



PURIFICATION OF WATER CONTAMINATED WITH OIL BY THE PROCESS OF HYDRODYNAMIC CAVITATION

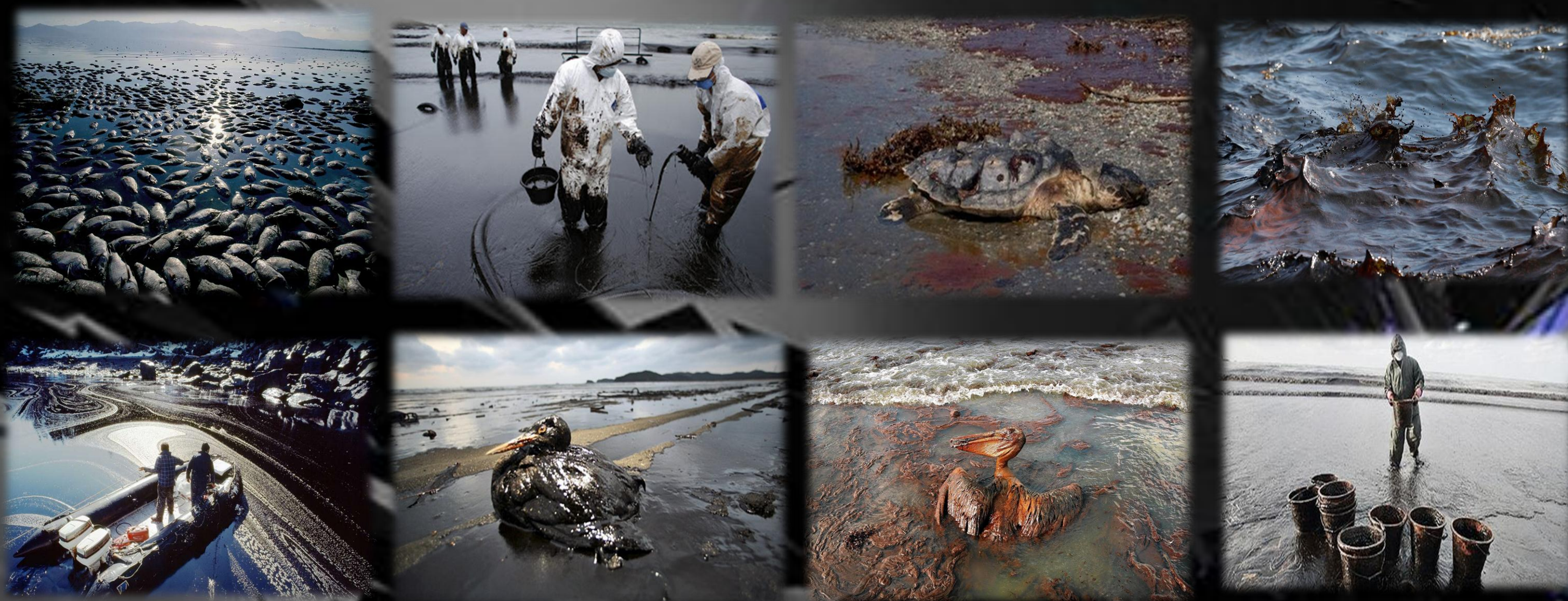
Author: Đorđe Ogrizović, Regional Center for Talented Youth Belgrade II, Serbia, djordje.o@sbb.rs
Supervisor: Borivoj Adnađević, PhD, Faculty of physical chemistry, University of Belgrade

1. Introduction

Lack of pure drinking water represents an increasing global issue. Oil is one of the most common and most dangerous organic pollutants of the industrial wastewater and environment. In order to remove oil from water numerous methods are used, which have a number of deficiencies. In this research the method of hydrodynamic cavitation has been applied as a potential new way of solving this global problem. The aim of this study is to examine the possibility of removing oil from water by using hydrodynamic cavitation method.

