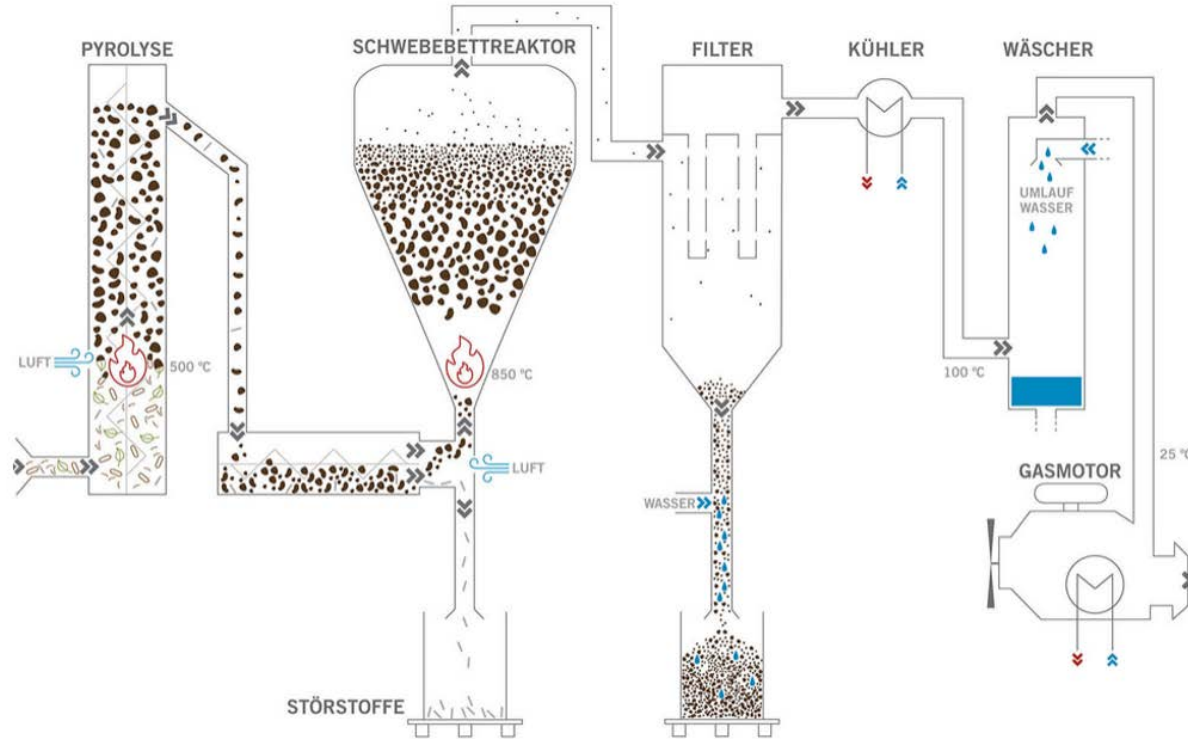


# **Adaption of waste wood in wood gasification Consideration of the pyrolysis stage**

Lukas Kurz & Benjamin Hupfauf



# The gasification process



# The biomasse

High homogeneity, „good“ particle distribution and low proportion of contaminants

