The following results are obtained when considering only ***radiation and convection.***

The calculations were done using assuming the following parameters:-

Surface area = 1000 m^2 kg^{-1}

Briquette density = 1500 kg m^{-3}

Bed velocity = 0.005 m s^{-1}

Specific heat = 1000 kJ kg^{-1} K^{-1}

Fractional radiated heat absorbed by the bed = 0.75

Surface Temperature = 1200 K

Initial Temperature = 300 K

To calculate overall heat transfer coefficient:

$$h = Nu\,k/d; \quad Nu = 2 + 0.9Re_{bed}^{0.5}; \quad Re_{bed} = V_s d/(\nu(1-\phi_{bed}))$$

Color Coding (Different air speed for different color)

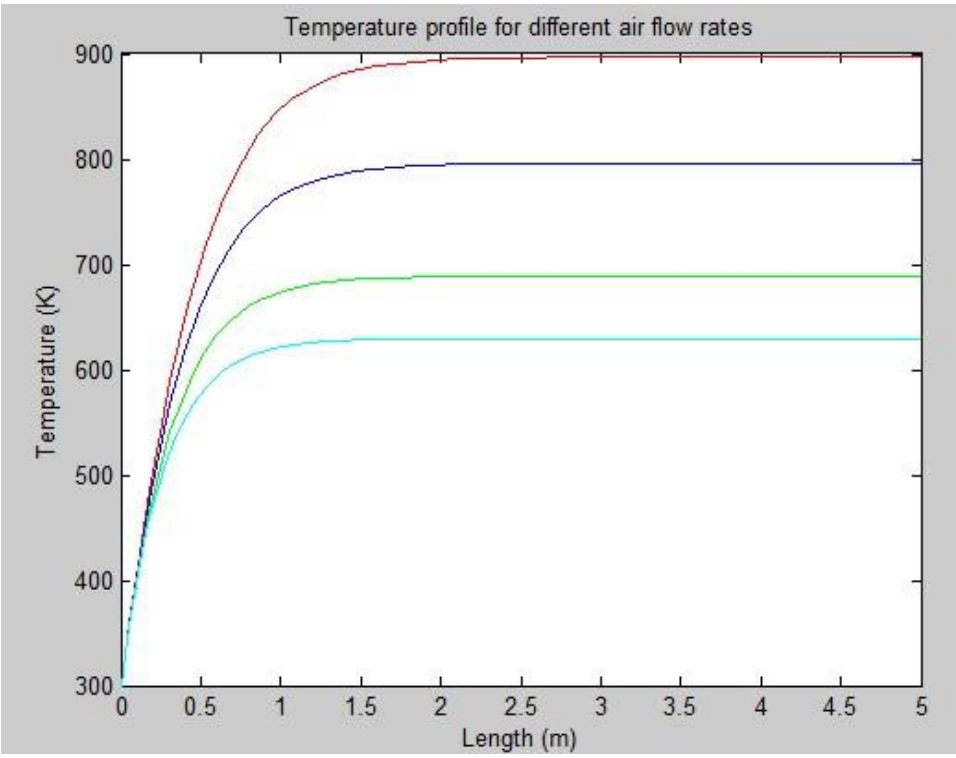
Red – 0.5 m s^{-1}

Blue- 1 m s^{-1}

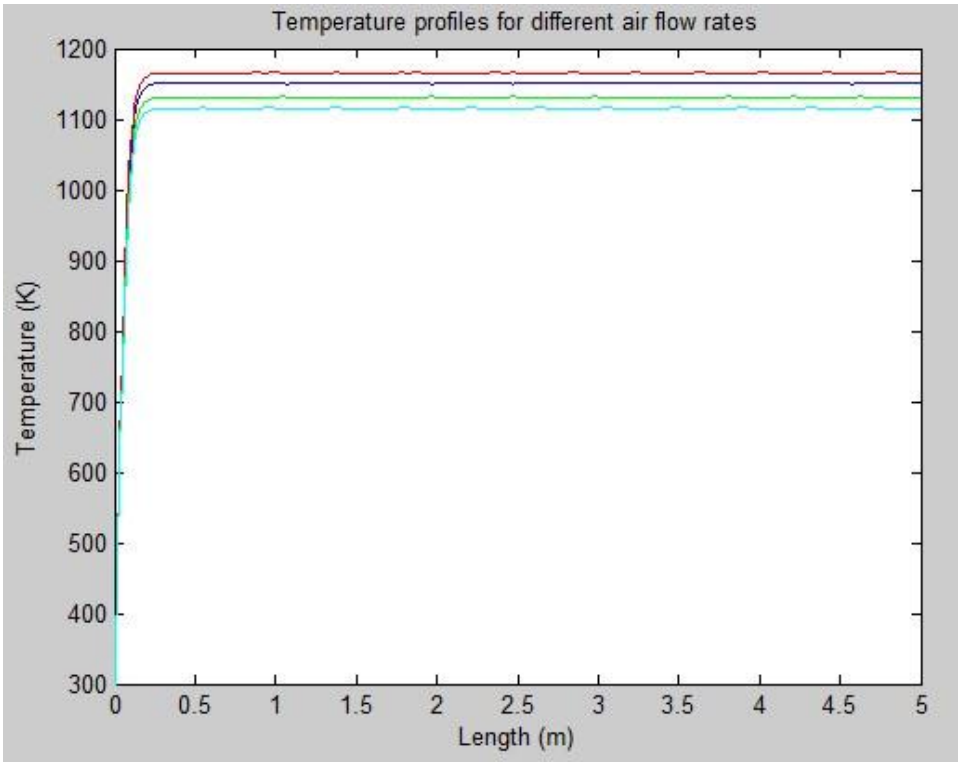
Green - 2 m s^{-1}

Cyan - 3 m s^{-1}

For Emissivity = 0.1



Emissivity = 0.9



Factors unaccounted for:

- Heat of reactions
- Height (2D variation)
- Mass transfer (diffusion, convection)
- Conduction (Fair enough to neglect)