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Fortification of Foodstuffs by Cold Water Soluble Vitamin D3 Preparation

Indroduction

- Limited number of foods naturally contains vitamin D. Therefore it is important to find the best ways for the addition of vitamin D into food products.
- The recovery of added vitamin in the final product, depending on the fortification method used, remains a challenge for the food manufactures.
- Usually for the fortification of food vitamin D in liposoluble form is used. However, sometimes food manufacturers need the hydrosoluble vitamin D.

The Goal of Investigation

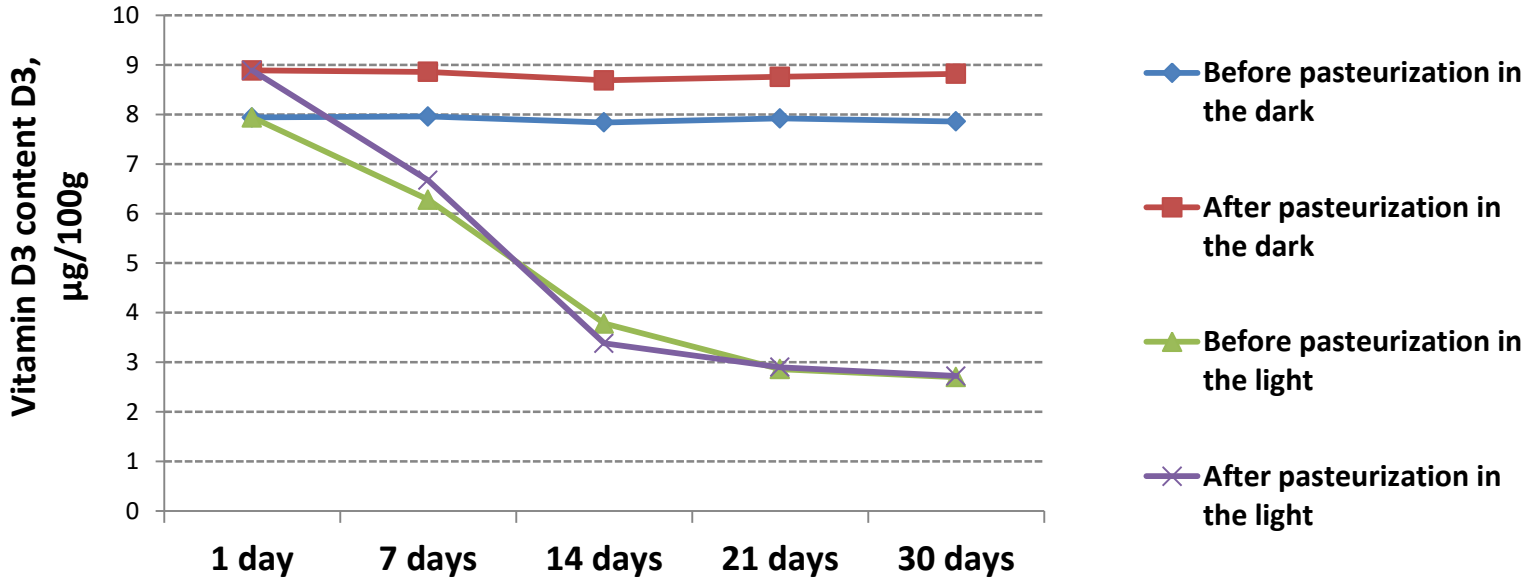
In the current study we examined the possibility to employ the commercial cold water soluble vitamin D3 preparation **100 CWS/AM** (DSM Nutritional Products, Netherlands) for the fortification of apple juice and two dairy products - curd and evaporated milk.

Sample Preparation and Vitamin D3 Determination

- Vitamin D3 content in food products was determined by reverse phase HPLC after overnight saponification at room temperature, extraction with hexane, evaporation and dry residual dissolving in mobile phase.
- Column YMC-Pack ODS-A (5 µm, 150×4 mm) Wavelength 265nm, column temperature 40 °C, mobile phase 95% MeOH+5% H_2O, 1 ml/min. Injection volume 50 µl.

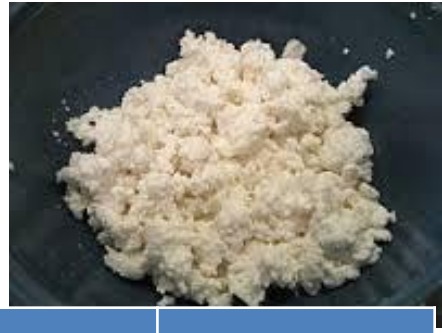
Apple Juice

CWS vitamin preparation 0.04 g was added to the 1000 g juice (D3 10 µg/100g).



Heat treatment had no effect on the recovery of vitamin in the product – in both cases it was 85.5%. No changes in the vitamin content were recorded during juice storage in the dark at 4°C for one month. However, vitamin D content decreased more than 2 times after storage of juice at 4°C for one month in the illuminated place (4187 lx).

