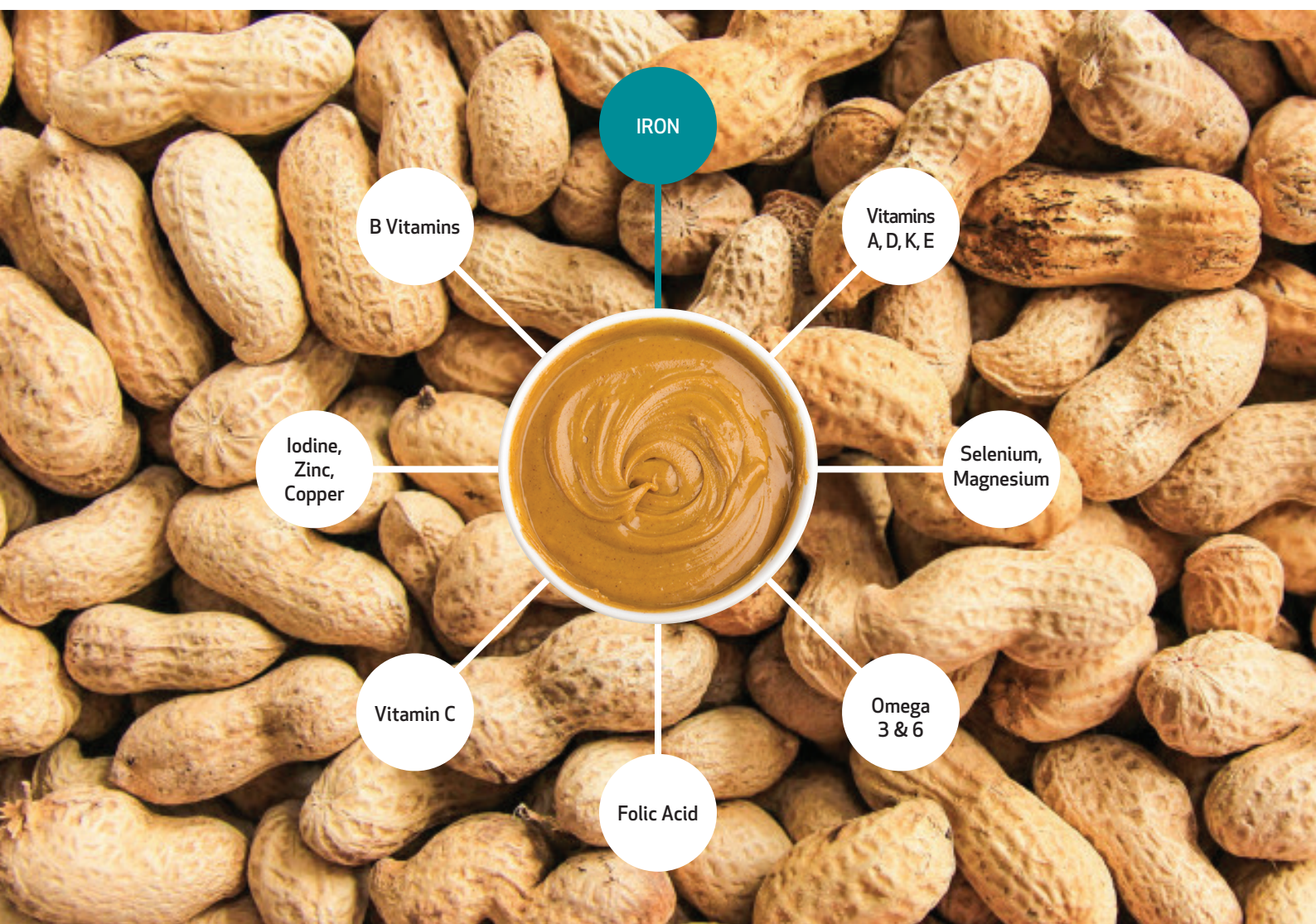


Rapid Measurement of **Iron** in Ready-to-Use Therapeutic Food (RUTF) with iCheck





Ready-to-Use Therapeutic Food (RUTF)

Ready-to-Use Therapeutic Food (RUTF) and Ready-to-Use Supplementary Food (RUSF) are energy-dense, micronutrient-enriched pastes, which are collectively also known as Lipid Nutrient Supplements (LNS). These specially formulated products are primarily given to children aged 6-59 months and aimed at the prevention and treatment of moderate acute malnutrition (MAM) and severe acute malnutrition (SAM). The objective of these foods is to enable rapid weight gain while ensuring essential vitamins and minerals are provided during the critical physical and intellectual growth periods of infants and young children.

The presence of MAM and SAM in children under 59 months is used as a proxy measure for the general nutrition and health status of a population at a specific point in time. MAM is identified by moderate wasting, or the weight-for-height between 2-3 standard deviations from the average. SAM is identified by severe wasting, or the weight-for-height in excess of 3 standard deviations from average and/or the presence of bilateral pitting edema.

