

# **Tropical seaweeds improve cardiovascular and metabolic health of diet-induced obese and hypertensive rats**



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# USQ Ipswich campus



**DRIVE TIME:  
SIMPLY DRIVE  
30 MINUTES  
WEST OF  
BRISBANE CBD**



## PAPER



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## Tropical foods as functional foods for metabolic syndrome

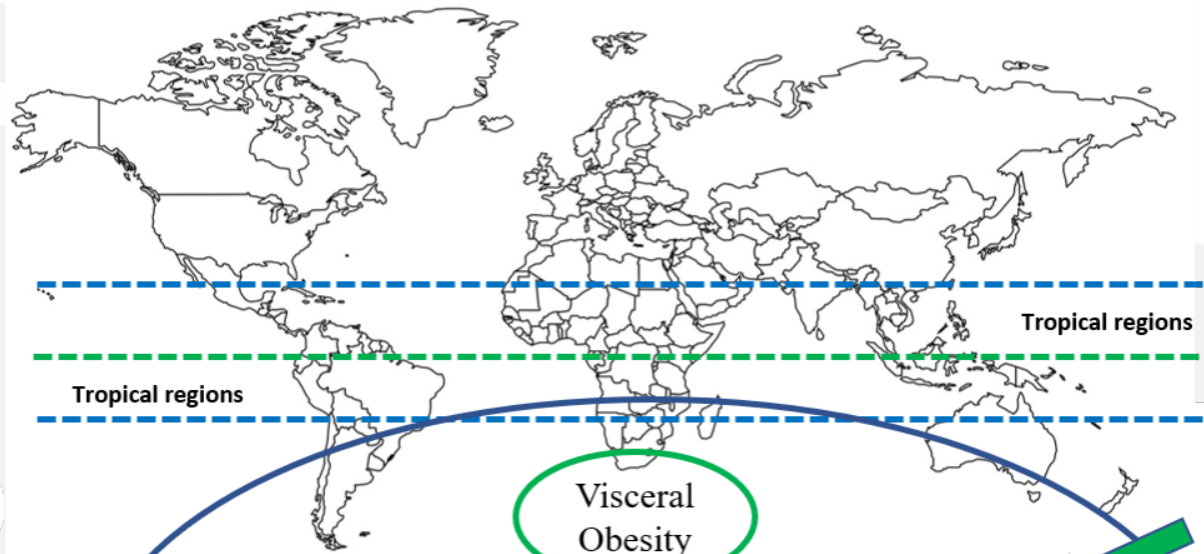
Oliver D. John, <sup>a</sup> Ryan du Preez, <sup>a,b</sup> Sunil K. Panchal <sup>a,c</sup> and Lindsay Brown <sup>\*a,d</sup>

Tropical foods are an integral part of the traditional diet and form part of traditional medicine in many countries. This review examines the potential of tropical foods to treat signs of metabolic syndrome, defined as a chronic low-grade inflammation leading to obesity, hypertension, impaired glucose tolerance, insulin resistance, dyslipidaemia and fatty liver. It is a major risk factor for cardiovascular and metabolic disease as well as osteoarthritis and some cancers. Tropical foods such as seaweeds and tropical fruits including indigenous fruits such as Davidson's plums are effective in reducing these signs of metabolic syndrome in rats, as well as reducing degeneration of bone cartilage and altering gut microbiome. Further, waste products from tropical fruits including mangosteen rind, coffee pulp and spent coffee grounds provide further options to reduce metabolic syndrome. Production of local tropical foods and local recovery of food waste from these foods could allow the development of commercial, sustainable and cost-effective functional foods in tropical countries. The aim is to develop these functional foods to reduce the incidence of metabolic syndrome and decrease the risk of costly chronic cardiovascular and metabolic disorders locally and globally.

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[rsc.li/food-function](https://rsc.li/food-function)



