Interactive comment on “Froth Production in Potable Water without Chemicals” by Ghanim Hassan and Robert G. J. Edyvean

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Froth Production in Potable Water without Chemicals

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Abstract
Froth flotation is a well-known solid-liquid separation technique. Hydrophobicity is the main driving force for such processes. Hydrophobic solids attach to air bubbles and rise up while hydrophilic or less hydrophobic species settle down. Froth can be produced with chemical frothers such as alcohols and polyglycols (Finch and Zhang, 2014). However, the use of chemicals limits the use of this separation method in applications such as drinking water, food, and pharmaceutical industries. Therefore, developing a technique that produces froth without adding any chemicals would be useful to such industries.
This work demonstrates that with suitable operating parameters a 27 cm froth height can be obtained in a 20 cm diameter column by using an air flow rate of 130 l/min.

Introduction
Froth flotation is a physical separation method among the selective ability of particles to adhere to air bubbles rising to water (Alam and Shang, 2012). This process usually involves the addition of chemical reagents to facilitate froth formation as well as attachment to the air bubble. The more hydrophobic materials are collected on the surface where a stable froth forms. The froth is skimmed to produce a “concentrate”, leaving the less hydrophobic part to stay as a “tailing” in the bottom of the flotation cell. Chemicals are used for enhancing froth formation and quality and to control the relative hydrophobicity of the particles (Alam and Shang, 2012; Bach et al. (2001)).
This separation technique is widely used in industry. Historically, early use was in mining for upgrading mineral ores as a preparation to further processes (Gumbs et al., 1997). Later, it was used in the paper industry (both recycling and production of paper), textile industry (predominantly dyeing and finishing operations), leather industry, rubber industry, and other specialty industries (Bach et al., 2001). Drinking water can also be treated by this method. Fine, oily, or suspended particles are separated in the Dissolved Air Flotation (DAF) process (Edzwald, 2010). PVC can be separated up to 99.3% from mixtures with PET using bubble flotation (Marques and Tenório, 2000).

Fig. 1.