



# LaChiPur – A Biobased and Biodegradable Flocculant

## Efficient purification of complex wastewaters

### **Task: treatment of seasonal agro-industrial wastewater**

Wastewaters from food processing (e.g. wine and olive oil manufacturing) contain a complex organic load posing major challenges for wastewater treatment plants due to shock loads during the harvesting season. The phenolic compounds contained in the wastewater, for example, are toxic to microorganisms in wastewater treatment plants, resulting in extended aeration times and thus increased energy consumption for treatment.

### **Challenge: replacement of synthetic flocculants**

Flocculants help to remove suspended solids and particles as well as impurities adhering by enhancing the creation of flocs, which are then removed by separation processes, e.g., sedimentation. Since the residues of mineral (metal-based) salts or synthetic (fossil-based) polymers used here are not biodegradable, the resulting sludge must be disposed of at great expense.

### Collaboration opportunities

#### **Do you produce flocculants?**

We optimize LaChiPur flocculants according to your demand.

#### **Do you produce waste containing chitosan?**

LaChiPur flocculants made from chitosan open up a new business model for valorizing your waste streams.

## Our solution: biobased flocculant made from chitosan – LaChiPur

Our LaChiPur flocculant is made from chitosan, obtained from residues of the food industry (fungi and crabs) and, furthermore, equipped with the enzyme laccase. Thus, in addition to its flocculation properties, LaChiPur can also oxidize organic pollutants e.g. phenolic compounds, reducing toxicity to microorganisms in the aeration tank and ultimately reducing energy use. Furthermore, LaChiPur has shown precipitation properties making it a potential biobased precipitation agent to remove phosphorous, for example.



*Effective treatment of complex wastewaters. Decolorization of olive mill wastewater achieved by LaChiPur*

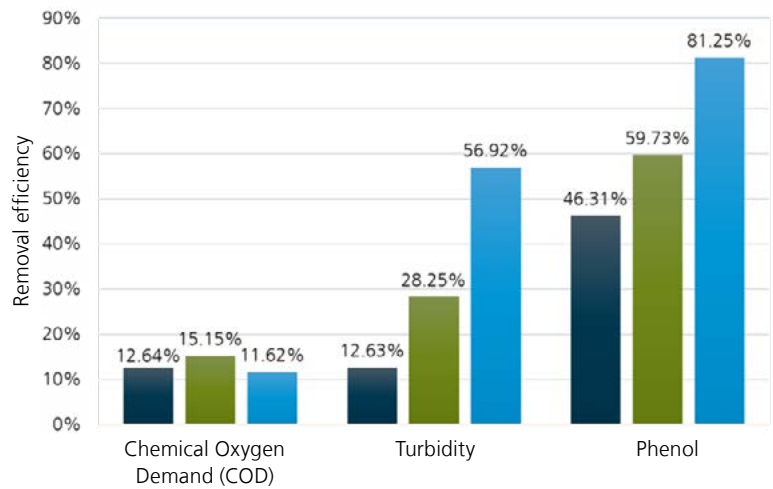
### Properties and performance

- Completely biobased and biodegradable
- Bifunctional: flocculation and oxidation
- Chitosan and Laccase share similar operation conditions
- Flocculation performance comparable to conventionally used coagulants/flocculants
- Customizable according to water matrix and load

### Future developments

- Chitosan and laccase based filter for water purification
- Development of sustainable alternative to acryl-based sludge conditioners
- Integration in water reuse applications and phosphorous recovery

### Treatment of red wine wastewater



- Pure laccase
- Cross-linked laccase-chitosan 1
- Cross-linked laccase-chitosan 2

### Removal rates of chitosan based flocculants for the treatment of different wastewaters

Origin of wastewater	TSS	Turbidity	COD	Phenols
Olive mill	92.4%	94.25%	26.68%	33,3%
Red wine	93.3%	93.97%	9.35%	26.06%
Municipal	90.03%	96.08%	73.88%	47.73%

### Advantages for wastewater treatment

- Temporal or on-demand application
- Saves aeration energy
- Higher biogas yields from sludge
- Trace substances can also be removed
- Made from local sources – security of supply
- Suitable as filter material

### Application areas of LaChiPur flocculants

- Treatment of agricultural wastewater (wine and olive oil processing)
- Treatment of complex wastewaters e.g. textile wastewater
- Mining waters
- Raw water conditioning

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