



Session	Alternative and Unconventional Feedstocks
Title	Your Bacterial Ally Against Fire
Company	BioFire
Speaker	Ali Elahinik
Keywords feedstock (max 2)	Organic Waste
Keywords technology (max 2)	Biopolymer Extraction
Keywords End-Product (max 2)	Flame Retardants
Abstract:	
For centuries, humans have relied on Nature’s smallest helpers, microbes, to solve big challenges. From brewing beer to producing medicine and cleaning wastewater, biotechnology has shown its power. But what if microbes could do more, like protect us from fire? Fire safety is essential. Flame retardants are used in countless industries, yet most are toxic, fossil-based, and increasingly restricted. “Safer” alternatives require high loadings that weaken materials, slow production, and raise costs. Europe’s dependence on fossil imports also makes fire safety a geopolitical risk. At TU Delft, more than a decade of research revealed a microbial biopolymer from wastewater, extracellular polymeric substances (EPS). This natural “glue” not only binds materials but also acts as a powerful flame retardant by forming a protective char layer and releasing gases that suppress flames. With proof-of-concept validated, we created BioFire to bring this breakthrough beyond the lab. A patent has been filed, a team formed, and early industry feedback shows strong interest in testing and co-development. Our next step is to partner with early adopters to validate BioFire in applications like specialty composites, benchmark it against competitors, and prepare for scale-up. BioFire transforms waste, a costly global problem, into a sustainable flame retardant that industries demand.	