Title of Technology:

System for the detection of adulteration in ghee and edible oils.

Need:

Food adulteration is a major concern, not only for the end-users but also the concerned industry. The food we consume is considered adulterated if

- ✓ A substance is added which depreciates or injuriously affects it,
- ✓ Cheaper or inferior substances are substituted wholly or in part.
- ✓ Any valuable or necessary constituent has been wholly or in part abstracted.
- ✓ It is an imitation.
- ✓ It is coloured or otherwise treated, to improve its appearance or if it contains any added substance injurious to health.
- ✓ For whatever reasons its quality is below the Standard

Adulterated food may pose serious health problems as it may be toxic and can affect health and it could deprive nutrients essential for proper growth and development.

Ghee and edible oils are being adulterated to gain profits. Ghee is usually adulterated with lard, Vanaspathi and oil. Edible oils are often adulterated with oils having similar properties. Existing methods of detecting adulterants in these food products are basically chemical methods or methods involving high-end analytical instruments. These methods are highly time consuming and required skill person to test these adulterants. Therefore, a quick, easy and low-cost solution for detecting the adulterants was needed.

The present system being developed which aims at detecting the adulterants in ghee and edible oils has been designed and developed to meet the unmet need of detecting adulterants on real time basis.

While blending of oils is widely seen and accepted in oil industry, it was needed to have a check on the blending of oils as prescribed and indicated. Therefore, the present system also targets in validating the blending of oils (whether the oils have been blended as indicted on the packets).

Specific features of Technology Envisaged/Developed (Benchmarking USP) (in bullets)**:**

- ✓ On-the-spot adulteration check of edible oils and ghee
- ✓ On-the-spot blending check and validation (for edible oils)
- ✓ Green Technology (No chemical usage)
- ✓ Easy to operate: Place and check
- ✓ Battery Operated
- ✓ Composition Measurement (in case of blending)

Measurement Principle: Optical (UV, Visible and NIR based) Scanning + chemometrics (Spectral fingerprinting)

Adulterants:
- ✓ Lard, Vanaspathi and oil in Ghee
- ✓ Very commom adulterants like
  - Adulteration of Extra virgin Olive oil with Olive Pomace oil
  - Adulteration of Coconut Oil with Palm Kernel Oil
  - Adulteration of Mustard Oil with Rice Bran Oil
  - Adulteration of sunflower Oil with Cotton Seed Oil

Applications of Technology and Impact (in bullets):

The developed system finds application of quality check in

- ✓ In edible oil industry
- ✓ Food inspection agencies

Photograph:

Fig: A schematic of the developed system (both for adulteration and blending)