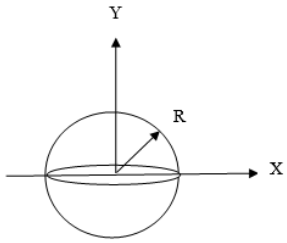
APPENDIX

In nature, we find mostly two geometries in the seeds:

1. Spherical shape
2. Ellipsoidal shape

Our analysis holds well both for spherical and non-spherical seeds when the equivalent diameter is considered for ellipsoidal seeds. The analysis is formulated for spherical geometries. However, for ellipsoidal geometry the equivalent diameter as a first approximation is to be employed.

1. Spherical seed

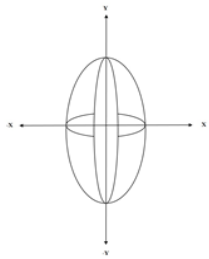


Spherical seed radius = R

R=Radius of the Spherical seed:

$\text{VOLUME} = \frac{4}{3}\pi R^3$: D=2R

2. Ellipsoidal seed - (equivalent diameter)



where the geometry of the seed is defined by the coordinate system $(-a < X < a)$: $(-b < Y < b)$

Volume of the seed = $\int_{-b}^{b} \pi x^2 \, dy$

where $x^2 = a^2\left(1 - \frac{y^2}{b^2}\right)$

Volume = $\frac{4}{3}\pi b^2 a$

On simplification $D_{eq} = 2(b^2 a)^{1/3}$Y

Define for non- spherical seed

$D=D_{eq}=2\,[b^2 a]^{1/3}$

For spherical geometry b=a=R: D_{eq}= 2R