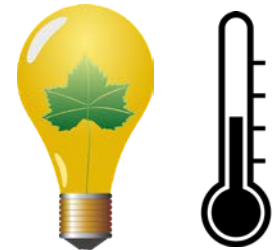
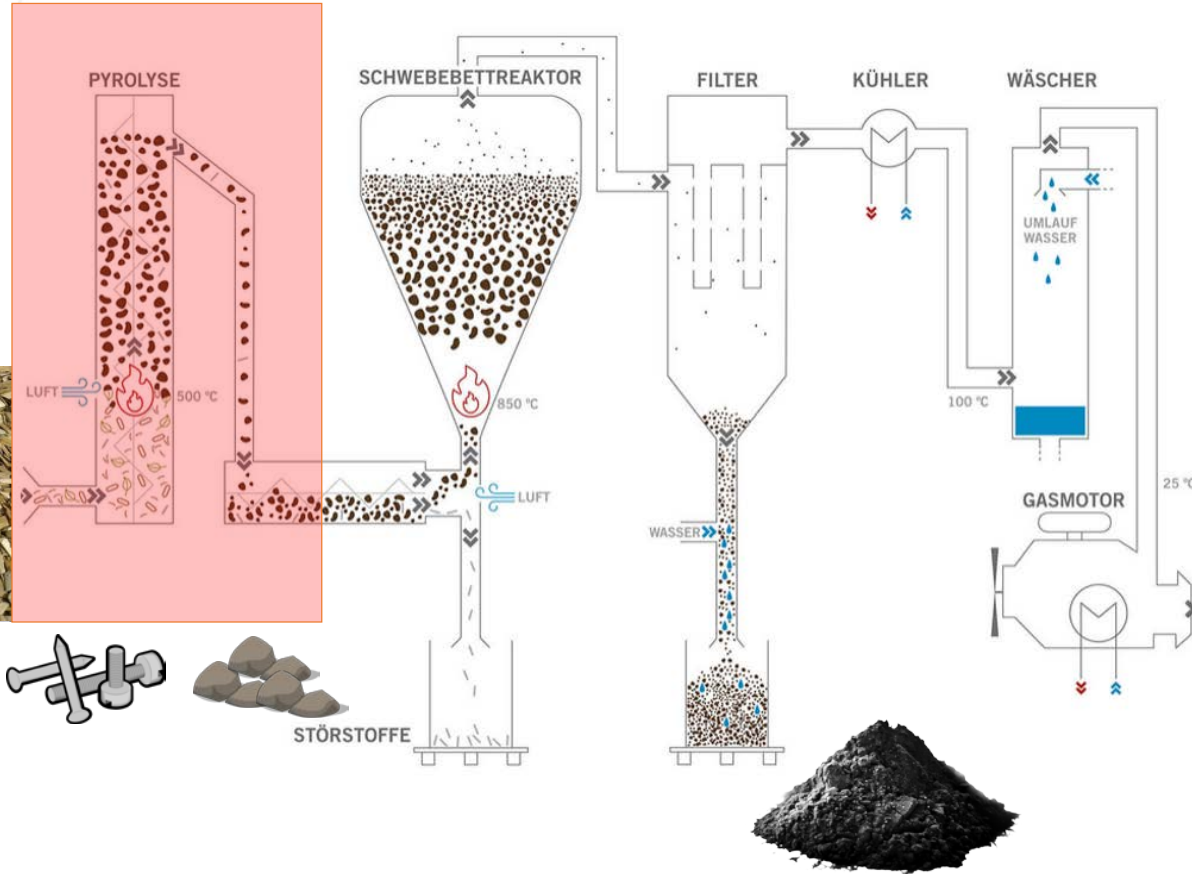


usage unproblematic



usage problematic

# Operational challenges when working with waste wood



# Selected projects

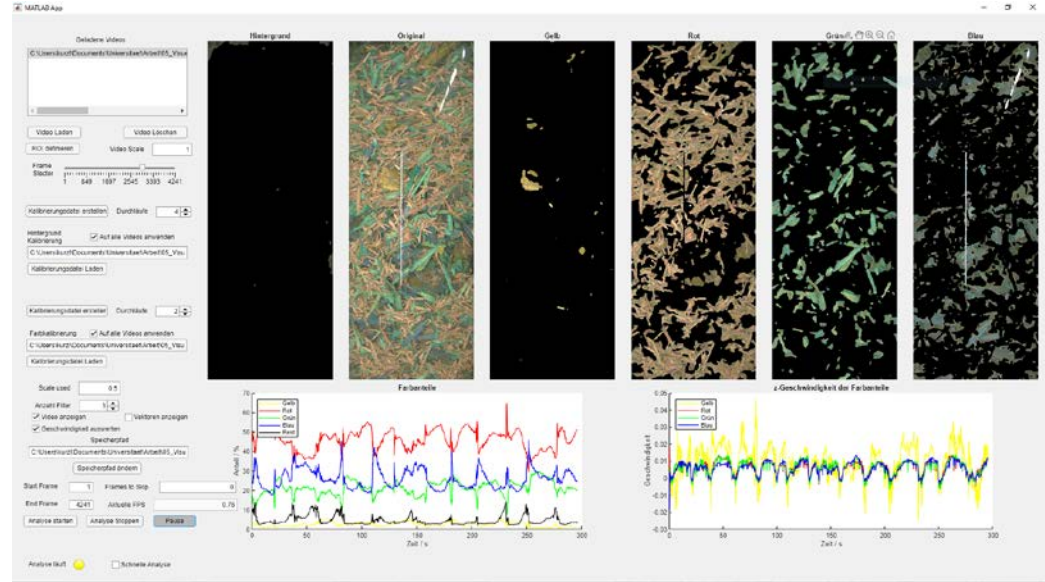
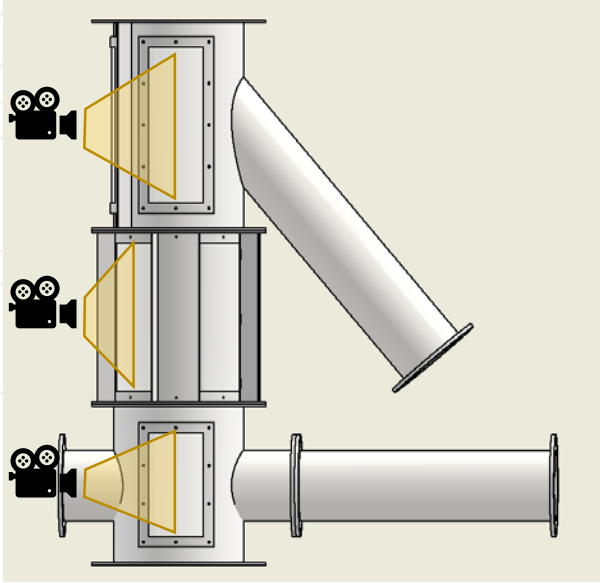
- „**Pytail**“ – Optimization, knowledge deepening process stage pyrolysis
- „**HoPyro**“ - Horizontal pyrolysis

