

# THE FORTIFICATION OF STAPLE FOODS WITH VITAMIN A



From a commercial point of view milk is divided in two forms: liquid or dried (powder) forms. The fortification of milk can be done by using either oily vitamins or powder / dry vitamins. The choice of fortificant is dependent on the available equipment in the dairy. The use of oily vitamins often requires a homogenizer, and the use of powder vitamins often requires some dry mixing facilities. Before adding vitamin A and D to any kind of milk (cow, goat, sheep, buffalo, camel, etc.) it is necessary to consult and check the seasonal variation in these vitamins. The variation depends on the available feed throughout the season.

## Technology

Liquid milk is normally fortified with oily vitamins as depicted in Figure 1. In principle a small aliquot of cold milk is mixed in a separate tank with the oily vitamin. For practical reasons the oily vitamin concentrate can be mixed with some vegetable oil in order to obtain a better and more homogenous dispersion. This pre-blend can for example be 1:10. The pre-blend is added to the milk aliquot in a ratio of 1:50 to 1:100. The milk / vitamin pre-blend is homogenized before adding it to the bulk milk.

Figure 1

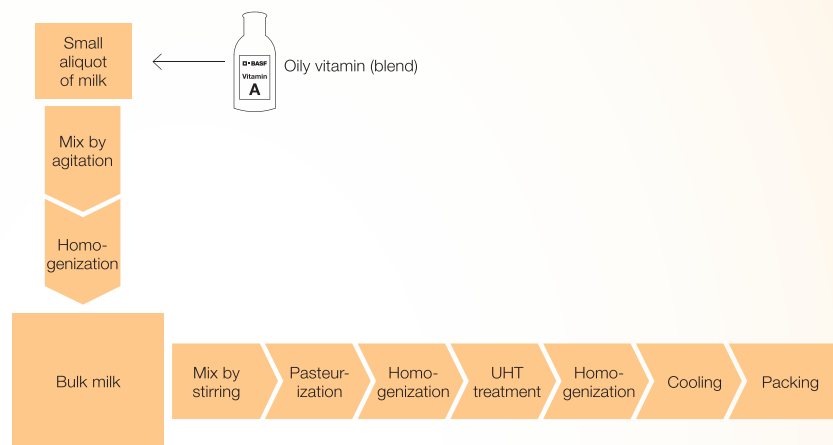
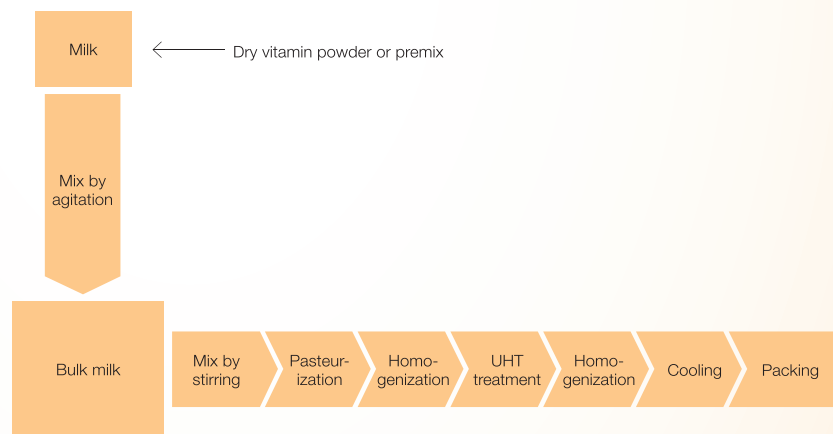


Figure 2



# Milk Fortification

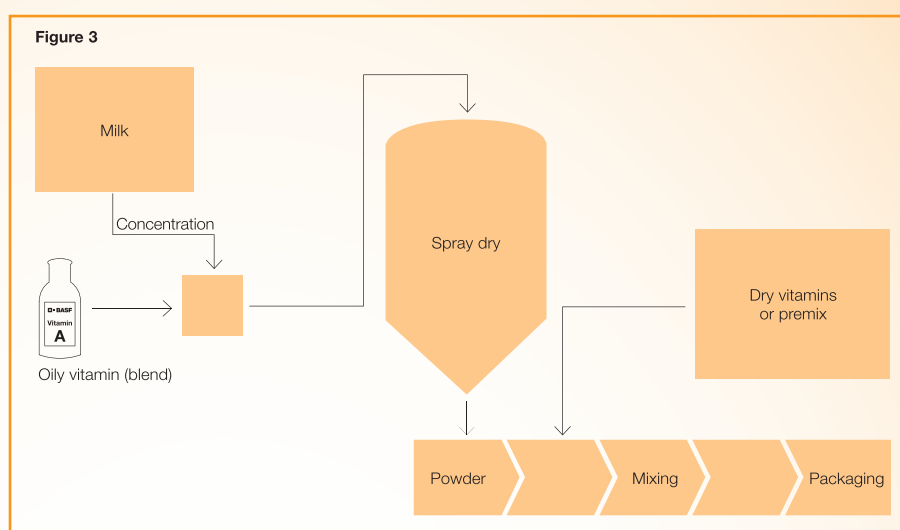
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Using powder vitamins also requires a separate tank for mixing the powder vitamins with an aliquot of milk. To speed up dissolution the temperature can be raised to 40-45°C. When the powder is properly dispersed the pre-blend is added to the bulk milk. It is not necessary to homogenize before adding to the bulk milk in this case (Figure 2).

The vitamins are added in both examples before pasteurization or UHT treatment of the milk in the normal production line. Powder milk / spray-dried milk can be obtained either by spray drying, roller drying or drum drying. In all cases powder milk can be fortified by using both oily and powder vitamins.

Fortification of powder milk can easily be done by simply mixing the dried milk powder with powder vitamins or vitamin premix or by addition of oily vitamins to the milk before the drying step. Oily vitamins can be handled as described above. Fortification steps are shown in Figure 3 with a spray dryer as an example. Homogenization before drying may be an option.



BASF would be glad to support your project implementation with technical support. Please do not hesitate to contact us.

#### Products suitable for milk fortification

The right choice of product depends largely on the actual set-up in each dairy and the products to be fortified. BASF is fully supportive in each case.

Internet: [www.food-fortification.com](http://www.food-fortification.com)

E-mail: [food-fortification@basf.com](mailto:food-fortification@basf.com)

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