PORTABLE EQUIPMENT FOR QUANTITATIVE ANALYSIS OF VITAMINS AND MINERALS IN FORTIFIED FOODS

Background
Food fortification consists of adding vitamins and minerals (e.g. iodine, iron or vitamin A) to widely and frequently consumed staple foods like salt, flour, oil or sugar to address micronutrient deficiencies. Populations that consume adequate amounts of fortified foods as part of their diet thus receive the necessary intake of vitamins and minerals. Food fortification has therefore become a proven intervention, and in certain countries is mandatory for food industries to fortify staple foods, as it can address vitamin and mineral deficiencies through large-scale programmes.

Quantitative analysis of vitamins and minerals
In order to quickly determine levels of vitamins and minerals in fortified foods (e.g. to confirm the fortification level or the claims on the label) easy-to-use iCheck measuring devices from manufacturer BioAnalyt have been developed based on fluorometric or photometric analytical methods. Up until recently, quantitative analysis could be conducted only in laboratories using specialised equipment and analytical methods (like High-Powered Liquid Chromatography or Atomic Absorption Spectrometry). Portable fluorometers and photometers using light emitting diode (LED) technology can now be used to determine levels of vitamin A in refined edible oils or solid foods, iodine in salt, iron in solid foods, etc., without requiring any additional laboratory equipment or consumables.

Each iCheck device is specific and corresponds to a particular food fortificant. Together with reagent kits, the devices allow quicker and cheaper testing than in laboratory settings, testing results from iCheck devices are still accurate and precise.

Note: Similar devices, e.g. WYD Iodine Checker (single wave-length photometer), may be available upon request.

Use of devices and training
The devices are suitable for field use without the need for a laboratory. Inspectors or border control officers can easily use them. They are highly suitable where sample analysis is not a regular or frequent occurrence.

It takes less than 10 minutes to determine vitamin A and iodine levels and about 45 minutes to determine iron levels in foods. The weight of fluorometer and photometers is about 2 kg and they can therefore be transported easily. Electricity is needed to operate fluorometer and photometers.

Use of the iCheck machines requires training prior to use and a basic training of 1 day is available through self-taught instructions. Additional on-site training or training via web modules can be organised with the manufacturer.
Calibration and recalibration of devices
Devices do not need to be calibrated before or during testing. However, a calibration control is recommended before each set of testing. The calibration control vials/standard are part of the device set.

Calibration of all devices is guaranteed for 24 months. If the device is in frequent use, maintenance every 2 years is recommended. The device should be directly sent to the manufacturer for a programme update and recalibration. Should recalibration be needed earlier than the guaranteed 24 months, recalibration will be undertaken free of charge.
For more info, please contact UNICEF Supply Division or the manufacturer directly: BioAnalyt GmbH, z.Hd. Technical Support, Rheinstr. 17, D-14513 Teltow, Germany

Calibration Control for Portable Fluorometer S0000227, Vitamin A in Foods - S0000254
iCheck TM Fluoro standard/calibration control (BioAnalyt nr. 005P00201) is part of the original devices set S0000227. It is stable for a minimum of 12 months and must be reordered after expiry. The item can be ordered from Supply Division or directly from the manufacturer. Reordering is recommended when replenishing the reagent set.

Manuel centrifuge - S0000255
A centrifuge is needed to prepare a sample when determining vitamin A and iron in solid foods. This manual centrifuge can be ordered from Supply Division or directly from the manufacturer.

Ordering information
Due to high prices and usually low order volumes, items should be ordered by air only.

ANNEX

Available devices and reagents
The materials below were created to make ordering easy. Please note reagents need to be ordered separately. Reagents are available in sets of 100, i.e. each set is suitable for 100 tests. Sets contain the reaction/extraction vials, additive vials, syringes and needles needed for sample preparation.

For detailed technical information on each item please visit UNICEF Supply Catalogue: https://supply.unicef.org/

<table>
<thead>
<tr>
<th>Analysis of vitamin A content in oil</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>UNICEF catalogue number</strong></td>
</tr>
</tbody>
</table>
| S0000226 | Portable Photometer, Vitamin A in Veg. Oil
Device to analyse the quantity of vitamin A content in refined edible oils, e.g. soybean, palm, sunflower, cottonseed, corn, peanut, rapeseed and coconut oil. Set with accessories | iCheck TM Chroma 3 L011
(Replacement of iCheck TM Chroma, L008) |
| S0000256 | Reagents for S0000226 Vit A/Oil, PAC-100**
Kit with reaction vial, syringe and needle. Pack of 100 | Reagent set for iCheck TM Chroma 3 X011 |
### Analysis of vitamin A content in foods and biological fluids

<table>
<thead>
<tr>
<th>UNICEF catalogue number</th>
<th>Equipment</th>
<th>BioAnalyt Product name and reference</th>
</tr>
</thead>
</table>
| S0000227                | Portable Fluorometer, Vitamin A in Foods  
Device to analyse the quantity of vitamin A content in foods, e.g. vitamin premixes, sugar, flour, milk and breast milk, solid foods.  
Set with accessories | iCheck TM Fluoro L005 |
| S0000257                | Reagents for S0000227 Vit A/Foods, PAC-100**  
Kit with extraction vial, syringe and needle.  
Pack of 100 | Reagent set for iCheck TM Fluoro X005 |
| S0000255                | Manual centrifuge  
Pack of 1 | BioAnalyt 000P005 |
| S0000254                | Calibration control for S0000227 Vit A/Foods  
Pack of 1 | iCheck TM Fluoro calibration control 005P00201 |

** Hazardous items  
These reagent sets contain chemicals in limited quantities classified as being hazardous (Danger class 8: corrosive).  
Special handling will be taken care of by the supplier and freight forwarder.

### Analysis of potassium iodate content in edible salt

<table>
<thead>
<tr>
<th>UNICEF catalogue number</th>
<th>Equipment</th>
<th>BioAnalyt Product name and reference</th>
</tr>
</thead>
</table>
| S0000228                | Portable Photometer, Iodine in Salt  
Device to determine quantity of potassium iodate (KIO3) content in edible salt  
Set with accessories | iCheckTM Iodine L009 |
| S0000258                | Reagents for S0000228 Iodine/Salt, PAC-100  
Kit with reaction vial, additive vial, syringe and needle.  
Pack of 100 | Reagent set for iCheck TM Iodine X009 |

### Analysis of iron in foods

<table>
<thead>
<tr>
<th>UNICEF catalogue number</th>
<th>Equipment</th>
<th>BioAnalyt Product name and reference</th>
</tr>
</thead>
</table>
| S0000229                | Portable Photometer, Iron in Foods  
Device to analyse the quantity of vitamin A content in foods, e.g. vitamin premixes, flour, soy- and fish sauce, beverages, solid foods.  
Set with accessories | iCheck TM Iron L010 |
| S0000259                | Reagents for S0000229 Iron/Foods, PAC-100**  
Kit with extraction vial, additive vial, syringe and needle.  
Pack of 100 | Reagent set for iCheck TM Iron X010 |
| S0000255                | Manual centrifuge  
Pack of 1 | 000P005 |
For more information, contact:

Jan Komrska
jkomrska@unicef.org, Nutrition Unit, UNICEF Supply Division