*G. dulcis*



*G. mangostana*



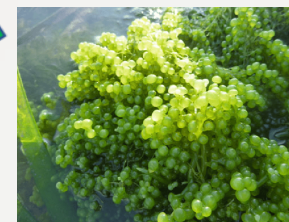
*G. humilis*



Coffee products



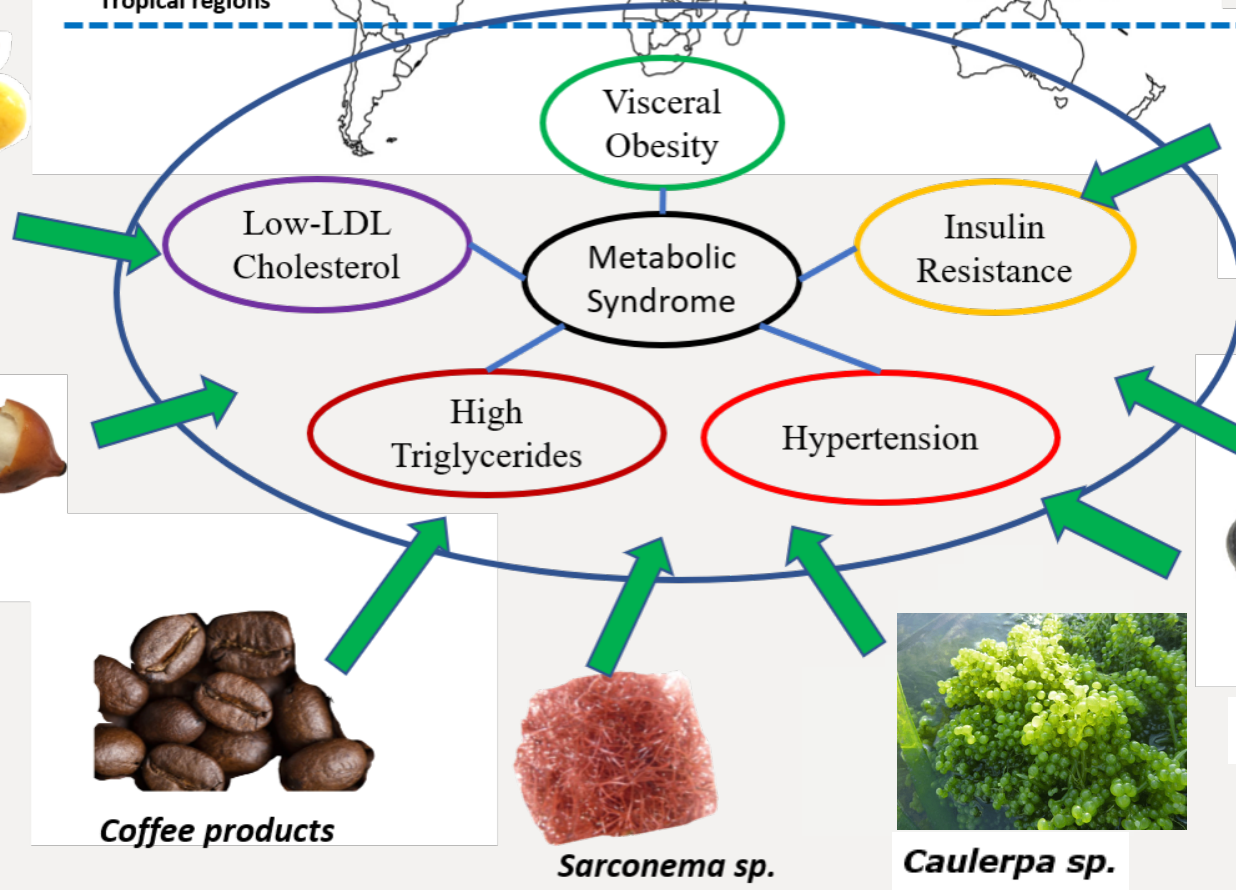
*Sarconema sp.*

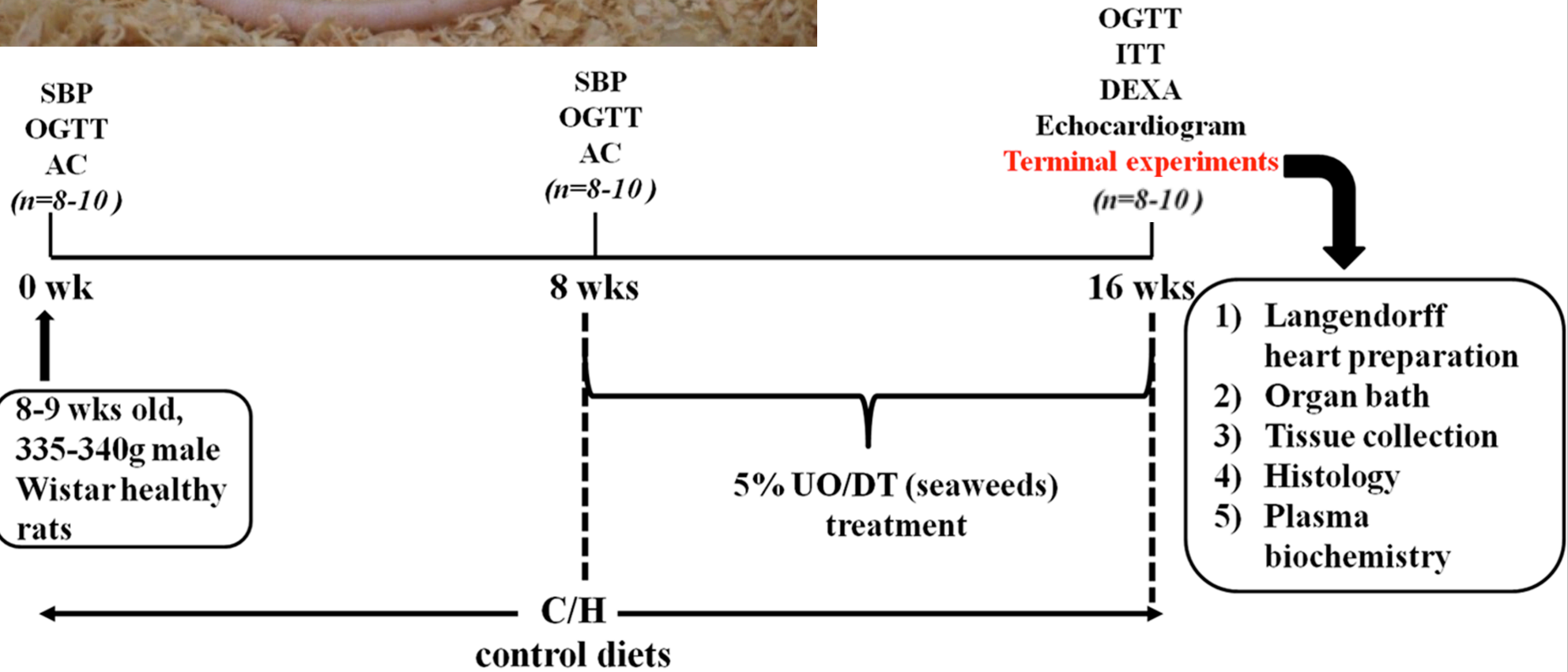
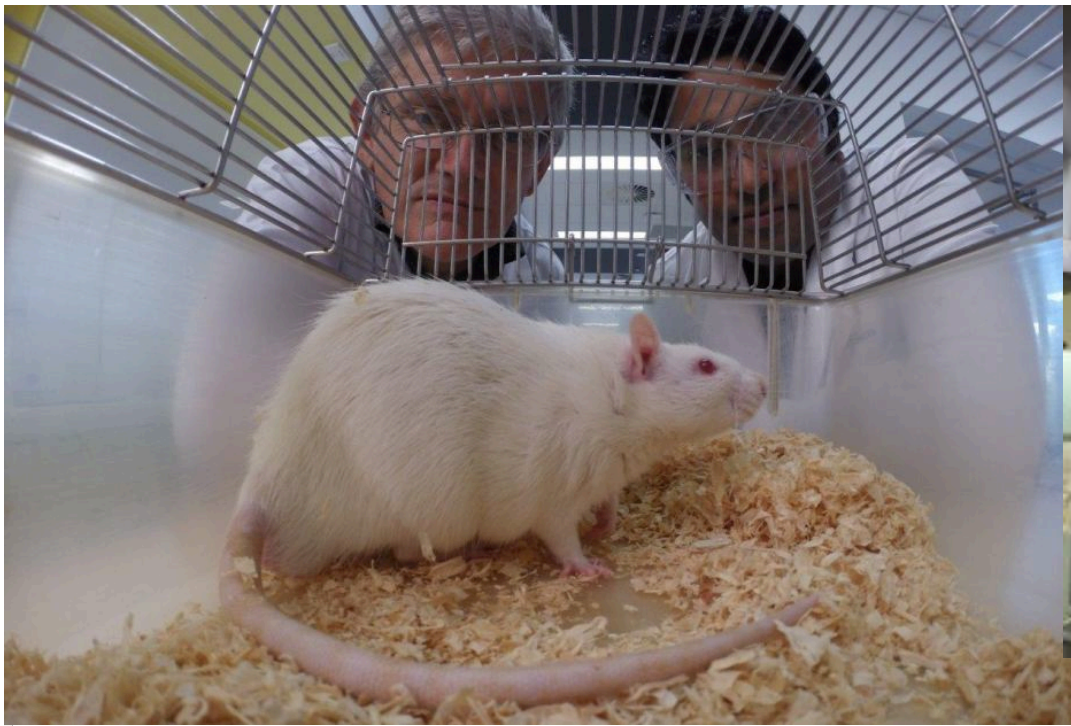