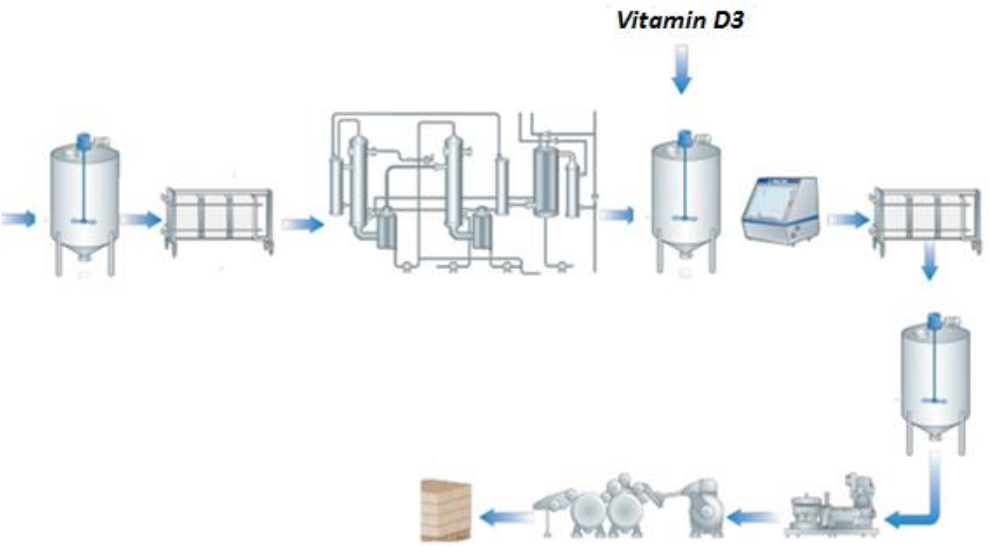
Curd

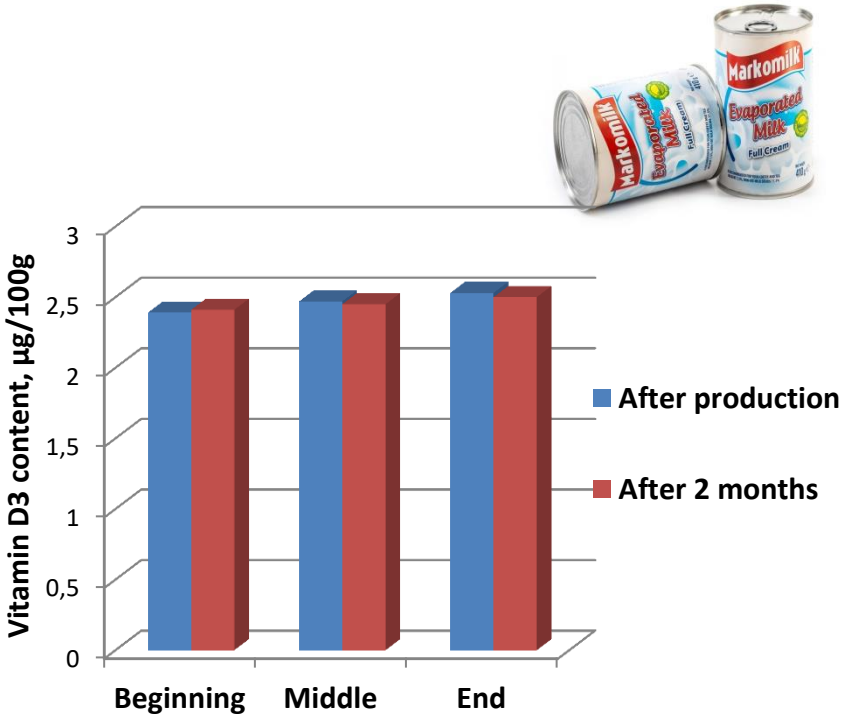


100 µg of vitamin D3 were added to 2 L of milk

Product	Method of Production	Vitamin Form	D3 µg/100g	Recovery, %
Whey	Acid-enzymatic fermentation	FS	1.49±0.33	12.63
Whey	Acid-enzymatic fermentation	CWS	1.58±0.71	13.80
Whey	Acid fermentation	FS	2.73±0.45	36.16
Whey	Acid fermentation	CWS	2.10±0.35	32.50
Curd	Acid-enzymatic fermentation	FS	15.59±1.55	80.68
Curd	Acid-enzymatic fermentation	CWS	16.59±2.65	82.92
Curd	Acid fermentation	FS	13.98±0.82	60.82
Curd	Acid fermentation	CWS	14.98±1.16	62.97

Evaporated Milk





- Industrial trial was performed with the evaporated milk enriched by the CWS vitamin preparation. Vitamin preparation 100 g was added to the 10252 kg evaporated milk before sterilization (D3 2.44 µg/100g).
- Determination of vitamin content in the beginning, middle and end of the production line showed, that vitamin distribution was equal – 2.45±0.31 µg/100g.
- After two months of storage, no decrease of vitamin was observed in the fortified evaporated milk.

Conclusion

Vitamin D3 preparation **100 CWS/AM** (DSM Nutritional Products, Netherlands) is good tool for the fortification of apple juice, curd and evaporated milk.