Kettle Boiled Batch Process Website

<http://discovery.kcpc.usyd.edu.au/9.5.5/9.5.5_processeskettle.html>

The Kettle Boiled Batch Process has many similarities to the [saponification](http://discovery.kcpc.usyd.edu.au/glossary-all.html#129) reactions that you can perform in the school laboratory: it uses a direct [saponification](http://discovery.kcpc.usyd.edu.au/glossary-all.html#129) reaction. A lot about this process can actually be determined from the name:

Kettle

A kettle is a large, open, steel tank. The kettles used for [saponification](http://discovery.kcpc.usyd.edu.au/glossary-all.html#129) can hold up to 130,000 kg of material.

Boiled

The reaction mixture is kept boiling through the injection of high temperature, high pressure steam. This also acts to keep the reaction mixture well-stirred. Some [soap](http://discovery.kcpc.usyd.edu.au/glossary-all.html#126) from previous reactions is usually left in the kettle to help the water and oil mix by forming an [emulsion](http://discovery.kcpc.usyd.edu.au/glossary-all.html#34) (see emulsification later in this module).

Batch Process

A batch process is a reaction where everything is added at the beginning, the reaction proceeds until it reaches completion and then the products are removed. (This is in contrast with a semi-batch reaction where more reactants are added as the reaction proceeds, or a continuous process where reactants are added and products removed constantly throughout the reaction.) In this case, the fats and oils, [caustic soda](http://discovery.kcpc.usyd.edu.au/glossary-all.html#139) (sodium hydroxide), salt and water are added at the beginning of the reaction.

At the conclusion of the [saponification](http://discovery.kcpc.usyd.edu.au/glossary-all.html#129) reaction, additional salt is added to the mixture (thus changing the way the [soap](http://discovery.kcpc.usyd.edu.au/glossary-all.html#126) solidifies). The mixture is washed with more steam and allowed to settle, removing the [glycerol](http://discovery.kcpc.usyd.edu.au/glossary-all.html#224). The washing and settling process usually takes several days to complete.

**Key Differences**

The key differences between the Kettle Boiled Batch Process and the [saponification](http://discovery.kcpc.usyd.edu.au/glossary-all.html#129) reactions performed in the school laboratory are:

* the industrial process uses a blend of fats and oils in the reactor
* heating and stirring is achieved using steam
* salt is added to control the way the [soap](http://discovery.kcpc.usyd.edu.au/glossary-all.html#126) solidifies
* [glycerol](http://discovery.kcpc.usyd.edu.au/glossary-all.html#224) is removed from the product (and used in other processes)