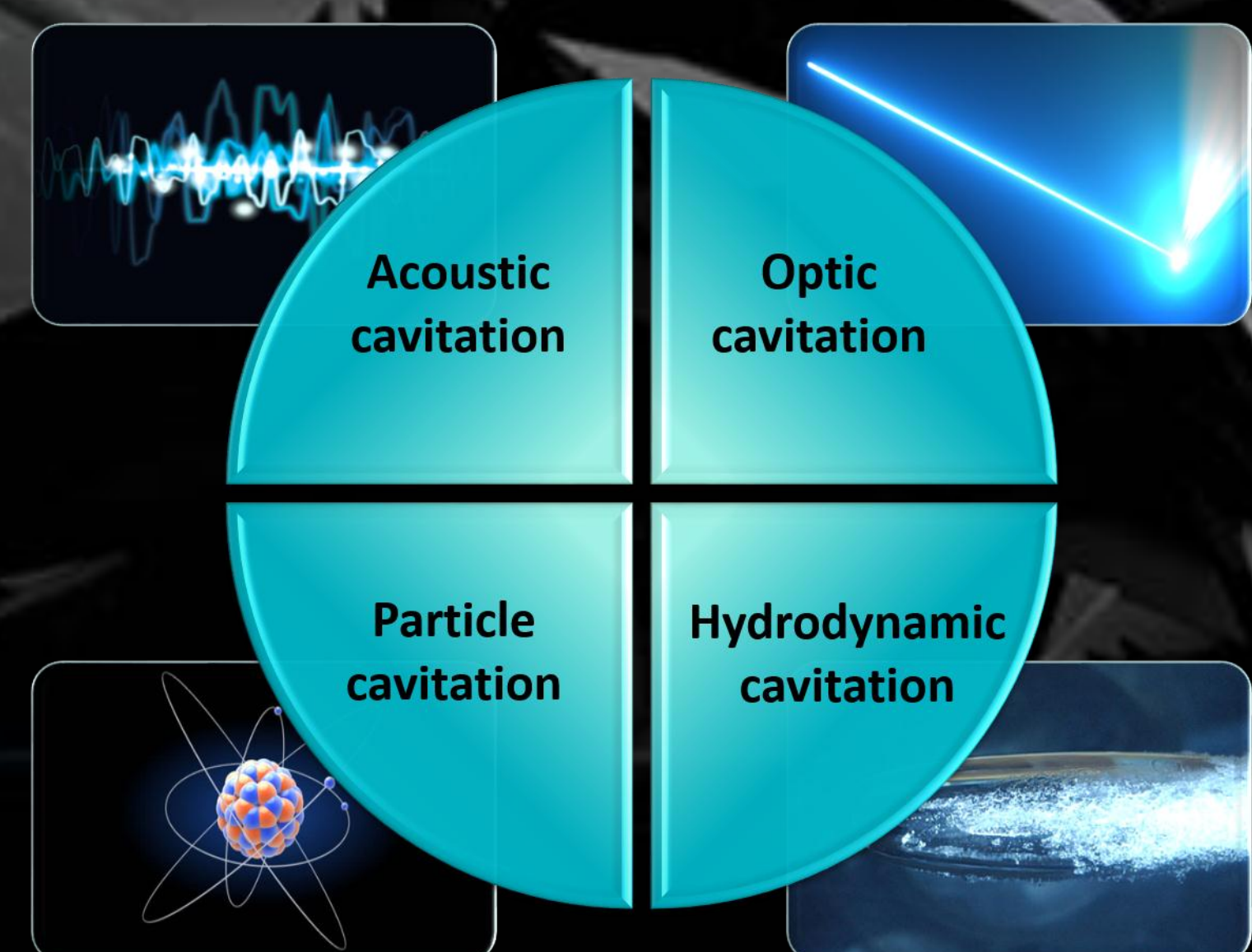


The largest oil spills in the world



2. Methods

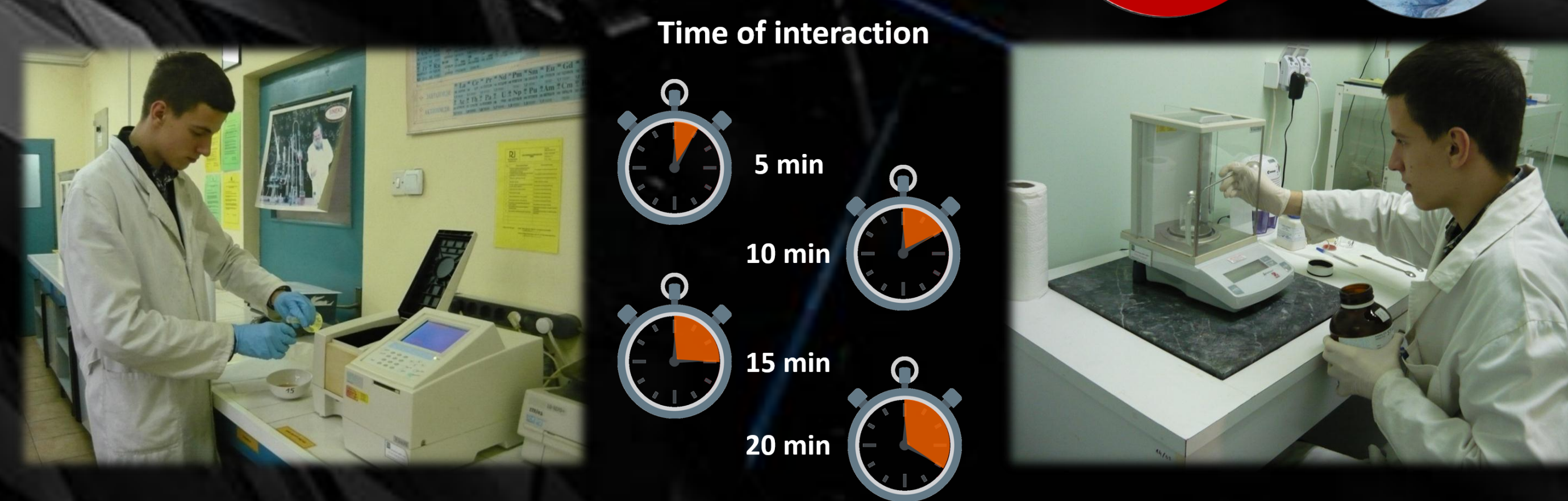
Concentration of oil in the aqueous solution is determined by a standard method. For research purposes a hydrodynamic cavitator of Venturi type has been constructed and built. Cavitation number was 0.1. The water with oil has been oozed through the cavitator at time intervals of 5, 10, 15 and 20 minutes and the initial concentration of oil in the aqueous solution equals 1.45 g/L. The influence of the concentration of hydrogen peroxide (H₂O₂) was examined.



3. Results

Figure 1 shows the effect of time on the percentage reduction in the concentration of oil in water.

From the figure it can clearly be seen that the concentration of oil in water in the first 5 minutes drops by 35.17% and in the range of 10 minutes it drops by 61.38%. Unexpectedly, after ten minutes the concentration does not change. The influence of hydrogen peroxide is presented in figure 2 and was examined at the same concentration of oil, at time period after 10 minutes. With the increasing of hydrogen peroxide in water, the degree reduction of oil content is higher. When the concentration of hydrogen peroxide is 500 mg/L, after 10 min the degree reduction is more than 80% and after 20 min the removal ratio is almost 100%.



4. Conclusion

Hydrodynamic cavitation has proved to be an effective method for removing oil out of water. This process depends on concentration of hydrogen peroxide. When the concentration of hydrogen peroxide is 500 mg/L, after 10 min the degree reduction is more than 80% and after 20 min the removal ratio is almost 100%.