*Caulerpa sp.*



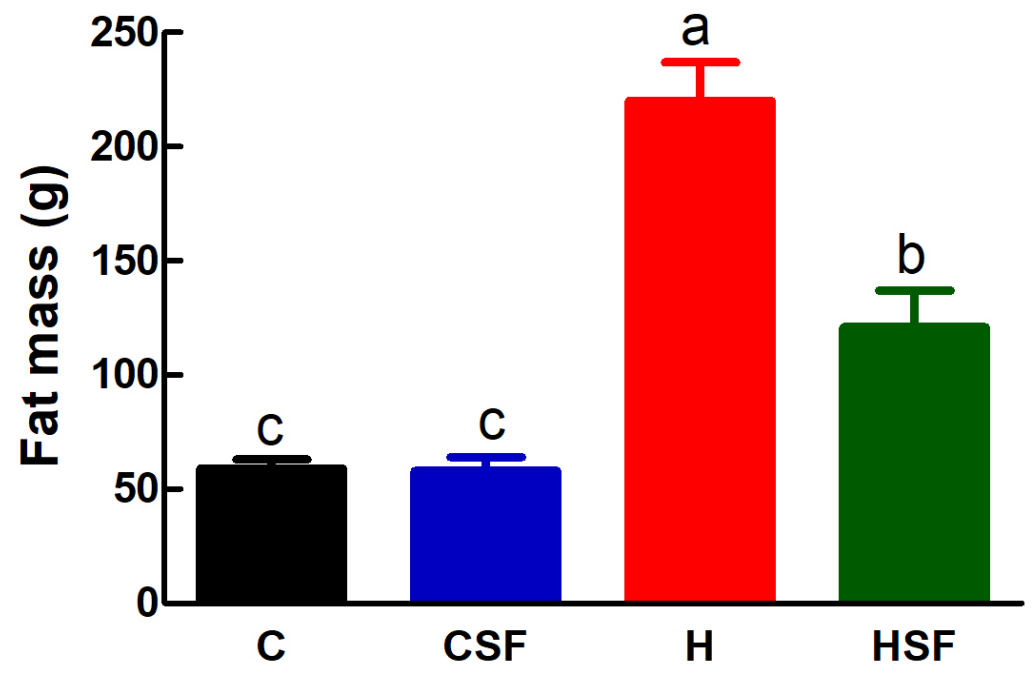
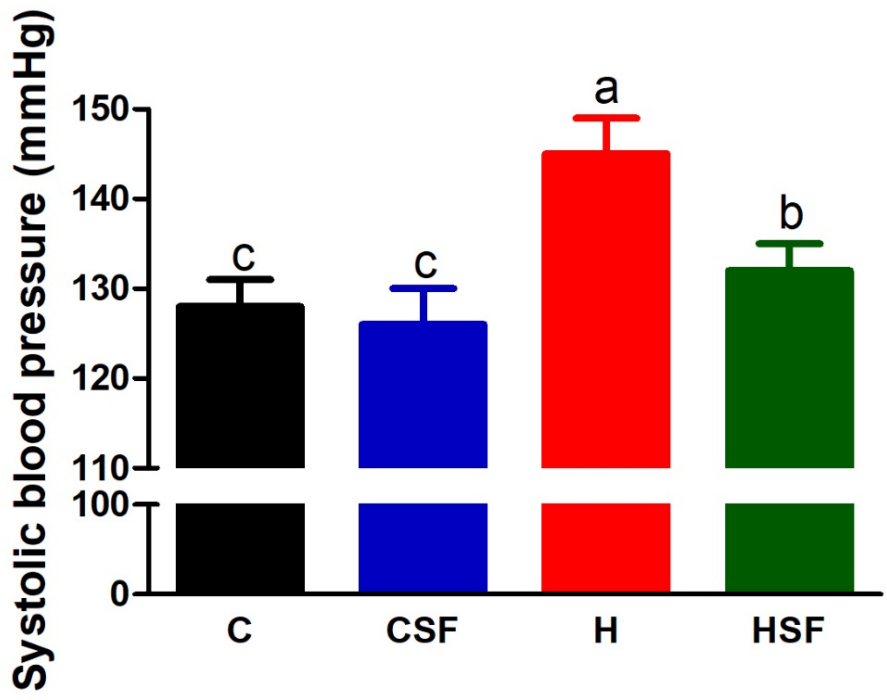
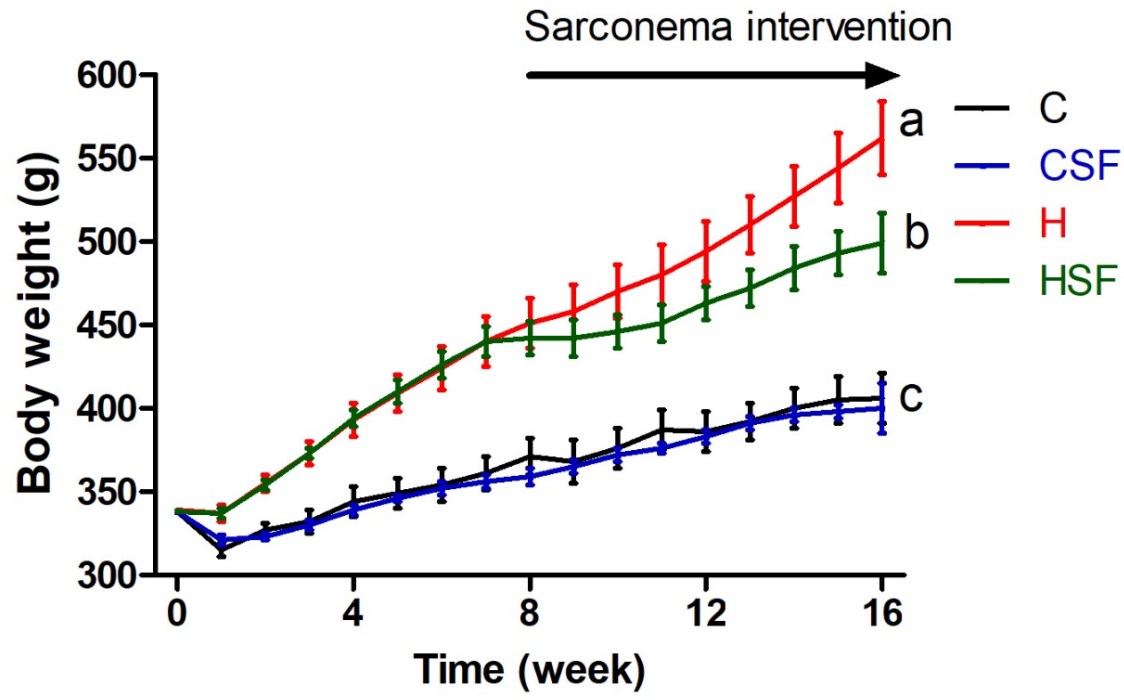
*D. pruriens*







*Sarconema filiforme*  
improved body weight,  
blood pressure and fat  
mass  
*du Preez et al, Marine Drugs,*  
*2020;18: 97*



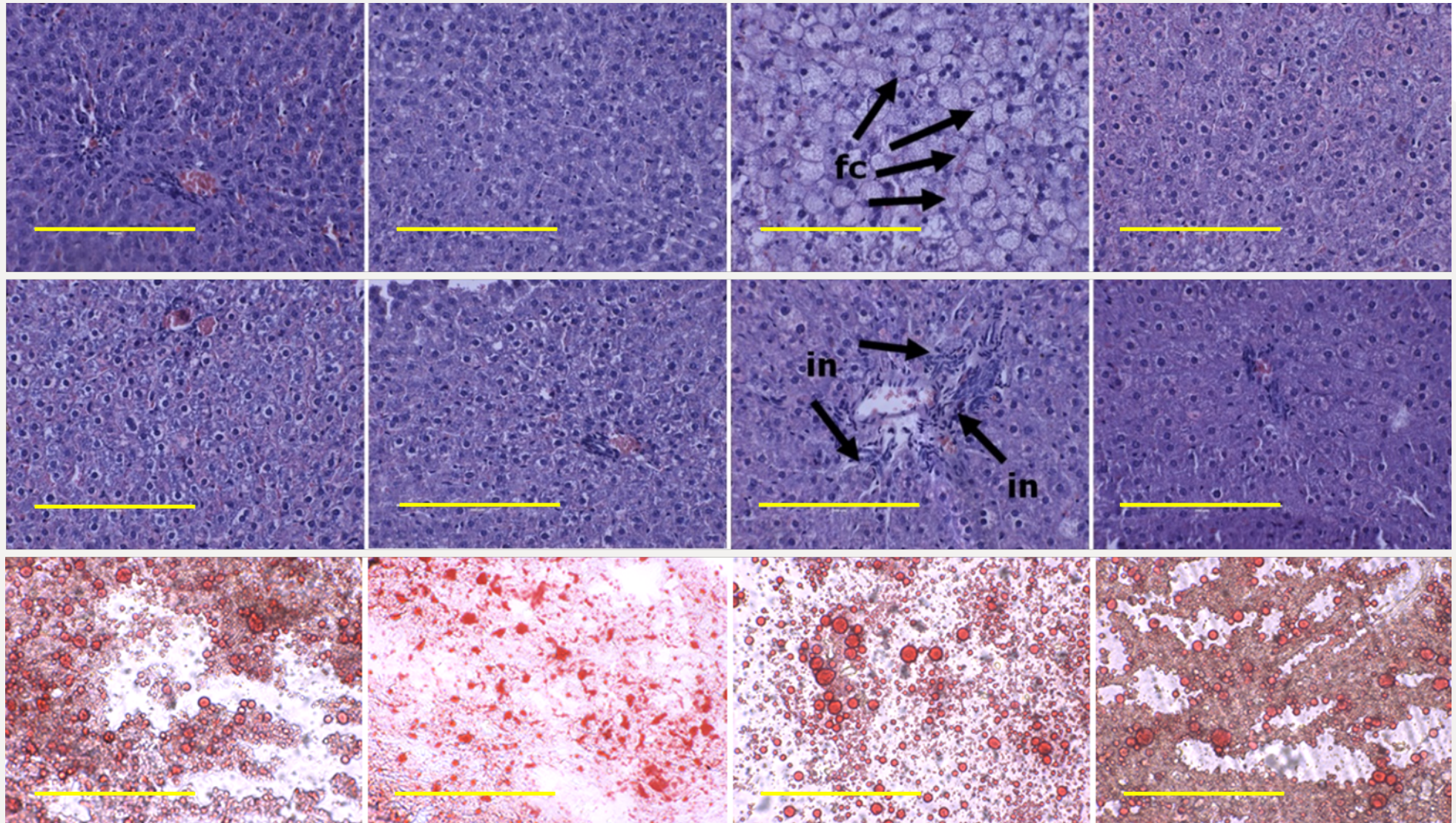
# Liver structure - responses to *Sarconema filiforme*

