Summary of

IS 2557 : 1994 (Annatto colour for food products – Specification)

Annatto is a **natural colorant** derived from the seeds of the tropical plant ***Bixa orellana***, widely used in the food industry for its vibrant yellow to orange hues. Chemically, annatto comprises **carotenoids**, with **bixin** ($C_{25}H_{30}O_4$) as the major **fat-soluble** pigment found in oil-based extracts, and **norbixin** ($C_{24}H_{28}O_4$), a **water-soluble** derivative present in aqueous solutions. Both bixin and norbixin can exist in cis and trans isomeric forms, and their thermal degradation products may also be present in processed annatto.

The extraction method (using oil or water) influences the relative composition, affecting its solubility and application. The annatto solution in oil is used for coloring butter and margarine while its solution in water with a little alkali is used for coloring cheese and other similar products. Beyond its culinary uses, annatto has been studied for its potential antioxidant, anti-inflammatory, and health-promoting properties.

The Indian Standard **IS 2557:1994**, prescribes requirements for annatto in both oil-based and water-based forms. The standard mandates that annatto must be derived solely from the *Bixa orellana* plant, processed and stored under **hygienic conditions**, and must not contain any extraneous coloring agents. For annatto solution in oil, the standard details oils (coconut oil, groundnut oil, mustard oil etc) which shall be used for extraction. Further, the requirements for the solution of annatto in water are also detailed.

Various analytical tests, including **spectrophotometry** and **chromatography**, are prescribed for assessing carotenoid levels. The **purity** requirements specify minimum bixin and norbixin content and permissible limits for **heavy metals** such as arsenic, lead, and copper. To maintain product integrity, the standard mentions **labelling** on containers with information on the type of annatto, source, and batch details. The document also outlines packaging guidelines to minimize contamination and protect the product from light. **Testing and sampling** methods are also detailed to maintain adherence to quality and safety standards.