RUSF is a less energy-dense product compared to RUTF, and is used for prevention of MAM during situations where it is likely to increase (e.g. seasonal lean periods). RUTF and RUSF are made from an energy-dense protein source – most often peanut paste – along with several vitamins and minerals. Some products also contain dried milk powder or other ingredients to suit local tastes. One of the most common is the Plumpy'Nut® branded products, originally formulated in 1996 and manufactured by the French firm, Nutraset.



10-month old child being fed by her mother in South Sudan.
Photo: Kieran McConville, Concern Worldwide.

RUTF and RUSF do not need to be prepared prior to consumption, making these practical solutions for addressing malnutrition within the household during times of natural disaster or conflict, where cooking fuel and facilities may be more limited. These products also do not need to be mixed with water, thereby avoiding potential contamination when purified water sources are not guaranteed. Many organizations, such as UNICEF and WFP, procure RUTF and RUSF products for use in their emergency and development feeding programs.

Providing a therapeutic or preventive food for very young and acutely malnourished children comes with a stringent set of regulations to ensure safety and quality. Manufacturers and distributors along the value chain may want to measure the levels of various nutrients that have been added and iCheck can help make this process field-friendly, fast, and cost-effective.



How it works

Measuring **Iron** in RUTF with iCheck

To facilitate the implementation of RUTF and RUSF, BioAnalyt developed a sample preparation protocol to enable reliable measurement of the concentrations of iron in RUTF and RUSF samples.

iCheck Iron is portable single-wavelength photometer, pre-calibrated for quantitative measurement of iron in multiple food matrices. iCheck Iron has the capability to measure intrinsic iron and added iron as ferrous fumarate, ferrous sulfate, NaFeEDTA, and ferric pyrophosphate in many food matrices.

To ensure reliable results with iCheck Iron, RUTF samples require a customized sample preparation protocol*. Samples should be diluted in a hydrochloric acid solution to facilitate solubilization of the iron. Afterwards, the solution should be mixed to ensure homogenization and further incubated for 30 minutes in a hydrochloric acid solution.

What Is Our Product?



Measurement Device

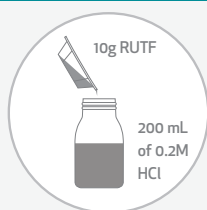
iCheck devices come in a case with all necessary accessories and have a 2-year warranty.



Consumables

Ready-to-use reagent vials come in a Test Kit box, containing consumables for 100 analyses, and have a 12-month shelf-life at room temperature.

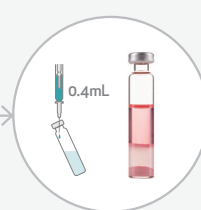
HOW DOES IT WORK?



Mix 10 g of RUTF or RUSF with 200 mL of a 0.2M HCl solution.



Mix the sample solution with a hand-mixer for 10 seconds and incubate the homogenized solution for at least 30 minutes.



Proceed with measurement following the iCheck Iron User Manual.



Multiply the result displayed with 20 (per dilution) to get the concentration of iron in RUTF in mg/kg.

*Contact us to get **detailed protocol and training**:

Email: support@bioanalyt.com
WhatsApp: +49 1573 1111 234

Results with iCheck are Comparable to those with Reference Methods

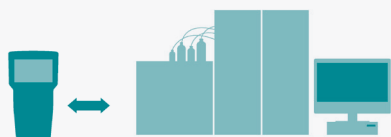
All iCheck devices are compared to traditional laboratory methodologies to ensure reliability and accuracy of measurements. For RUTF, iCheck methods were compared to mass spectrometry methods (ICP-MS). RUTF samples were sourced from Uganda, South Africa, and France and iron levels were measured using both methods.

The results are listed in the table below together with specifications provided by manufacturers. Based on these samples, iCheck results are comparable to those of ICP-MS and correlate well with the standard specifications.

| Sample | Iron type | Specifications, mg/kg | Measured Concentration, mg/kg | |
|--------|------------------|-----------------------|-------------------------------|---------------|
| | | | ICP-MS | iCheck ± SD |
| RUTF 1 | Ferrous fumarate | 176 – 215 | 172.54 | 168.27 ± 0.99 |
| RUTF 2 | Ferrous fumarate | 100 – 140 | 113.73 | 117.27 ± 1.45 |
| RUTF 3 | Ferrous fumarate | 100 – 140 | 116.78 | 114.13 ± 3.36 |

iCheck analysis was performed in-house at BioAnalyt, Germany. ICP-MS analysis was performed in an accredited lab in Germany. Extended measurement uncertainty (MU) for iron with ICP-MS is 10%. ICP-MS method for iron was according to EN 15763 mod.; DIN EN ISO 17294-2. iCheck results are reported with standard deviation of triplicate measurement.

Benefits of iCheck



- **Speed:** Results in 5 to 60 minutes.
- **Economy:** Cost is only 10% of conventional lab methods.
- **Easy implementation:** Only 1 day of training is required.
- **Scalability:** Portable, with no set-up calibration required.
- **Accuracy:** Performance is comparable to reference lab methods.

iChecks are manufactured in Germany, used in over 80 countries and validated against standard laboratory methods. Learn more at www.bioanalyt.com/products.

