and sample was left for 30 seconds to come back to its original dimension.
- One minutes and 55 second after the setting time dial indicator was again with the contact with sample and second dimension b was obtained.

The recovery from deformation was calculated as a percentage using the following formula, indicated by the ADA specification no. 18:

$100 \times [1- (a-b/19)]$

The number 19 means the length of the original plastic mold, in millimeters. Value was obtained in point 2 and value b in point 5. The average values of the recovery from the deformation of three specimens, for each impression material tested, were recorded and statistically analyzed. To meet the ADA or ISO requirements, the recovery from deformation should be at least 95%.

Compressive strength

Samples for compressive strength dimension diameter 12.5 mm thickness 19 mm prepared according the point 2.3.2 one minutes after the setting time were put in the Shimadzu compressive strength instrument. Speed of the pressing head was 50 mm/ min. For one tests three samples were prepared three times. It means each sample was pressed separately, 1 minute after its setting time. Test was finished when the sample was destroyed.

Compatibility with gypsum

Samples of unset alginate after 30 seconds of mixing were placed in the metal mold with engraved lines main 50 microns and other with 20 microns, according ISO standard. After filled the mold with material glass slab was used to covered and press the material. One minute after setting of the mass, mold was dismantled and ring of set alginate was removed. Surface of the material was inspected with the magnifier to see the quality of the line. Surface of the alginate plates was washed with distillate water. Gypsum class III Mramorit Blue (Spofa Dental) was mixed according manufacture recommendation 100g gypsum with 30 ml of distillate water. Alginate plate was covered by gypsum with gently brushing to allow gypsum fill the all pits on the surface. After 45 minutes alginate plate was removed from the surface of the gypsum and the quality and visibility of the lines on the gypsum surface was inspected by magnifier. Normative requirement is that the 50 microns line has to be fully visible on the gypsum surface.

Water concentration

All raw materials can potentially contain some unboned water. This can potentially influence on the setting time during storage, because this water can start the crosslinking reaction between alginate and calcium ions. Water can be easily removed from some materials using azeotrope distillation with some solvents like benzene or p- Xylene [8].

For this test 20 g of each raw material was taken after opening the container or package. Powder was placed in a glass flask volume 250 ml and mixed with 100 ml of p-Xylene. Glass flask was equipped with a cap to the azeotrope distillation, and all was heating during 2 hours in electrical heater. After this time quantity of the removed water was detected at the end of cap in ml. Scheme of this is on the picture bellow

RESULTS

Setting time

Setting time of commercial products is in range from 100-150 seconds. (Table-1)

After one month of storage setting time of some products is longer, but in some compositions shorter about 10% from original values(Table-2).

After 3 months storage in plastic jars it is possible to observe change in the setting time. Alginates after this period have shorter setting time. This can be observed for all materials. (Table-3)

Table-2: Setting time of alginate samples on beginning after opening the original package

Product							
	S1	S2	S3	AVG	SD	χ_2	Conf. level
Alligat Chroma	105	102	103	103.3	1.5	0.62	0.73
Aroma Fine Plus	120	123	121	121.3	1.5	0.62	0.73
Hydrocolor 5	105	105	106	105.3	0.6	0.24	0.89
Hydrogum 5	150	153	151	151.3	1.5	0.62	0.73
Kromopan	145	142	143	143.3	1.5	0.62	0.73
Ypeen Premium	145	144	144	144.3	0.6	0.24	0.89
Elastic Cromo	135	136	137	136.0	1.0	0.41	0.82
X1 Sample	145	148	146	146.3	1.5	0.62	0.73

Table-3: Setting time after 1 month storage in plastic jars

Product							
	S1	S2	S3	AVG	SD	χ_2	Conf. level
Alligat Chroma	112	112	114	112.7	1.2	0.47	0.79
Aroma Fine Plus	118	116	119	117.7	1.5	0.62	0.73
Hydrocolor 5	100	98	95	97.7	2.5	1.03	0.6
Hydrogum 5	150	148	148	148.7	1.2	0.47	0.79
Kromopan	140	136	134	136.7	3.1	1.25	0.54
Ypeen Premium	135	134	137	135.3	1.5	0.62	0.73
Elastic Cromo	129	131	130	130.0	1.0	0.41	0.82
X1 Sample	140	141	140	140.3	0.6	0.24	0.89