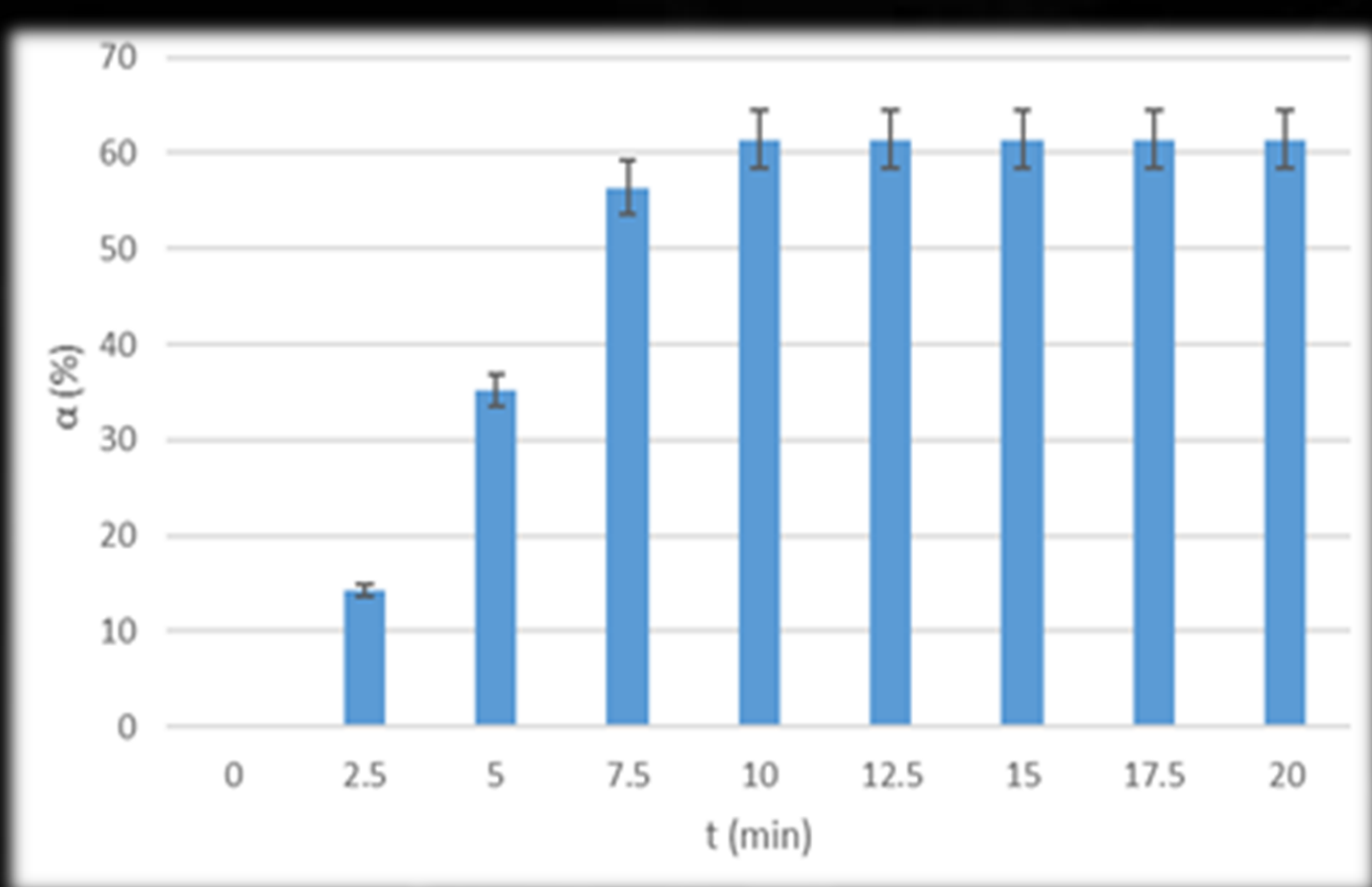


Figure 1. The dependence of the percentage reduction of the concentration of oil in water by the time

