

THE SEED

After fertilization, ovules undergo transformation into seeds. A seed comprises two main components: a seed coat and an embryo. The embryo itself consists of an embryonal axis and either one (as seen in wheat and maize) or two cotyledons (as observed in gram and pea).

Structure of Dicotyledonous Seed:

- **Seed Coat:** The outer protective layer enveloping the seed is termed the seed coat, derived from the integuments of the ovule. The seed coat comprises two distinct layers: the outer testa and the inner tegmen. A visible scar on the seed coat, known as the hilum, marks the point of attachment of the developing seed to the fruit. Positioned above the hilum is a small pore called the micropyle.
- **Embryo:** The embryo stands out as the most crucial element of the seed. It consists of an embryonal axis and typically two cotyledons. These cotyledons often exhibit a fleshy nature and store reserve food materials. At the two ends of the embryonal axis are the radicle, responsible for root development, and the plumule, which gives rise to the shoot system.
- **Endosperm:** The endosperm is a product of double fertilization. In certain seeds like castor, it functions as a tissue for storing food. However, in seeds such as bean, gram, and pea, the endosperm is absent in mature seeds, and these are referred to as non-endospermous seeds.

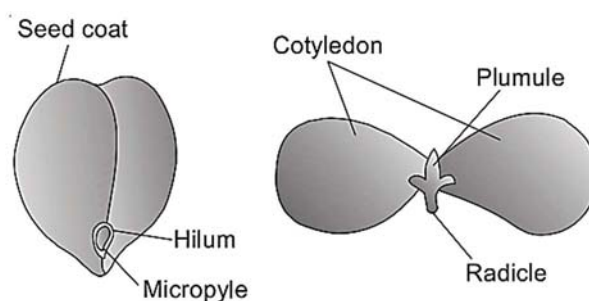


Fig. : Structure of Dicotyledonous Seed

Structure of Monocotyledonous Seed

- In the seeds of monocotyledonous plants, such as cereals like maize, the seed coat takes on a membranous form and is typically fused with the fruit wall. Beneath the protective layer of the grain, two primary structures exist: the endosperm and the embryo. The endosperm, characterized by its bulkiness, serves as a storage reservoir for nutrients. Consequently, monocotyledonous seeds are identified as endospermic, although exceptions like orchids exist, demonstrating non-endospermic characteristics.
- Within the endosperm, an outer layer, composed of proteins, known as the aleurone layer, acts as a separator between the endosperm and the embryo. The embryo, situated within a groove at one end of the endosperm, is relatively small in size. It comprises a singular large and shield-shaped cotyledon, referred to as the scutellum, along with a short axis containing both a plumule and a radicle. These latter structures, the plumule and radicle, are enveloped in protective sheaths known as coleoptile and coleorrhiza, respectively.

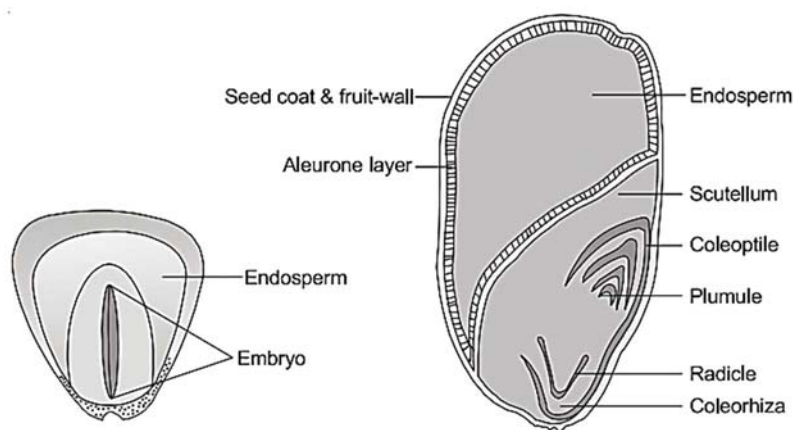


Fig. : Structure of a monocotyledonous seed

Perispermic Seed

- In the majority of cases, the nucellus, a part of the ovule, is utilized and depleted post-fertilization as a result of nutrient absorption by the developing endosperm and embryo. However, there are instances where the nucellus retains its presence within the seed even after fertilization, forming a structure known as perisperm. Seeds exhibiting this characteristic are referred to as perispermic seeds. An example of such seeds can be found in *Piper nigrum*, commonly known as black pepper.