Table-4: Setting time after 2 months storage in plastic jars

Product							
	S1	S2	S3	AVG	SD	χ_2	Conf. level
Alligat Chroma	113	115	115	114.3	1.2	0.47	0.79
Aroma Fine Plus	114	112	112	112.7	1.2	0.47	0.79
Hydrocolor 5	98	97	99	98.0	1.0	0.41	0.82
Hydrogum 5	142	140	140	140.7	1.2	0.47	0.79
Kromopan	138	136	137	137.0	1.0	0.41	0.82
Ypeen Premium	136	133	134	134.3	1.5	0.62	0.73
Elastic Cromo	123	125	125	124.3	1.2	0.47	0.79
X1 Sample	134	130	130	131.3	2.3	0.94	0.63

Table-5: Setting time after 3 months storage in plastic jars

Product							
	S1	S2	S3	AVG	SD	χ_2	Conf. level
Alligat Chroma	119	120	122	120.3	1.5	0.62	0.73
Aroma Fine Plus	110	109	110	109.7	0.6	0.24	0.89
Hydrocolor 5	100	96	96	97.3	2.3	0.94	0.63
Hydrogum 5	136	137	138	137.0	1.0	0.41	0.82
Kromopan	134	134	133	133.7	0.6	0.24	0.89
Ypeen Premium	130	130	128	129.3	1.2	0.47	0.79
Elastic Cromo	120	118	117	118.3	1.5	0.62	0.73
X1 Sample	129	126	128	127.7	1.5	0.62	0.73

Permanent deformation

Table-6: Deformation of the samples on beginning

Product	permanent deformation at beginning [%]						
	S1	S2	S3	AVG	SD	χ_2	Conf. level
Alligat Chroma	2.26	2.24	2.2	2.2	0.0	0.01	0.995
Aroma Fine Plus	2.71	2.78	2.73	2.7	0.0	0.01	0.995
Hydrocolor 5	3.08	3.1	3.08	3.1	0.0	0.00	1
Hydrogum 5	2.6	2.64	2.61	2.6	0.0	0.01	0.995
Kromopan	3.24	3.26	3.27	3.3	0.0	0.01	0.995
Ypeen Premium	3.23	3.23	3.27	3.2	0.0	0.01	0.995
Elastic Cromo	3.12	3.15	3.1	3.1	0.0	0.01	0.995
X1 Sample	3.1	3.13	3.12	3.1	0.0	0.01	0.995

Table-7: Deformation of the samples after 1 month storage in plastic jars

Product	permanent deformation after 1 month [%]						
	S1	S2	S3	AVG	SD	χ_2	Conf. level
Alligat Chroma	2.31	2.34	2.35	2.3	0.0	0.01	0.995
Aroma Fine Plus	2.72	2.76	2.74	2.7	0.0	0.01	0.995
Hydrocolor 5	3.1	3.1	3.09	3.1	0.0	0.00	1
Hydrogum 5	2.67	2.69	2.67	2.7	0.0	0.00	1
Kromopan	3.24	3.25	3.26	3.3	0.0	0.00	1
Ypeen Premium	3.26	3.2	3.27	3.2	0.0	0.02	0.99
Elastic Cromo	3.16	3.18	3.16	3.2	0.0	0.00	1
X1 Sample	3.12	3.07	3.14	3.1	0.0	0.01	0.995

Table-8: Deformation of the samples after 2 months storage in plastic jars

Product	permanent deformation after 2 months [%]						
	S1	S2	S3	AVG	SD	χ_2	Conf. level
Alligat Chroma	2.46	2.49	2.5	2.5	0.0	0.01	0.995
Aroma Fine Plus	2.86	2.88	2.9	2.9	0.0	0.01	0.995
Hydrocolor 5	3.14	3.18	3.16	3.2	0.0	0.01	0.995
Hydrogum 5	2.85	2.89	2.91	2.9	0.0	0.01	0.995
Kromopan	3.45	3.4	3.38	3.4	0.0	0.01	0.995
Ypeen Premium	3.38	3.45	3.46	3.4	0.0	0.02	0.99
Elastic Cromo	3.32	3.4	3.38	3.4	0.0	0.02	0.99
X1 Sample	3.26	3.33	3.36	3.3	0.1	0.02	0.99

