

6. Toxoid vaccines (Toxoids):

Certain pathogenic bacteria such as *Corynebacterium diphtheriae* (diphtheria), *Clostridium tetani* (tetanus) during their growth in the host cells produce and release toxic substances known as "toxins". These toxins are responsible for the pathological symptoms and/or lethality. These toxins possess antigenicity.

Toxoids are bacterial toxins or materials derived from them whose toxicity is reduced or completely eliminated but their immunogenicity is maintained either by treating them with chemicals such as formaldehyde or heating them. Toxoids produced by the action of formaldehyde are known as formol toxoids.

Toxoid vaccines use toxoids as antigens to induce active immunity against diseases caused by toxins secreted by specific bacteria.

General method of preparation of toxoids:

1. The toxins are obtained from selected strains of specific micro-organisms, grown in suitable media.
2. The toxins are converted to toxoids either by chemical treatment or heating. Normally, toxins are converted to formol toxoids (FT).
3. Formol toxoids have antigenicity with reduced toxicity.
4. To increase the immune response, the toxoid is adsorbed to aluminium or calcium salts, which serve as adjuvants.
5. The adsorbed product may be separated, washed and suspended in a saline or other appropriate solution isotonic with blood.

The official bacterial toxoids are Diphtheria vaccines (Adsorbed) I.P., Tetanus Vaccine (Adsorbed) I.P., Adsorbed Diphtheria, Tetanus and Hepatitis B (rDNA) Vaccine, etc.