

A New Natural Drag Reducing Agent

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Abstract— Drag reduction agents are commonly used to prevent the energy losses during transportation in oil pipelines conduits, oil well operations and transport of suspensions and slurries. In this work, Basella Alba L as a new natural flow improver in pipelines is introduced. The effects of new natural drag reduction were tested using a transparent polyvinyl chloride closed loop fluids circulation system. The experimental work was carried out in a horizontal 1.5 inch (0.038m) pipe. The difference in addition concentration and liquid flow rate are the primary variables investigated in order to get the efficiency of Basella Alba L as natural drag reducer agents. From the experimental data, % DR is calculated. The injection of Basella Alba - natural mucilage into the water flowing produced a maximum drag reduction about 78.33% with concentration 1000 ppm. The results showed the new flow improver has potential in order to reduce the frictional pressure drop along the pipeline's length.

Keywords-Drag Reduction, Natural Mucilage, Turbulence, Pipelines

INTRODUCTION

One phenomenon in the transportation of fluid at longer distances causes the pressure drop along the pipelines and also reduces in the production efficiency. These problems occur due

to the turbulent flow in the pipelines. About 60 years ago, Toms discovered that trace amounts of polymeric additives was capable of significantly reducing drag [1]. Since then, almost 7000 studies on drag reduction have been published by using various additives such as polymers, surfactant solutions and fiber particles [2]. Drag reducing agents have been very beneficial in reducing frictional pressure losses and more importantly allow a greater production rate at an economical cost. Systems that see regularly increasing production stand to gain the most as drag reducing agents lower operating costs such as pumping power, maintenances of pipelines pressure and facilitate refinery loading and unloading operations [3-6]. The ability to reduce the frictional drag in turbulent flow in pipes by addition of drag reducing agents has great commercial application in many industries and processes. Polymers are the most effective drag reducing agents among various additives like polymers, surfactant solutions, and fiber particles. There are two types of polymers - synthetic polymer and natural polymers. The addition of a few parts per million of a high molecular weight or long chain polymer to a turbulent fluid flow can result in a large reduction in the frictional drag in pipes and channels [1]. Synthetic polymers such as polyethylene oxide (PEO), co-polymer (Magnafloc 1011) of polyacrylamide, carboxymethyl cellulose, polythene oxide, and sodium-acrylate are often used as drag reducing agents in turbulent flow. The result after injection of these polymers into pipelines is a marked improvement of pressure loss especially at high mixture velocity which is evidenced by clear changes in flow patterns [7-15]. However, natural polymeric additives attract less attention in industrial applications despite the fact that benefits of a natural polymeric are similar to synthetic