Soxhlet and His Extractor

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SOXHLET AND HIS EXTRACTOR

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In 1879, a simple but ingenious apparatus was invented to automatically extract fats from fat-containing solids. The apparatus (Fig. 1) is still extensively used today, and its applications have been extended to other fields such as the extraction of elemental sulphur from ores or residues and organic compounds from asphalt and pitch.

The apparatus consists of four parts:
- a glass thimble with porous bottom in which a weighed sample of the solid is put;
- the siphon (the middle part) in which the thimble and its contents are put;
- a flask, which is attached to the siphon, containing the solvent (ether for extracting organic compounds, and carbon disulphide for extracting elemental sulphur); and
- a condenser that is assembled on top of the siphon.

The flask is then heated gradually until the solvent reaches the boiling point. Heating is maintained for about half an hour during which time the vapours ascend through the side arm of the extractor and then condense and drip into the thimble. When the extractor is filled to the top of the side arm, the solvent, containing the solute from the sample, siphons over into the flask. Thus, the apparatus allows for a series of extractions with fresh solvent, as it drains the solvent automatically.

When extraction is complete and all of the solvent has been siphoned into the flask, heating is stopped, the unit is allowed to cool and is then disconnected, the thimble is dried, and the loss in weight is determined; this represents the material extracted by the solvent.

The apparatus is shown on several postage stamps, for example one from the Guinean Republic on the occasion of the inauguration of the new headquarters of the World Health Organization (Fig. 2).

Franz von Soxhlet (1848-1926) (Fig. 3), the inventor of this apparatus, was a professor at the Technische Hochschule in Munich, Germany. He was appointed to this position in 1879 at the age of 31. In the same year, he made his invention at the Institute of Agriculture and Animal Physiology where he remained all his life. He studied chemistry at the University of Leipzig and earned a doctorate in 1872. He then joined the Experimental Station for Agricultural Chemistry in Vienna where he remained for about six years before accepting the Bavarian position. In 1894, he was bestowed with a doctorate degree honoris causa from the University of Halle in Germany. His main areas of research were milk, sugars, and margarine. In 1895, he wrote a book entitled “Margarine.” He died on May 5, 1926.

SUGGESTED READINGS