Table-9: Deformation of the samples after 3 months' storage in plastic jars

Product	permanent deformation after 3 months [%]						
	S1	S2	S3	AVG	SD	χ_2	Conf. level
Alligat Chroma	2.79	2.68	2.75	2.7	0.1	0.02	0.99
Aroma Fine Plus	2.97	2.87	2.96	2.9	0.1	0.02	0.99
Hydrocolor 5	3.35	3.46	3.5	3.4	0.1	0.03	0.985
Hydrogum 5	2.89	2.94	2.95	2.9	0.0	0.01	0.995
Kromopan	3.55	3.62	3.64	3.6	0.0	0.02	0.99
Ypeen Premium	3.5	3.48	3.52	3.5	0.0	0.01	0.995
Elastic Cromo	3.45	3.5	3.52	3.5	0.0	0.01	0.995
X1 Sample	3.34	3.37	3.36	3.4	0.0	0.01	0.995

Alginates after storage in plastic jars have lower ability to come back to their original dimension after short duration of compressive force. But results are upper ISO specification, that requires max 5% of dimensional change.

Compressive strength

Table-10: Compressive strength of alginate on beginning

Product	compressive strength at beginning						
	S1	S2	S3	AVG	SD	χ_2	Conf. level
Alligat Chroma	0.74	0.77	0.74	0.8	0.0	0.01	0.995
Aroma Fine Plus	0.44	0.46	0.46	0.5	0.0	0.00	1
Hydrocolor 5	1.21	1.23	1.2	1.2	0.0	0.01	0.995
Hydrogum 5	1.33	1.33	1.29	1.3	0.0	0.01	0.995
Kromopan	0.84	0.86	0.85	0.9	0.0	0.00	1
Ypeen Premium	1	1.01	1.03	1.0	0.0	0.01	0.995
Elastic Cromo	0.95	0.96	0.94	1.0	0.0	0.00	1
X1 Sample	1.12	1.13	1.1	1.1	0.0	0.01	0.995

Table-11: Compressive strength after 1 month of storage in plastic jars

Product	compressive strength after 1 month						
	S1	S2	S3	AVG	SD	χ_2	Conf. level
Alligat Chroma	0.7	0.72	0.7	0.7	0.0	0.00	1
Aroma Fine Plus	0.45	0.45	0.44	0.4	0.0	0.00	1
Hydrocolor 5	1.19	1.2	1.2	1.2	0.0	0.00	1
Hydrogum 5	1.34	1.33	1.3	1.3	0.0	0.01	0.995
Kromopan	0.81	0.82	0.82	0.8	0.0	0.00	1
Ypeen Premium	0.98	0.99	0.99	1.0	0.0	0.00	1
Elastic Cromo	0.96	0.98	0.95	1.0	0.0	0.01	0.995
X1 Sample	1.08	1.07	1.07	1.1	0.0	0.00	1

Table-12: Compressive strength after 2 months storage in plastic jars

Product	compressive strength after 2 months						
	S1	S2	S3	AVG	SD	χ_2	Conf. level
Alligat Chroma	0.68	0.66	0.64	0.7	0.0	0.01	0.995
Aroma Fine Plus	0.4	0.39	0.4	0.4	0.0	0.00	1
Hydrocolor 5	1.18	1.16	1.14	1.2	0.0	0.01	0.995
Hydrogum 5	1.21	1.18	1.17	1.2	0.0	0.01	0.995
Kromopan	0.78	0.77	0.77	0.8	0.0	0.00	1
Ypeen Premium	0.9	0.88	0.87	0.9	0.0	0.01	0.995
Elastic Cromo	0.8	0.83	0.84	0.8	0.0	0.01	0.995
X1 Sample	1	0.98	0.96	1.0	0.0	0.01	0.995

