

## ECOLOGICAL SANITATION AND HUMAN HEALTH

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The term "ecology" was first suggested in 1866 by E.Haekel, a German biochemist. At present, the term has been expanded into more than ten disciplines of ecosystem, such as the ecotope, ecologic economics, ecological agriculture and ecological engineering, etc. Ecological sanitation applies the fundamentals of ecology, and takes the non-hazardousness, decrement as well as resources recovery of human excreta as the guiding principles for the construction of ecological facilities, and the rational utilization of non-hazardous treated human excreta as a useful resources, so as to achieve the purpose on health protection of human beings and ecological balance. Human excreta is composed of urine and faeces which is a high quality organic manure, and the resources are abundant. The use of human excreta as fertilizer has a history of more than two thousand years in China and has played a big role in agricultural production. In 1993 a survey indicated that 93.9% of human excreta were used as fertilizer. However, from the hygienic point of view, faeces contain a large amount of microorganisms and parasite eggs, such as hepatitis A virus (HAV), typhoid fever bacillus, shigella, cholera vibrio, and Shistosoma eggs, hookworm ovum, as well as ascarid ovum and so on. If human excreta were used without any treatment that would cause extensive environmental pollution and transmit intestinal infectious diseases, parasitic diseases and impair peoples' health. Now, the prevalence of viral hepatitis, dysentery, typhoid fever, infectious diarrhoea and other entero infectious diseases account for more than 70% of the infectious diseases in the country. China has a high prevalence of hepatitis A that accounts for more than 20% of the total hepatitis patients. According to estimates there are 531 million people infected with ascaris, 194 million with hookworm, 212 million with whipworm and 870,000 with schistosomiasis. The sanitization of human excreta is a prerequisite for disease prevention and control.

There are a number of methods for the sanitization of human excreta: high temperature composting, three-compartment septic tank treatment, anaerobic digestion etc. The Ministry of Health has issued "Hygienic standards for sanitization of human excreta" (GB 7959-1987). Based on a long time investigation and practical application, various types of rural household toilets that meet the requirements of eco-sanitation were popularized, namely the three-compartment septic tank toilet, double-urn funnel-shaped toilet, triplet biogas toilet, ecological toilet with urine diversion, double pit toilet and so on. The paper proposes some recommendations with regard to the development of eco-sanitation in the future:

1. To strengthen mobilization, training and education to increase the consciousness of ecological sanitation, and set up the Ecological Sanitation Association under the China Ecology Society, so as to promote eco-sanitation.
2. To develop and promulgate "Hygienic standards for rural household toilets", and list the ecological sanitary toilet for urine and faeces separate collection in it, and enable the acceleration of popularization.
3. To enhance the cooperation between the departments of environmental protection and agriculture, and integrate the constructions among ecological sanitation, ecological environment and ecological agriculture closely, so as to attain optimum benefits.