**C**

**CSF**

**H**

**HSF**



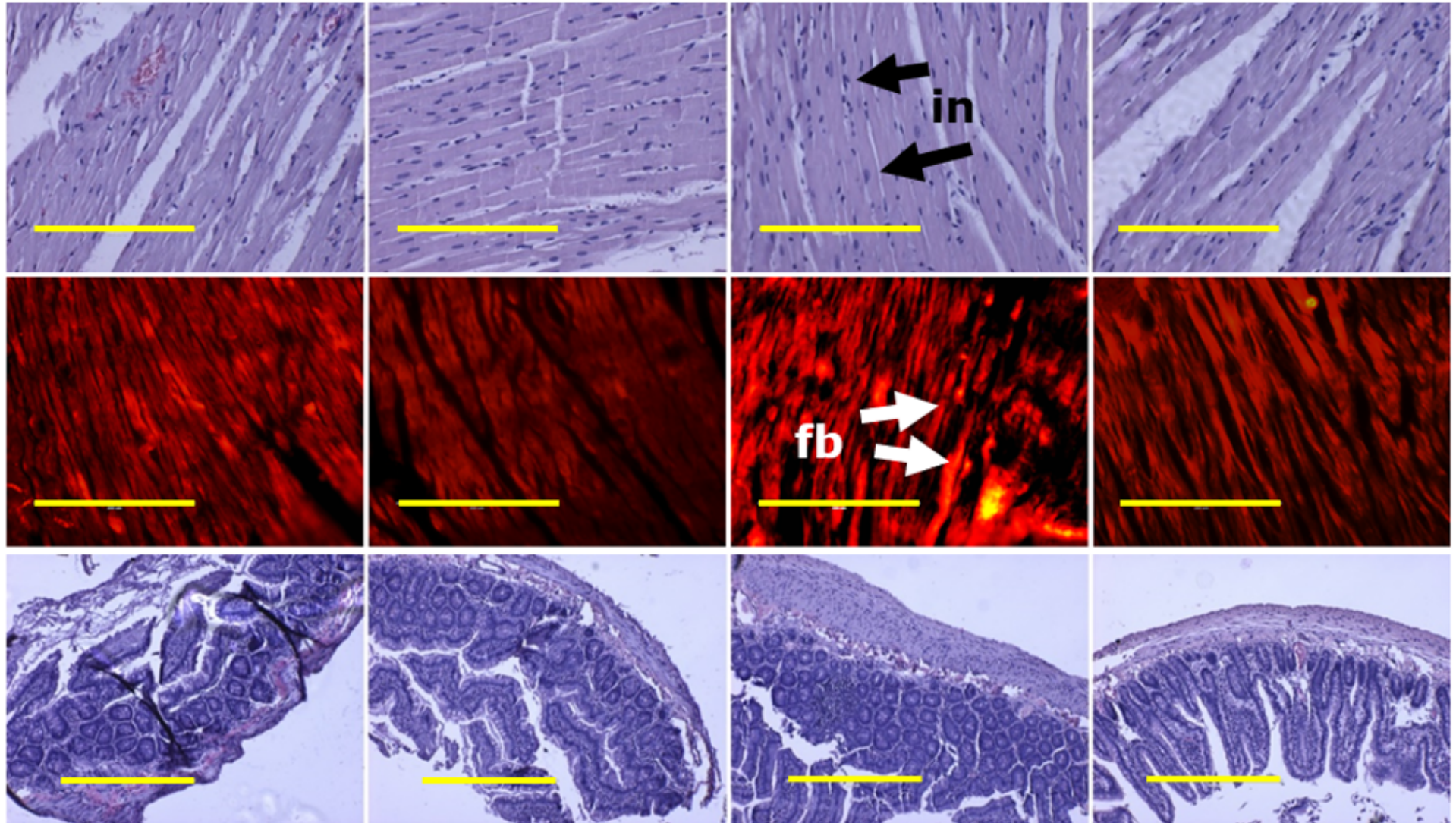
# Heart and ileum structure - responses to *Sarconema filiforme*

