

# Solving a Sticky Situation: Microplastic Analysis of Lipid-Rich Tissue

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## Adding Ethanol to Potassium hydroxide digestions reduces the viscosity of lipid-rich solutions aiding filtration

### Background

- Potassium hydroxide (KOH) digestions are used to separate MPs from tissue
- Many fish have high lipid content
- Lipid-rich tissue + aqueous 10% KOH = Saponification
- Heat and agitation increase the rate of saponification
- Once saponified, samples are often too viscous to pour and cannot be filtered

This study developed a workflow to treat samples which have undergone saponification

### Methods

- Fish tissue is dissected (1,2)
- Tissue digestion using: 10% KOH 1:10 w/v, 40°C, 72h  
OR  
1:4 w/v, ~22°C (RT), 14d (3)
- Visual assessment of digesta for saponification (4)
- If saponification occurred, digesta is treated with 100% ethanol (EtOH) 1:10 v/v (EtOH:Sample) (5.a)
- If soap is completely liquefied, then digesta is filtered (6)
- If soap persists, more EtOH is added to reach 1:4 v/v (5.b)
- Repeat as necessary until soap is dispersed (5.b)
- Digesta is filtered sequentially over 547, 263 and 26 µm stainless steel filters to retrieve MPs (7)

Table 1. Effect of ethanol treatment on spiked MPs

Polymer	Recovery (%)	Spectral Match (%)	Carbonyl index	Physical Appearance
PE	93.3	98.6%	NC	NC
PES	100	98.0%	NC	NC
PS	100	99.3%	NC	NC
Rayon	93.3	97.1%	NC	Y- bleached*