Table-13: Compressive strength after 3 months of storage in plastic jars

Product	compressive strength after 3 months						
	S1	S2	S3	AVG	SD	χ_2	Conf. level
Alligat Chroma	0.65	0.62	0.62	0.6	0.0	0.01	0.995
Aroma Fine Plus	0.36	0.32	0.35	0.3	0.0	0.01	0.995
Hydrocolor 5	1.08	1.06	1.09	1.1	0.0	0.01	0.995
Hydrogum 5	1.12	1.11	1.13	1.1	0.0	0.00	1
Kromopan	0.68	0.69	0.7	0.7	0.0	0.00	1
Ypeen Premium	0.81	0.83	0.79	0.8	0.0	0.01	0.995
Elastic Cromo	0.76	0.76	0.74	0.8	0.0	0.00	1
X1 Sample	0.9	0.87	0.86	0.9	0.0	0.01	0.995

Alginates storage in plastic jars has a negative influence on the compressive strength. Materials stay less resistance to the forces.

Compatibility with gypsum Reproduction of the details

All alginate impression materials can reproduce the lines 50 microns line 25 microns is not visible. See pictures bellow. Observation materials with dark color have the lines much more easily visible in naked eyes compare to light color (white, yellow).

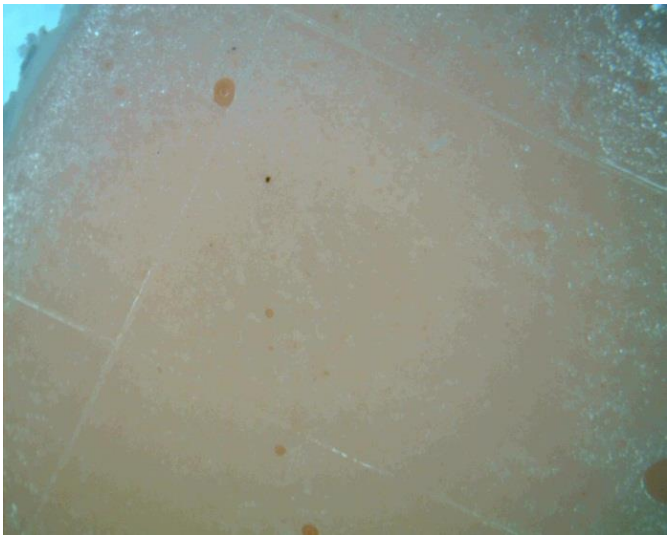

Fig-1: Aroma Fine (GC)

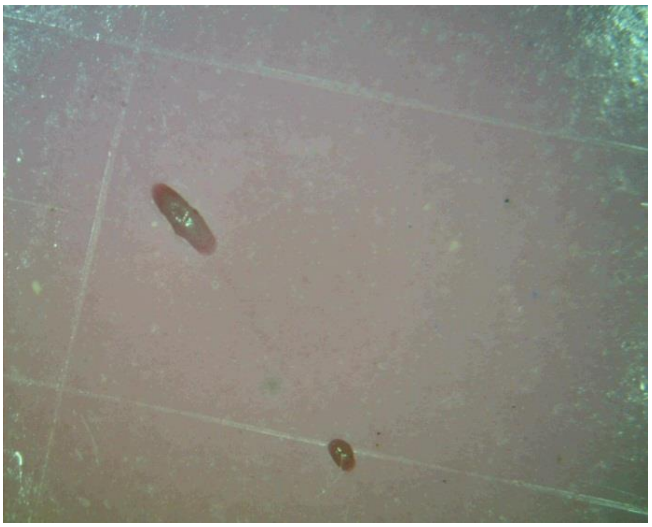

Fig-2: Hydrogum 5 (Zhermack)

Fig-3: Tropicalgin (Zhermack)