# Project Pytail

## Goals:

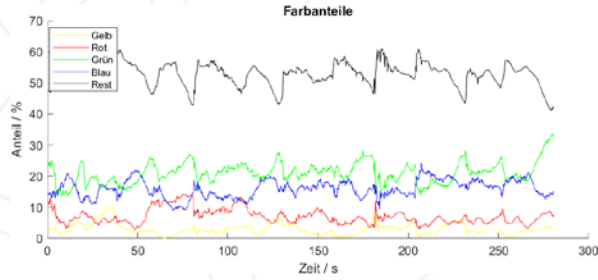
- **Better understanding of biomass transport in vertical reactors**
- Examination of various biomasses: forest residues, wood chips, waste wood, waste wood with contaminant content
- **Influence of different fine particles on conveying behavior**
- Testing of various components (paddles, drive wheels)

# Project Pytail

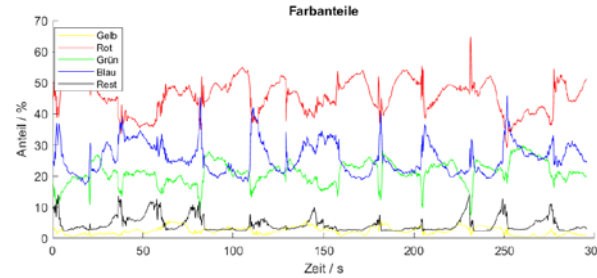


- Optical evaluation of stained biomass using surface cameras
- Evaluation of the fraction proportions using a Matlab program "bottom", "middle" and "top" in the reactor