NC – No Change; \*changes due to KOH exposure prior to adding EtOH

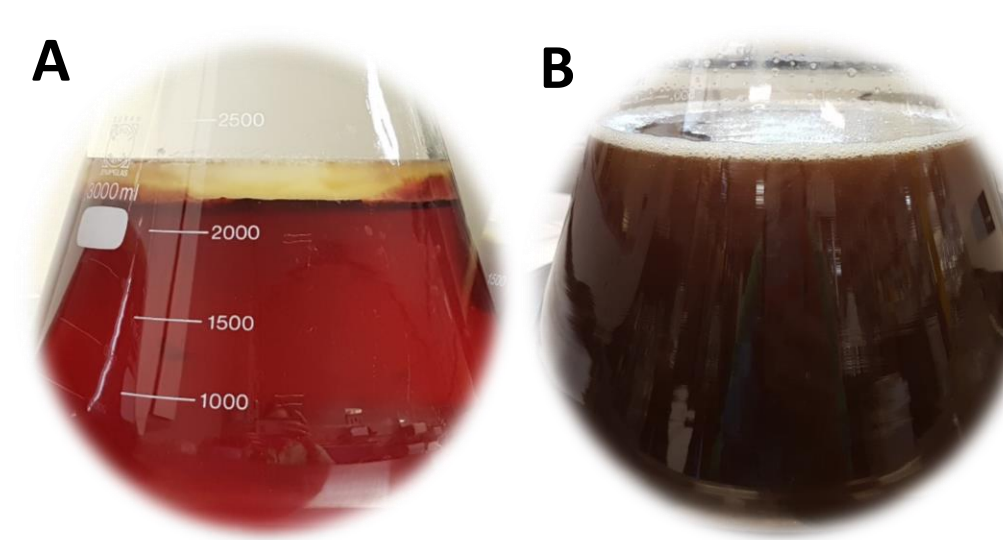
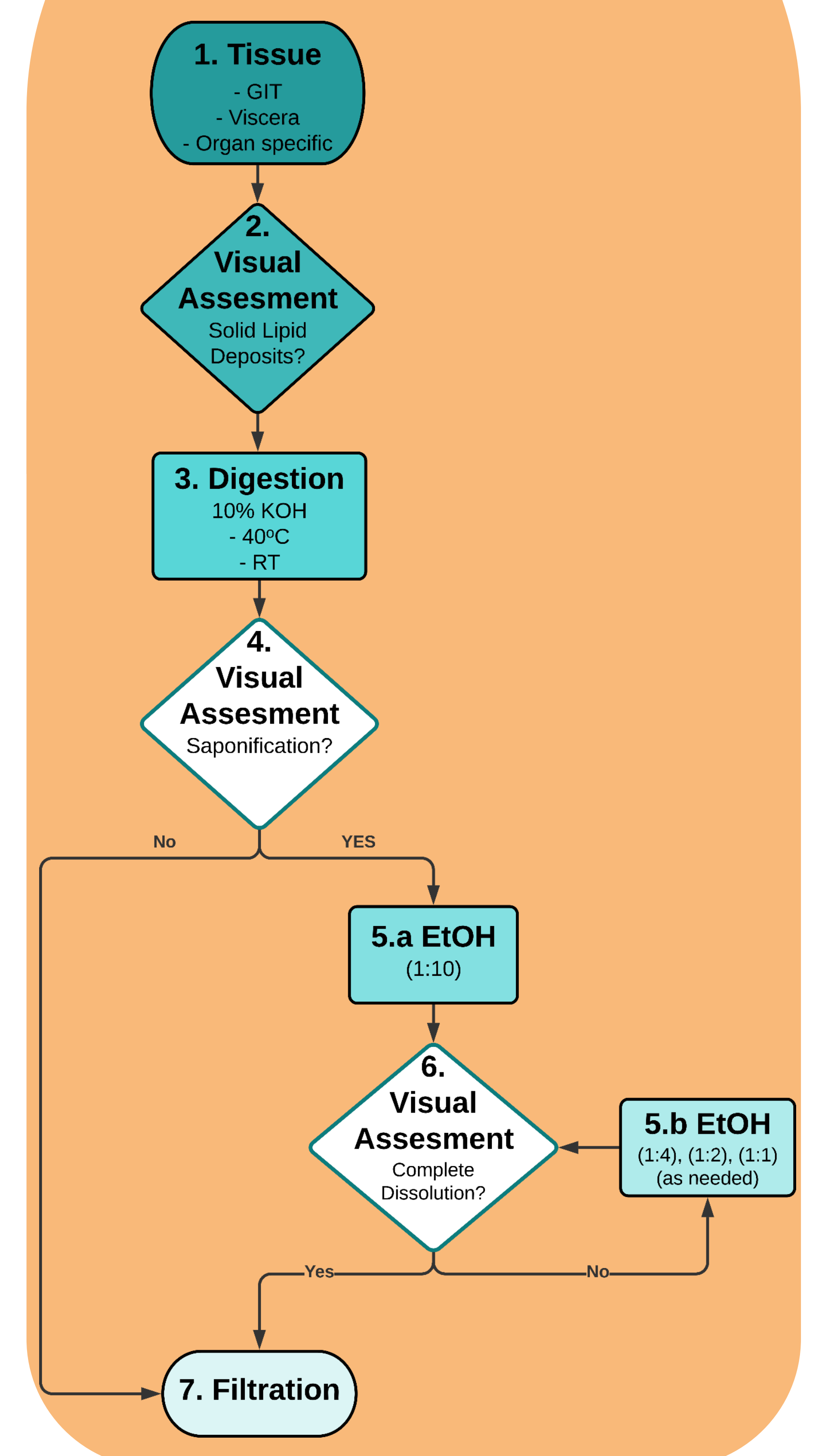


Figure 1. Saponified *Lates calcifer* GIT, A) Untreated, B) Treated

### Treatment Workflow



### Results

- All soaps formed through digestion were dispersed when treated with either 1:10 or 1:4 EtOH
- Untreated samples were unable to be filtered, due to complete saponification
- Digestion efficiency for EtOH treated samples ranged from 99-100%
- Spiked MPs were unchanged by EtOH treatment (Table 1)
- Treatment can be implemented *ad hoc* (only if saponification occurs)

Questions? Contact Me

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