**MATERIALS AND METHODS**

Glass-ionomer cement is two part material, powder and liquid, which requires mixing in order to set. Cement setting is based on an acid-base reaction; when ions of metal elements released from the glass powder surface bond with polyions derived from the polyacid. Since the reaction is very fast, various compounds are added to the liquids to extend the composition setting time. These are most often carboxylic hydroxyacids capable of complexing ions released from the glass [1-4]. Moreover the kinetics of the glass-ionomer cement curing process may also depend on other factors like pH or structure [4, 5].

**INTRODUCTION**

Glass-ionomer cement is a dental material used for the repair of damaged teeth. It is based on the reaction of hydroxyl-terminated polyacrylic acid with metal oxides. The resulting glass-ionomer composition, without changing the strength properties of the cements, reduces their compressive strength. It is well known [2] that structural factors may have considerable influence, as they facilitate released ions complexing. It is known from the literature, that oxalic acid may function in glass-ionomer compositions as a setting reaction modifier [3]. Due to low solubility of oxalic acid in water and in the synthesised copolymer matrix, the acid was used as a second additive to selected liquids, apart from tartaric acid or malic acid. What is more, in order to increase oxalic acid solubility, the tests were carried out with a use a liquid with the copolymer solution concentration reduced to 45%.

Different results of the setting times for the compositions containing tartaric acid and malic acid also suggest that structural factors may have considerable influence, as they facilitate released ions complexing.

**RESULTS AND DISCUSSION**

The addition of carboxylic hydroxyacids to AA-IA copolymer solution caused reduction of their viscosity (fig. 1) and had positive influence on the mixing process of the glass-ionomer compositions through extension of setting time. The highest increase in the composition setting time was observed for the addition of malic acid to the liquids (fig. 2).

The addition of carboxylic hydroxyacids to liquids had negative influence on the strength of the cements (fig. 3). Test results showed that cements containing liquids with added malic acid of 5% and 10% demonstrated the highest compressive strength, but higher content of this acid caused the higher reduction in cement strength to values below 100 MPa, which does not meet the requirements of the above mentioned standard. The cements based on liquids containing tartaric acid were characterised by the most stable strength properties until 40% content of this acid. However, if more oxalic acid is added, the setting time is not extended. For compositions based on liquids with malic acid, the setting time is reduced after the addition of 0.5 wt% and 1 wt% of oxalic acid. However, if more oxalic acid is added, the setting time is extended (fig. 4).

**CONCLUSIONS**

Strength test results of cements based on liquids containing oxalic acid don’t demonstrate a considerable influence of oxalic acid on the compressive strength of cements that contain it [7].

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**REFERENCES**