

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

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Discussion paper



1 Froth Production in Potable Water without Chemicals

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7 **Key words:** Froth flotation, Drinking water, Bio-purification.

8 **Abstract**

9 Froth flotation is a well-known solid-liquid separation technique. Hydrophobicity is the main driving force for such
10 processes. Hydrophobic solids attach to air bubbles and rise up while hydrophilic or less hydrophobic species settle
11 down. Froth can be produced with chemical frothers such as alcohols and polyglycols (Finch and Zhang, 2014).
12 However, the use of chemicals limits the use of this separation method in applications such as drinking water, food,
13 and pharmaceutical industries. Therefore, developing a technique that produces froth without adding any chemicals
14 would be useful to such industries.

15 This work demonstrates that with suitable operating parameters a 27 cm froth height can be obtained in a 20 cm
16 diameter column by using an air flow rate of 1.30 l/min.

17 **1. Introduction**

18 Froth flotation is a physical separation method using the selective ability of particles to adhere to air bubbles rising in
19 water (Alam and Shang, 2012). The process usually involves addition of chemical reagents to facilitate froth formation
20 as well as attachment to the air bubble. The more hydrophobic materials are collected on the surface where a stable
21 froth forms. The froth is skimmed to produce a "concentrate", leaving the less hydrophobic part to stay as a "tailing"
22 in the bottom of the flotation cell. Chemicals are used for enhancing froth formation and quality, and to control the
23 relative hydrophobicity of the particles (Alam and Shang, 2012; Zech et al., 2012).

24 This separation technique is widely used in industry. Historically, early use was in mining for upgrading mineral ores
25 as a preparation to further purification techniques (Smith et al., 1993; Nagaoka et al., 1999). In the paper industry froth
26 flotation is used to remove hydrophobic impurities such as printing inks and stickers from recycled paper (Finch and
27 Hardie, 1999). Waste water can also be treated by this method. Fats, oils, grease and suspended solids are separated
28 in the Dissolved Air Flotation (DAF) process (Edzwald, 2010). PVC can be separated up to 99.3% from mixtures with
29 PET using bubble flotation (Marques and Tenório, 2000).

Fig. 1.