C

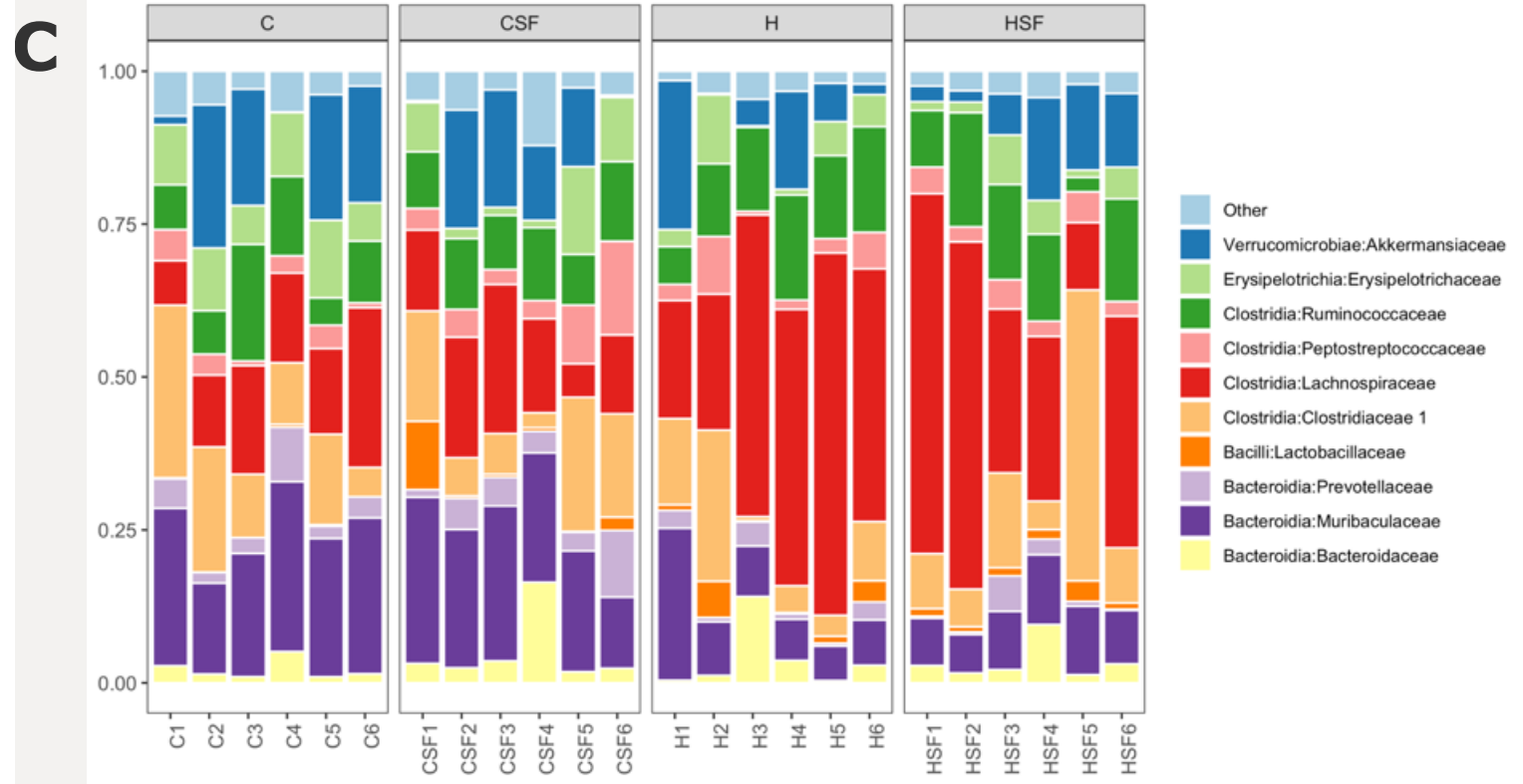
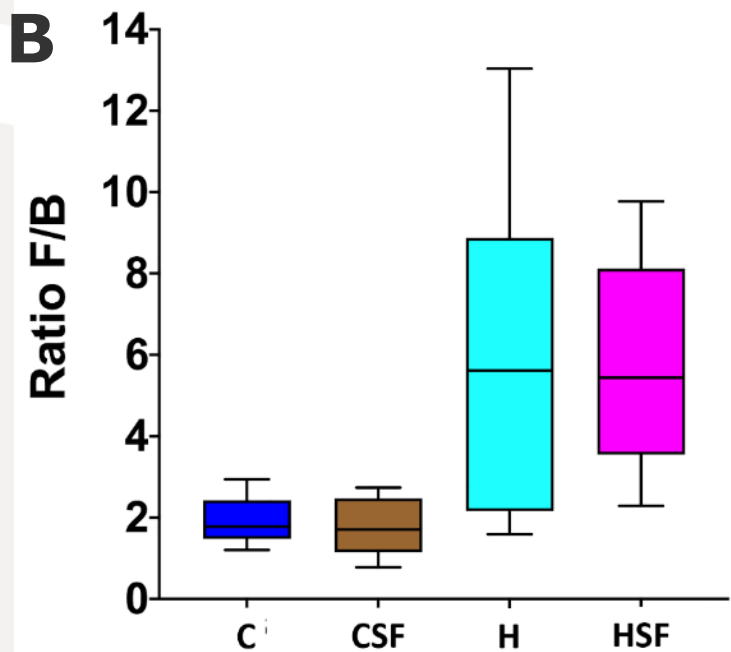
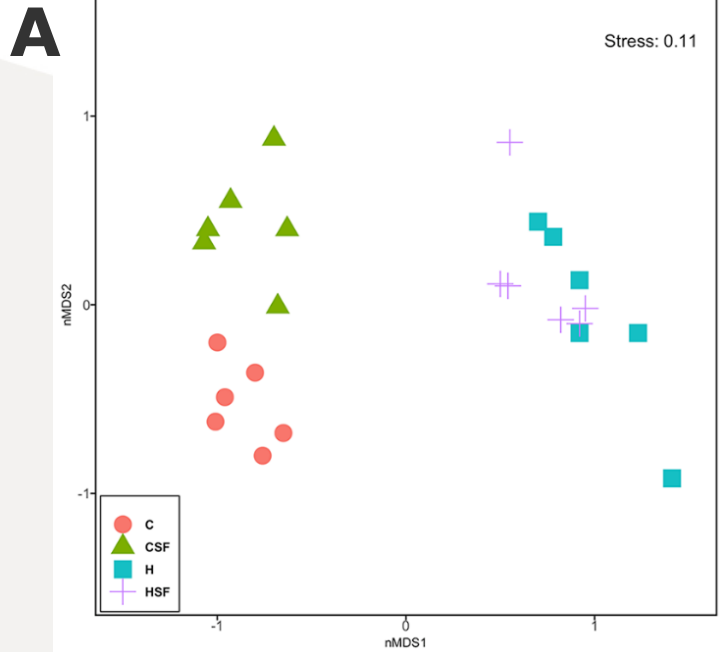
CSF

H

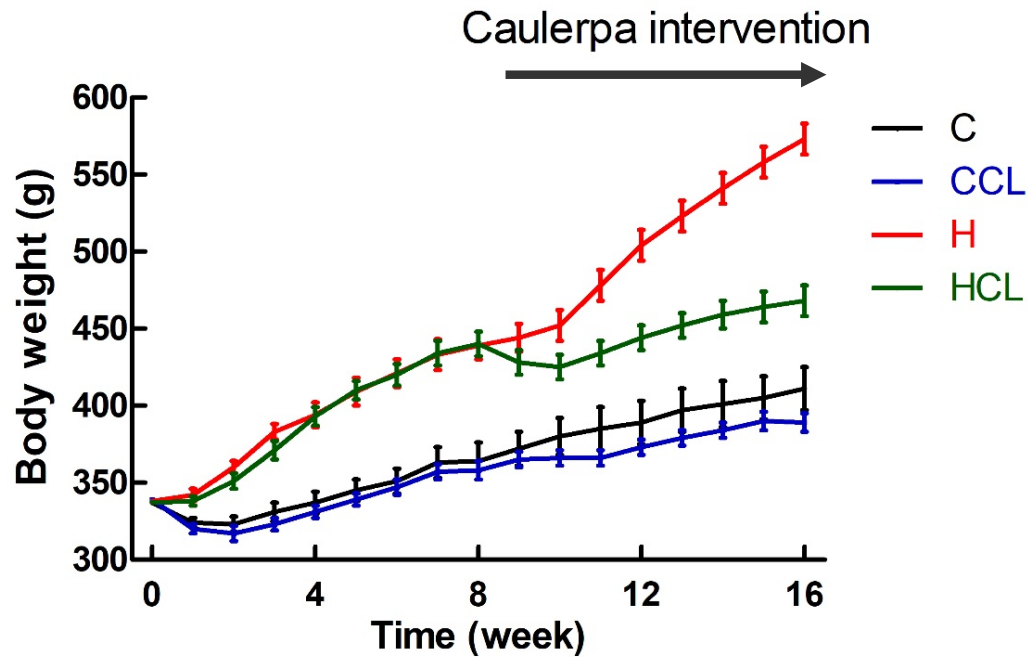
HSF





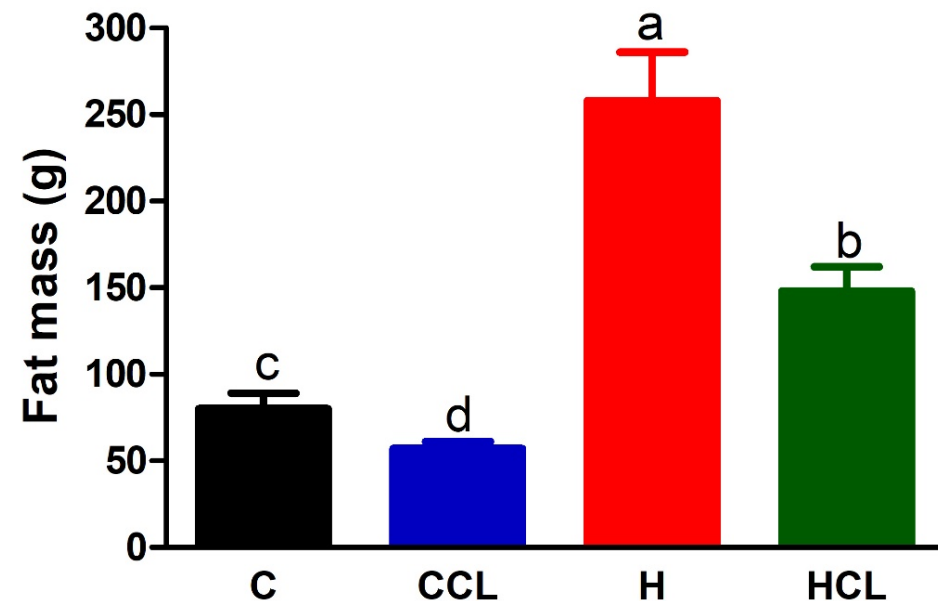
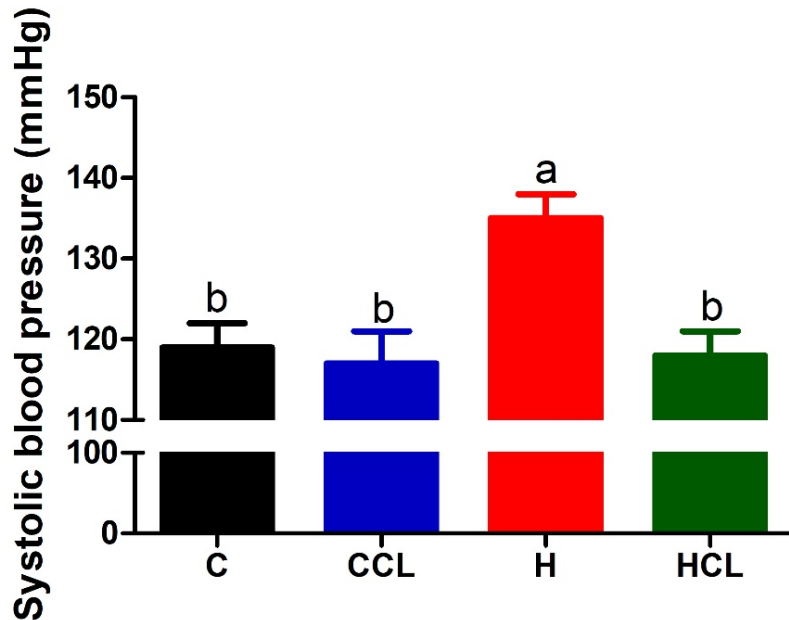


