TARGET THICKNESS STUDY

Tailpiece Radius 2.10 cm
Raster Radius   1.00 cm
Half Cup Length   1.52 cm

Method	Average Thickness (mm)
1-dimensional integral	4.98 mm
2-dim, Red+Green	4.98 mm
2-dim, Red only	5.19 mm

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```
#include <math.h>
#include <stdio.h>

#define TAIL_RADIUS  2.10
#define RAST_RADIUS  1.00
#define Z_OFFSET     1.52 //half the length of a target cell

double he_length(double x,double y) {
  double length;
  length=sqrt(pow(TAIL_RADIUS,2)-pow(x,2))-Z_OFFSET;
  return(length);
}

int main(int argc, char **argv) {
  int i,j,steps,two_dim_count;
  double x,y,step_size,half_step,y_edge;
  double one_dim_avg,two_dim_avg;
  if(argc!=2) exit(1);
  steps=atoi(argv[1]);
  one_dim_avg=0;
  two_dim_avg=0;
  two_dim_count=0;
  step_size=2*RAST_RADIUS/((double) steps);
  half_step=step_size/2.0; //we want the centers of a bin, not the edge
  for(i=0;i<steps;i++) {
    x=((double) i)*step_size-RAST_RADIUS+half_step;
    one_dim_avg+=he_length(x,0.0);
    y_edge=sqrt(pow(RAST_RADIUS,2)-pow(x,2)); //edge of raster radius
    for(j=0;j<steps;j++) {
      y=((double) j)*step_size-RAST_RADIUS+half_step;
      if(fabs(y)<=y_edge) {
        two_dim_avg+=he_length(x,y);
        two_dim_count++;
        //printf("%f %f %f\n",x,y,he_length(x,y));
      }
    }
  }
  one_dim_avg/=(double) steps;
  two_dim_avg/=(double) two_dim_count;
  printf("1d average (mm)=%5.2f\n",one_dim_avg*10.0);
  printf("2d average (mm)=%5.2f\n",two_dim_avg*10.0);
}
```