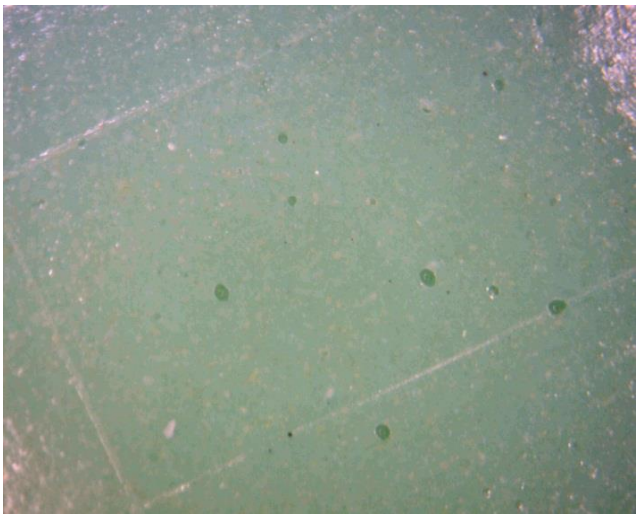

Fig-4: X1 Sample

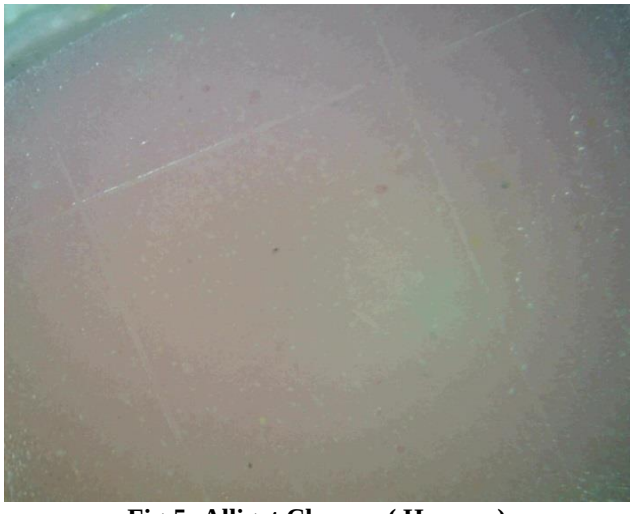

Fig-5: Alligat Chroma (Hereaus)

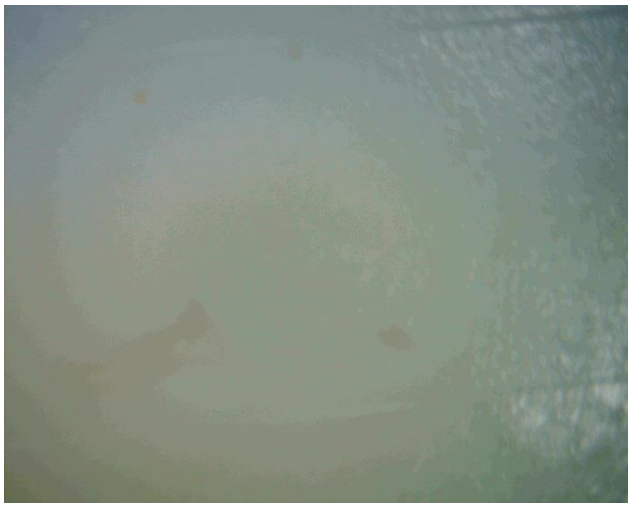

Fig-6: Elastic Chromo (Spofa)

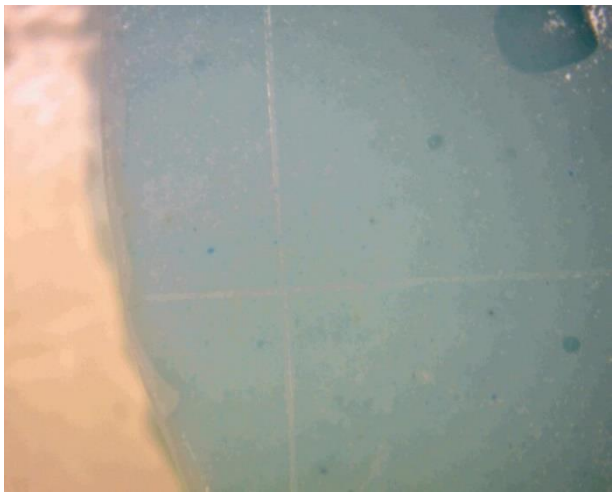

Fig-7: Hydrocolor (Zhermack)

Fig-8: Cromopan (Lascod)

Fig-9: Ypeen Premium (Spofa)

In gypsum in all cases the 50 microns lines were visible, on beginning after one two and three months. It means that storage of the alginate has no influence on the reproduction of details.