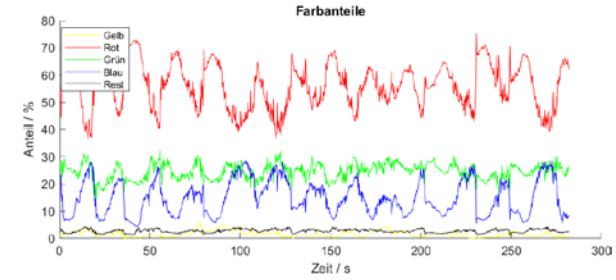
# Project Pytail



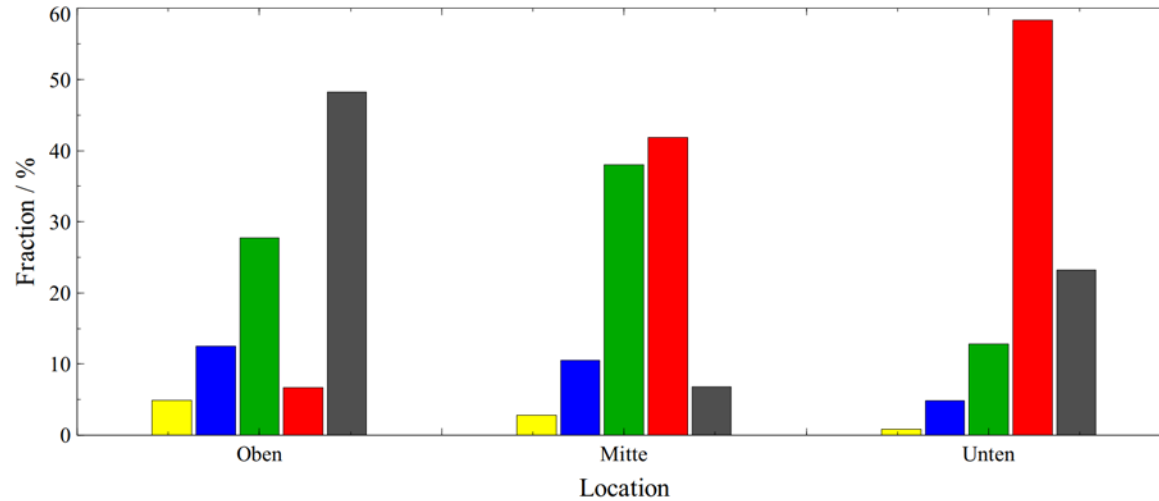
„top“



„middle“



„bottom“



# Problematic contaminant input



30 l after 10 min

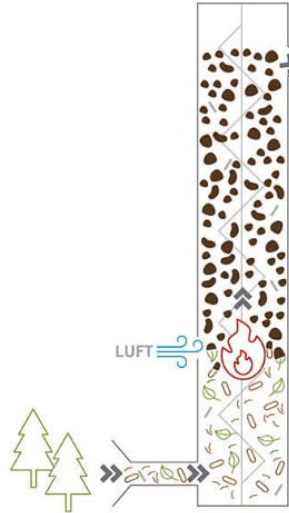


60 l after 20 min



90 l after 30 min

# Project HoPyro

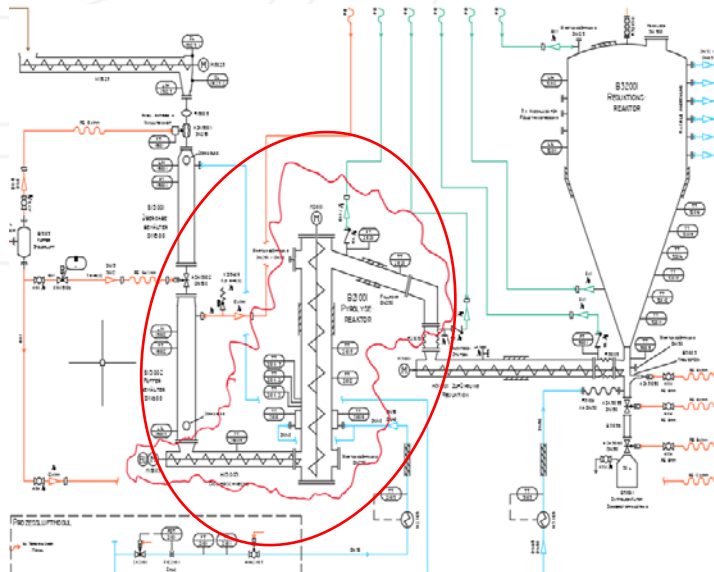


## Goals:

- Development of a horizontal pyrolysis unit as an alternative
- Higher flexibility with lower-quality biomass (contaminants such as stones, sand, metals)
- Simplification of conveyor technology → lower investment and operating costs
- Reaching new target groups through a broader range of biomass applications