*Sarconema  
filiforme*  
changes  
the gut  
microbiota



*Caulerpa lentillifera*  
improved body weight,  
blood pressure and fat  
mass

*du Preez et al*, submitted  
October 2020



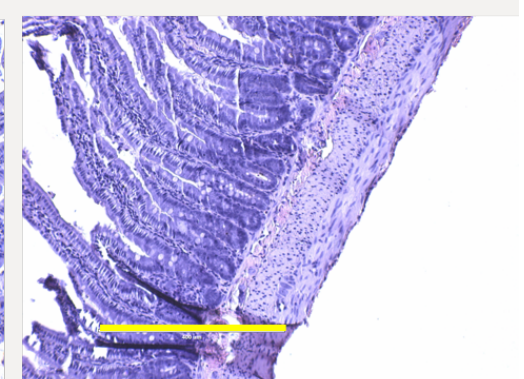
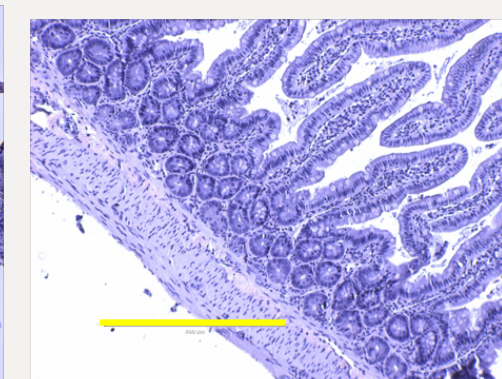
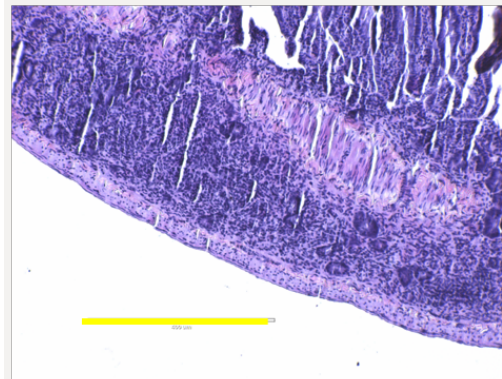
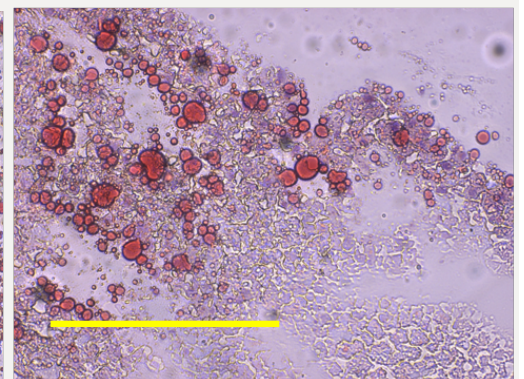
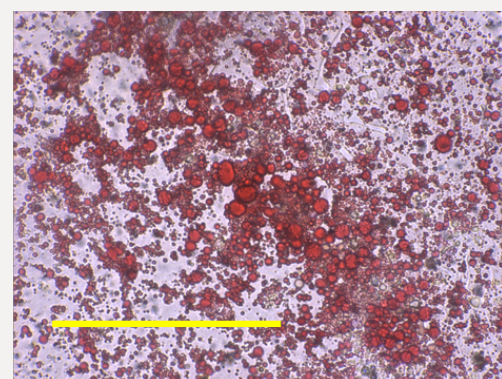
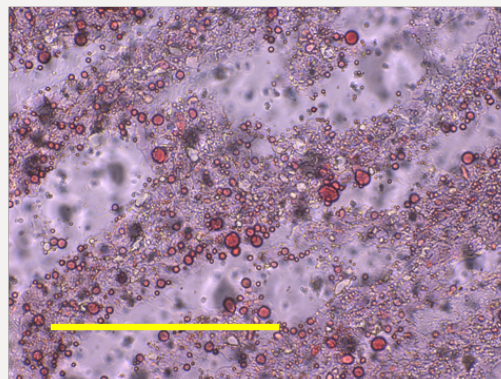
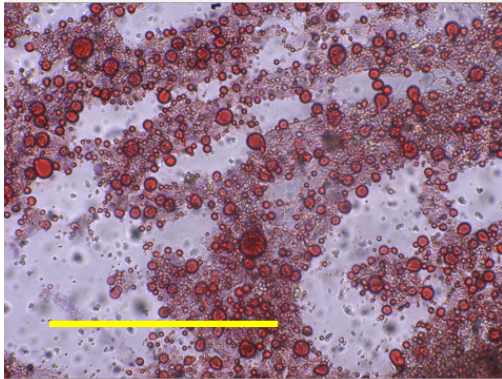
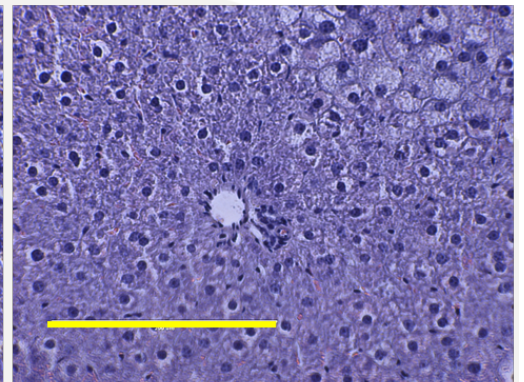
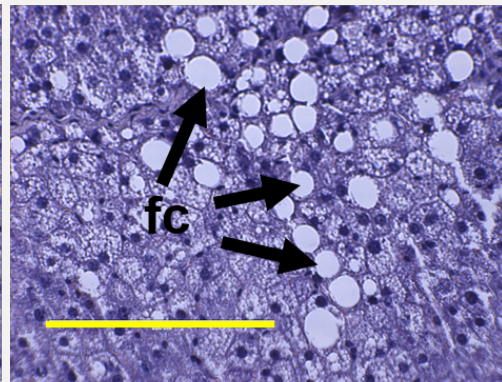
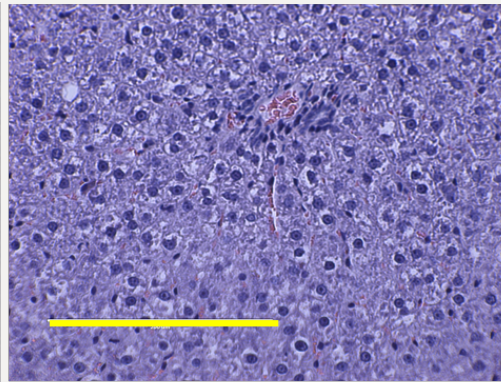
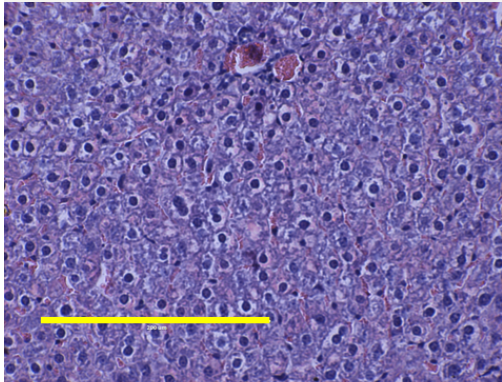
# Liver and ileum structure - responses to *Caulerpa lentillifera*

