**Investigation on Biotribology of Post Processed Additively Manufactured Biomaterial through Magnetorheological Fluid Assisted Finishing process**

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**Abstract:** *Additive Manufacturing* (AM) is recently used to manufacture biomedical implants as the customized fabrication of the desired complex shapes is easily achievable with reduced manufacturing time and material waste. However, the poor surface quality of additively manufactured products is a major concern during these biomaterials' better functionality. Hence an appropriate surface finishing method is required to improve the surface quality of the *AM* products. *Magnetorheological Fluid Assisted Finishing* (MFAF) process is an advanced surface finishing process used to enhance the surface quality of the workpiece without altering surface topography. *Powder Bed Fusion* (PBF) is used to manufacture the SS314 biomaterial; further, its surface quality is enhanced through the *MFAF* process. However, average surface roughness (*Ra*) only provides details regarding the average height of peaks and valleys from the mean line. Hence, kurtosis (*Rk*u) and skewness (*Rsk*) analysis are studied after the surface finishing operation to determine the surface characteristics of the polished surface. Furthermore, the biotribology of the final polished surface of the *AM* implant determines its sustainability inside the human body. Hence, the pin-on-disc experiment is performed on the polished surface to determine the polishing process efficiency during tribological contact of the biomaterials with the bone. During the pin-on-disc, the pin is made of the SS314 manufactured through AM, and its surface is polished through *MFAF*.

***Keywords:*** Additive Manufacturing, Magnetorheological Fluid Asisted Finishing process, Biotriobolgy, average surface roughness