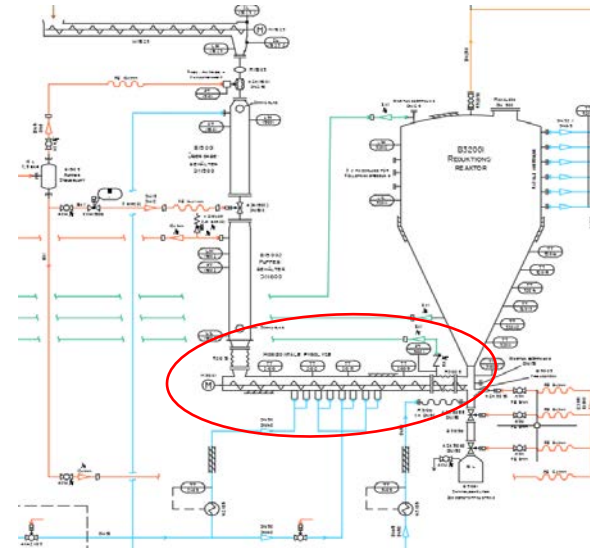
# Project HoPyro

## Vertical (State of the Art)



Minimum 3 motors, 3 augers, extensive piping, large cooling area

## Horizontal



potentially only 1 motor, 1 auger, directly into the carburetor reactor

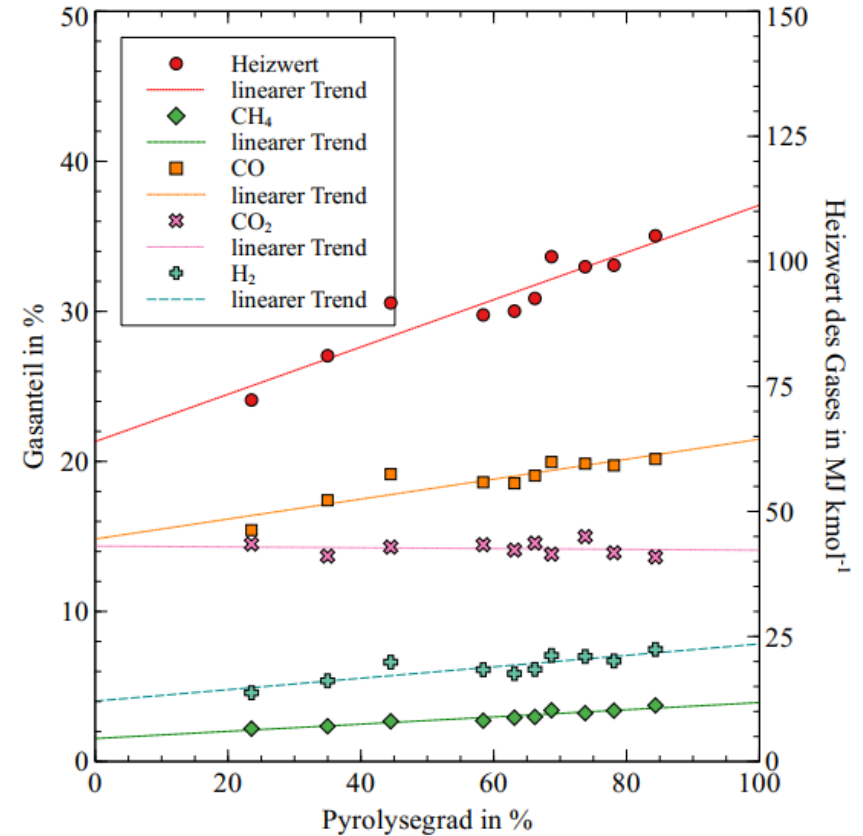
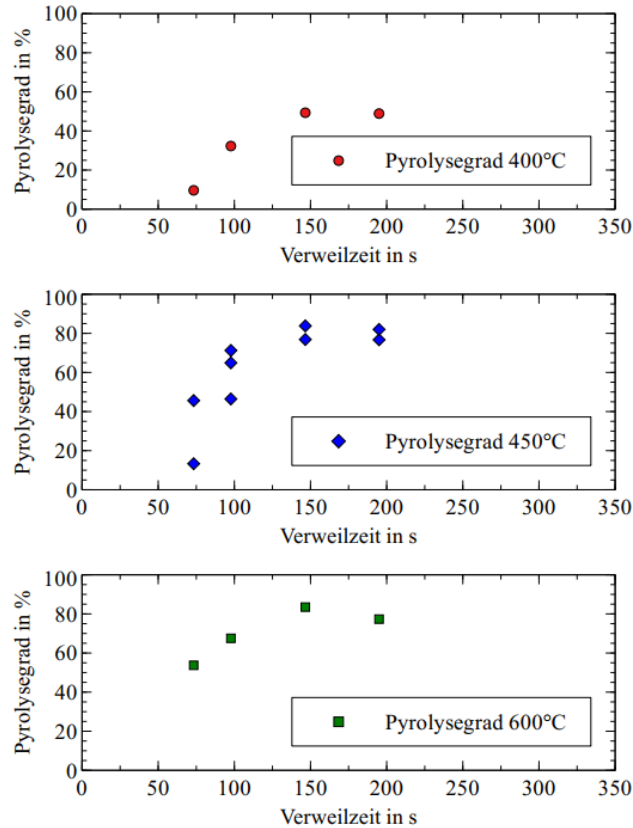
# Project HoPyro



# Project HoPyro



# Project HoPyro



## To be discussed – ongoing - broadening horizons

- Successful conversion from vertical to horizontal pyrolysis on a technical laboratory scale
- Scale-up to a commercial gasification plant is currently underway.
- Further applications and product variations are already being considered.
  - Suspended Mushroom Substrate / Mealworm manure/frass
  - Physical properties of mealworm manure/frass (Particulate matter and low moisture) may have the potential to focus on liquid products of pyrolysis.
  - However, the focus remains on biochar as the main product of pyrolysis.
- Even though our focus will remain on the solid products of pyrolysis, we are very pleased with today's exchange and fruitful broadening of horizons.



**Thank you – We look forward to the  
exchange!**