**C**

**CCL**

**H**

**HCL**



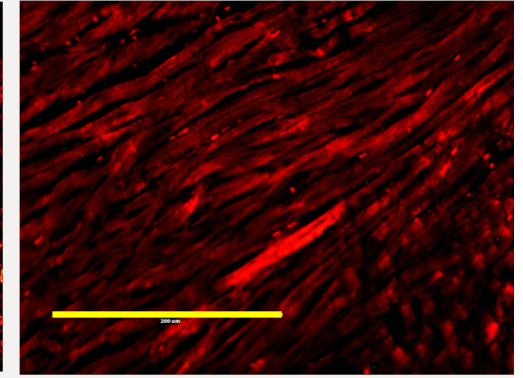
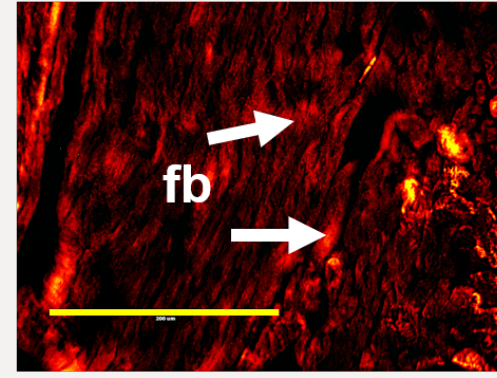
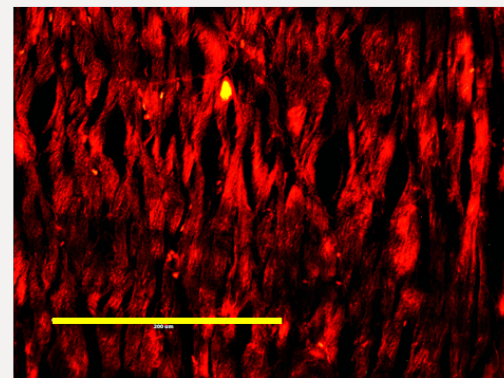
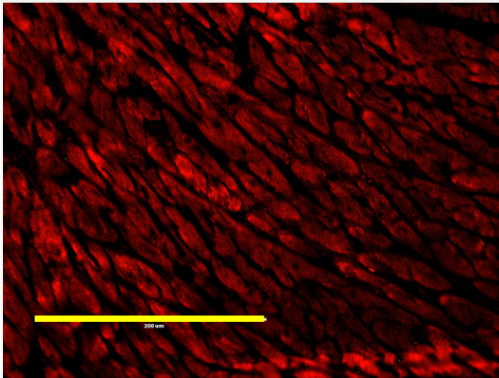
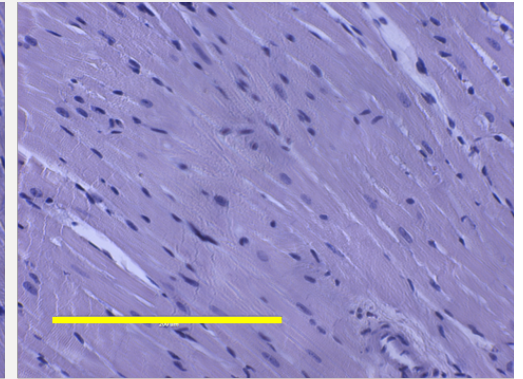
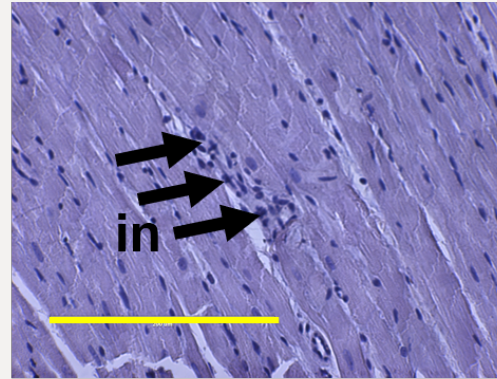
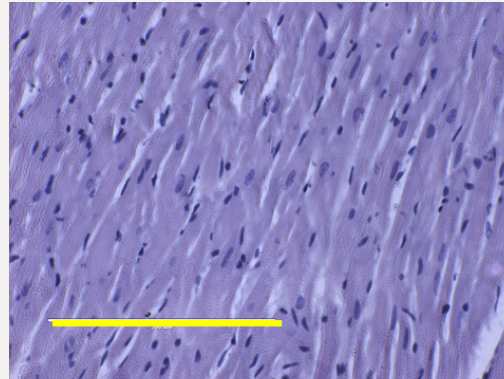
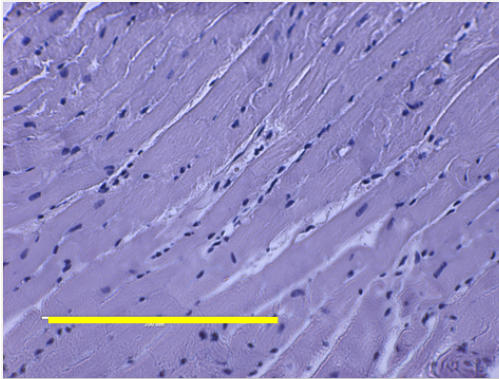
# Heart structure - responses to *Caulerpa lentillifera*