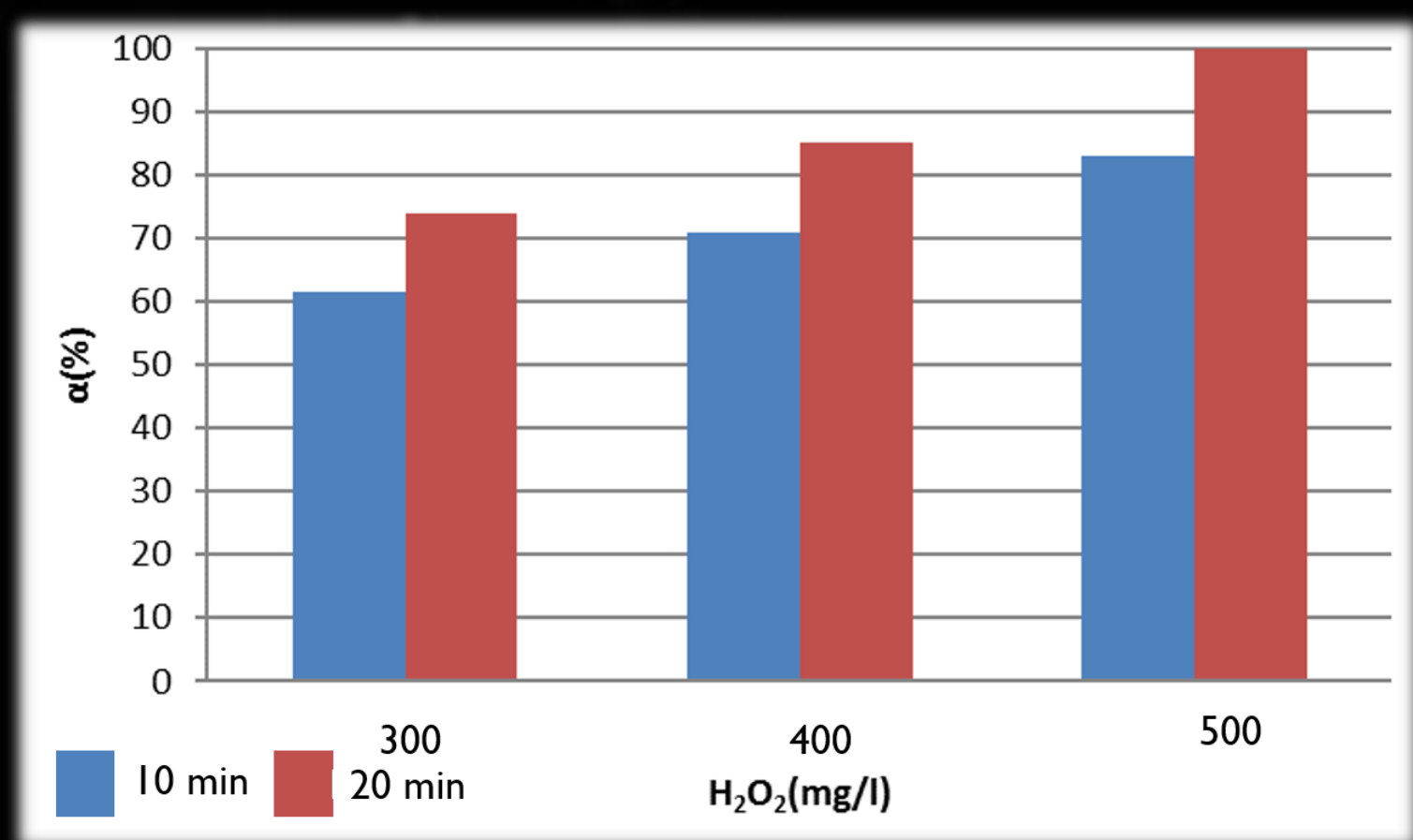


Figure 2. The influence of H₂O₂ concentration on the degree of reduction of the oil content

