INVESTIGATION OF THE EFFECT OF ANOXIC SELECTOR ON SLUDGE BULKING IN SBR SYSTEM(case study: SHIRAZ WasteWater Treatment Plant IN South-Western of IRAN)

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Abstract

One method of biological wastewater treatment is activated sludge. The activated sludge process is the most commonly used technology for biological wastewater treatment. Bulking sludge is a complicated and unpredictable challenge for many wastewater treatment plants globally. The sludge will not settle properly and huge amounts of soft foam can float all over the plant. One of the methods to prevent bulking sludge is use of selector before main aeration basin. In this paper the effect of use of anoxic selector in activated sludge process was investigated. Experiments were conducted in batch culture with use of Sequential Batch Reactor (SBR) system. Three reactors, each with 4 liter volume, and different initial floc loading were used. Different anoxic feeding time which shows contact time in the selector were applied in terms of 0,20,30,40 min. Parameter sludge volume index (SVI) was measured for different initial floc loading and contact time in the selector. Results from this study showed that selector with contact time of 40 min and floc loading 0.4 has good effect on sludge stability.

Keywords: Activated Sludge, Anoxic Selector, Sludge Bulking, Floc Loading

1. INTRODUCTION

Biological, physical and chemical methods are being used in wastewater treatment. Biological way is one of the most used and popular method in wastewater treatment. In activated sludge process wastewater containing organic matter is aerated in an aeration basin in which micro-organisms metabolize the suspended and soluble organic matter. One Part of organic matter is synthesized into new cells and the other part is oxidized to CO_2 and water to derive energy. In activated sludge systems the new cells formed in the reaction are removed from the liquid stream in the form of a flocculent sludge in settling tanks. A part of this settled biomass, described as activated sludge is returned to the aeration tank and the remaining forms waste or excess sludge. e.g. [2]

One of the problems can occur is Bulking sludge. It is a condition defined by solids with poor settling characteristic_(which are either slow or unable to settle at all and will just float on top) and this can be observed by the high Sludge Volume Index (SVI) test result. That caused by many factors such as low PH, low F/M, low nutrients and also low dissolved oxygen (DO), these factors prepare conditions for growth of type of bacteria are called filamentous bacteria, e.g. [3]

One method for control of sludge bulking is using selector. Biological selection uses differential growth kinetics to promote the development of good settling (floc-forming) bacteria rather than filamentous bacteria. This is accomplished because most floc-forming bacteria grow faster than filamentous bacteria at higher BOD loading rates. Therefore, small, highly loaded reactors provide