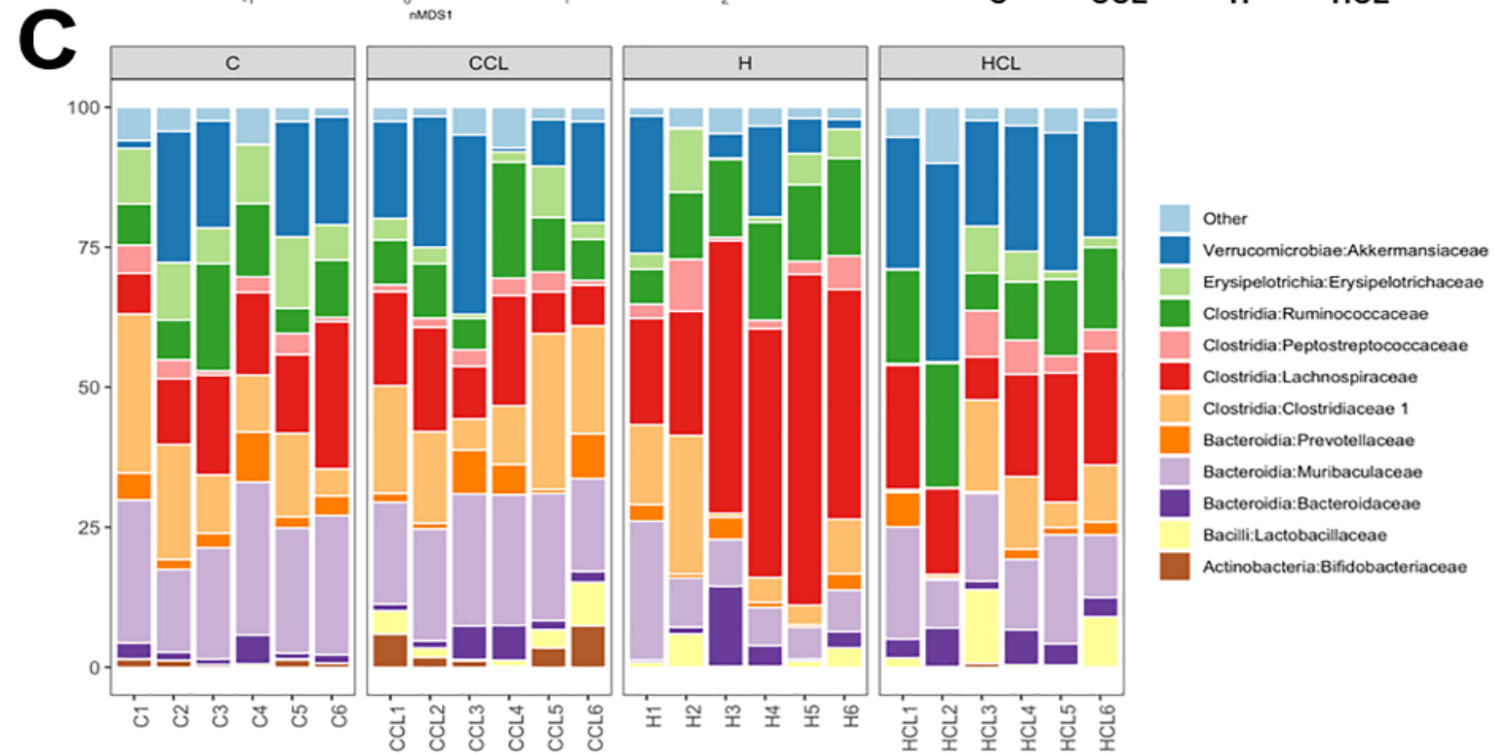
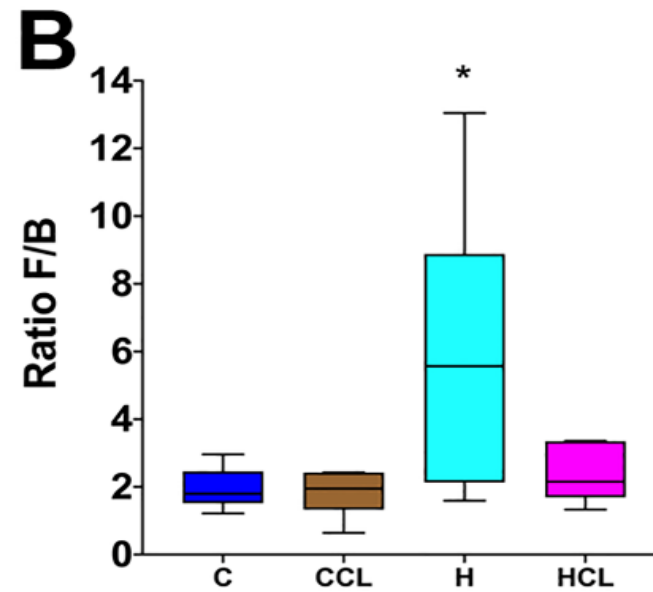
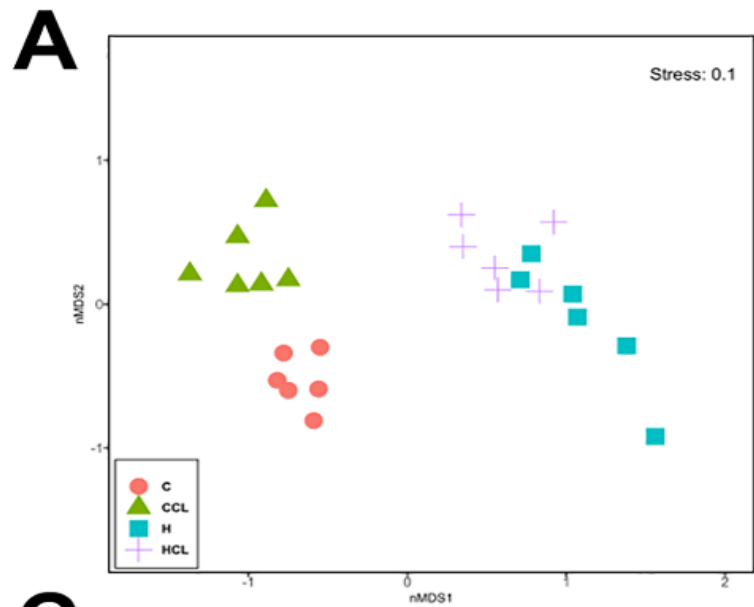
**C**

**CCL**

**H**

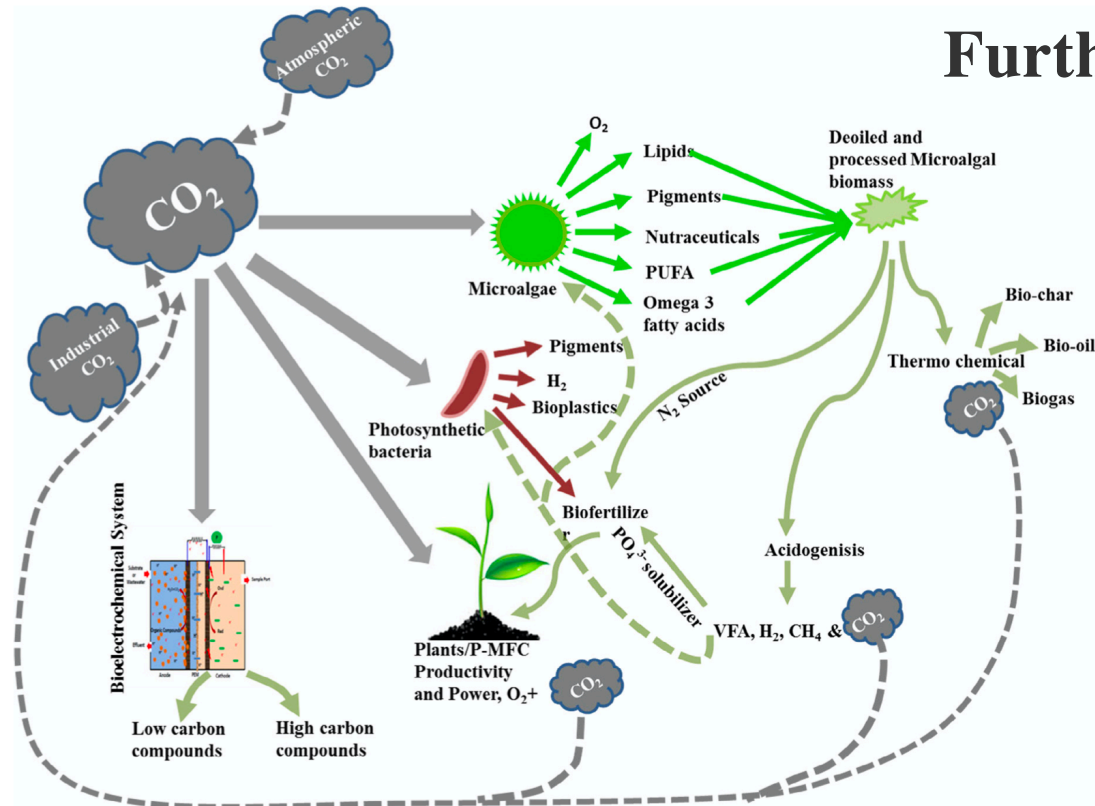
**HCL**





*Caulerpa  
lentillifera*  
changes  
the gut  
microbiota

# Further uses for seaweeds



## Conclusions

1. The red seaweed *S. filiforme* and the green seaweed *C. lentillifera* grown in tropical areas reverse diet-induced cardiovascular, liver and metabolic changes.
2. Probable mechanisms include prevention of infiltration of inflammatory cells and prebiotic effects on gut microbiota.
3. Both seaweeds can thus be defined as functional foods for metabolic syndrome.