3.5 Water concentration in raw materials

Table-14: Show the results of water distillate with benzene azeotrope from the raw materials

product	water con [%]
Celite 281	7.2
Protanal AF	6.4
CaSO4 *2H2O	2.3
K2TiF6	0.1
Na3PO4	0.25
Propylene glycol	0.1
Mint aroma	0.25
MgO	0.2

All raw materials contain some water in their volume; such water can potentially have influence on the degradation of the alginate properties during the time. It cans catalase relation of cross linking between calcium ions and sodium alginate during time.

DISCUSSION

Alginates impression materials can go several changes during time, especially if they are store in not original package. One possible explanation can be oxygen influence. From the chemistry of the polymers it is commonly know that oxygen can degrade polymers. Alginates like natural polymers can go such wat of decomposition by forming free radicals. Second potential factor that is known to be critical factor to the shelf life of alginate is temperature and sun exposition. From the web side of the producer of sodium alginate it is possible to find information about thermal stability of sodium alginate that can be safely storage at room temperature. Long exposition to temperature higher that 40ºC can go to the polysaccharide chains breaking, which bring the material with lower mechanical properties. To overcome this problem some producer pack the material in the atmosphere of inert gases (nitrogen for example) this solution can improve the time of using from 2 to 5 years.

Alginate compressive strength and permanent deformation due to the simple equipment are tested very often. Monzavi A. others tested PlastAlgin and obtain following results: The strain in compression, permanent deformation and mean compressive strength was 7.35%, 3.25% and 0.74 Mpa [10]. Some authors investigate the properties simple cross linkage between sodium alginate and calcium ions [11].

Properties of sodium alginate can be different form one year to other like a product from natural origin. This factor can influence on the final composition of impression material. Song-Qin in his work shows the correlation between the properties of setting material and concentration of sodium alginate in the composition [12]. For instance, high proportions of the alginate salt were reported to improve the resilience of the impression material. Moreover, hardness readings indicated that the increase in the alginate content might lead to the formation of a progressively firmer and harder gel. Recovery from deformation can be from

89.9% up to 95.3% with sodium alginate concentration 16%.

Current investigation suggests that is possible to obtain more that 95% of recovery from deformation when the concentration of sodium alginate is 12%. Other commercial materials reach the similar level. Probably this ca be influence of lower level of calcium sulfate dehydrate 6.5% instead 12-14% and lower concentration of retarder trisodium phosphate (0.5% instead 2.5%) [3, 12].

But the situation can dramatically change when dentists open the original package of alginate material and store it in dental office environmental. Some protection can be using plastic jars to which the material is placing after opening the original package. Such container has to be good closing after using a material. But during the opening period still the material can absorb the oxygen or water from air. After storage of all alginate materials it is possible to detect some change like shortening of the setting time, lower compressive strength and worse recovery from deformation. After 3 months of storage there were not visible changes in reproduction of detail and compatibility with gypsum. Obtained results can be in accordance with Hondrum SO and others. In their opinion long stability of alginate up to 60 months can increase the setting time, decrease compressive strength, and recovery from deformation [14]. As the polymer network formed, viscosity increased, resulting in less elasticity and decreasing in recovery from deformation.

Repacking of the alginate from original container to plastic jars was investigated by Siti Sunarintyas S. and others. Short term storage in higher temperature 29ºC and very high humidity can reduce the setting time of two commercial materials about 20 seconds [15,16]. Those phenomena may be because of partial spontaneous polymerization of the alginate material in the plastic bags, perhaps prompted by moisture contamination from relative humidity during storage. Results obtained with tests compatibility with stone and detail reproduction form 50 microns line are similar to the results described by Murata H and others [9].

Some teste were done regarding the container for long storage of alginate materials. Results show that aluminum foil package became the best container followed by plastic and paper. Plastic container was recommended as a cheaper the alternative of aluminum container regarding on its thickness and possibly to use in short period in dental office [15].
In some cases, when the results from stability tests are needed it is possible to make an accelerated aging tests (for examples 5 weeks at 60ºC) parallel with normal conditions [17].

CONCLUSION

Alginate impression materials must be storage at original container, to protect from external humidity. After opening the package materials should be storage in plastic jars good closed. Raw material for alginate impression material production contain some water, which can change the properties of material during time.

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