and multiyear guarantees, not usually provided with a conventional compost or wood chip bed biofilter. For large volumes of air, a biofilter may be the only cost effective solution (http://www.biofilter.com/). There is no secondary pollution (unlike the case of incineration where additional CO_2, CO, and NO gases are produced from burning fuel(s) and degradation products form additional biomass, carbon dioxide and water).

10.1.2. Water Treatment. Trickling filters have been used to filter water for various end uses for almost two centuries. Biological treatment has been used in Europe to filter surface water for drinking purposes since the early 1900s and is now receiving more interest worldwide (http://www.biofilter.com/). Media irrigation water, although many systems recycle part of it to reduce operating costs, has a moderately high biochemical oxygen demand (BOD) and may require treatment before disposal. Biofilters are being utilized in Columbia falls, Montana at Plum Creed Timber Company's fibreboard plant (http://www.biofilter.com/).

Biofiltration is one of the most effective water treatment technologies. Its application includes water filtration in farms, livestock operations, city municipal, industrial, and household applications. Some of the organisations which have supported the development or application biofiltration of water (http://www.biofilter.com/) over the past 14 years include the following:

(i) Prairie Farm Rehabilitation Administration (PFRA),

(ii) The National Research Council (NRC),

(iii) The Saskatchewan Research Council (SRC),

(iv) Napier University (Scotland),

(v) Agriculture and Agro-food Canada.

Biofiltration is ideal for well, lake, pond, river, and dug out water. Biofilters remove the following substances from air and water: iron and iron bacteria, parasites, colour, cysts, manganese, pesticides, arsenic, lead, mercury, turbidity, dissolved organic carbon (dissolved organic material in water), tannins [26].

A good number of research and practical work has been and is being carried out by Nigerian scientists and academics in the area of biofiltration of waste water. Bearing in mind that good water is a very essential commodity which is not readily available in most part of the country, it is therefore of great necessity to look at economic feasible ways to treat water for the benefit of the citizens. The sources of portable water for most Nigerian cities are government treated tap water and commercially treated drinking water as well as domestic water by water service private firms. Rural communities make do with water from ponds, streams, rivers, rain, and spring which are prone to contamination by water-borne diseases such as typhoid and diarrhoea which is common in those communities. Some of the applications of this important biotool in Nigeria are as follows.

(1) Asamudo et al. [27] demonstrated the effectiveness of using the fungus *Phanerochaete chrysosporium* in the biofiltration of textile effluent, polycyclic aromatic hydrocarbons (PAH), and pulp and paper effluents. The microorganism was capable of producing extracellular enzymes such as manganese peroxidase, cellulases, and lignin peroxidases, in achieving total remediation of these effluents.

(2) Ezeronye and Okerentugba [28] carried out a study to demonstrate the effectiveness of a yeast biofilter composed of a mixed culture of *Saccharomyces* spp., *Candida* spp., *Schizosaccharomyces* spp. and *Geotrichum candidum* in the treatment of fertilizer factory effluents and 98% treatment efficiency was achieved. The biochemical oxygen demand (BOD) of the effluent was reduced from a range of 1200–1400 to 135–404 mg/L. Besides, ammonia nitrogen (NH_3-N) and nitrate-nitrogen (NO_3-N) were reduced from 1000–10 mg/L and 100–17.6 mg/L, respectively.

(3) Ogunlela and Ogunlana [29] developed a system using lava stones and oyster shells biofilter substrates for the oxidation of ammonia in a recirculatory aquaculture system. The effluent was treated using the biofilter, and chemical analyses were carried out once a week for four consecutive weeks. The results at the end of the fourth week indicated that the ammonia and nitrite concentrations were 0.0374 mg/L and 0.292 mg/L, respectively, which were below the permissible limits of 0.05 mg/L and 0.3 mg/L for ammonia and nitrite, respectively.

One of the most recent innovations in the use of this biotool in Nigeria was by Rabah et al. [30]. Their work describes the use of yeast biofilters in the treatment of abattoir waste water. Thus, Nono (locally fermented milk product) and Kunun-zaki (a refreshing drink made from millet) samples were obtained at the minimarket of the main campus of the Usmanu Danfodiyo University, Sokoto, Nigeria, in sterile sample bottles and transported in an icebox to the laboratory for the isolation of yeasts. Wastewater was collected from an abattoir in Sokoto, Nigeria, using sterile two litre capacity sample bottles and transported in an icebox to the laboratory. The wastewater was collected from three points in the abattoir: at the point where the wastewater leaves the slaughter hall (Point A, PA), midway through the drainage channel (Point B, PB), and the point where the wastewater drained to the surrounding soil (Point C, PC). A total of three samples were collected from each point at different times.

The biofilter was constructed using Perspex glass with a length of 18.0 cm, width of 10.8 cm, and a depth of 10.5 cm. The filter has upper and lower compartments separated by a perforated partition made up of the same Perspex glass. It also has a tap for the collection of filtered wastewater. Potato peels were ground to smaller particles, wetted, and placed on the perforated partition. The yeast biomass was inoculated on the peels and left for one week at ambient laboratory temperature ($28 \pm 2^{\circ}C$) to allow the cells to grow. Then the abattoir wastewater was introduced into the filter bed and left to stand for a minimum period of 14 days. The filtered