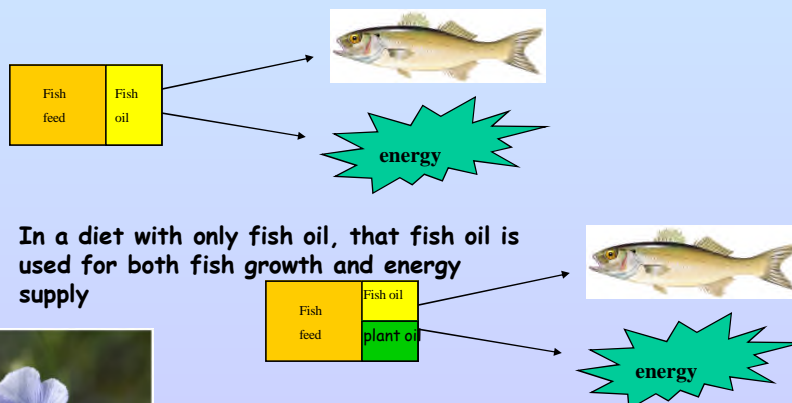


Minor bioactive plant compounds in fish feeds and their effect on fish metabolism

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Vegetable oil can 'spare' fish oil
main reason is energy but effects can vary....

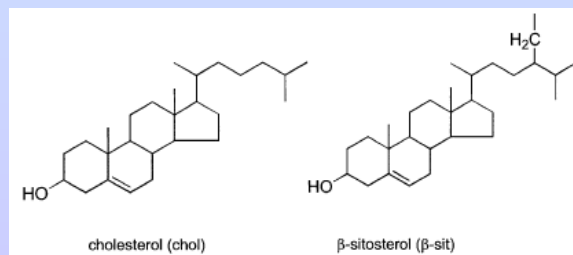


In a diet with only fish oil, that fish oil is used for both fish growth and energy supply

In a diet with a mixture of fish oil and vegetable oil, that fish oil is spared for fish growth and plant oil used for energy supply

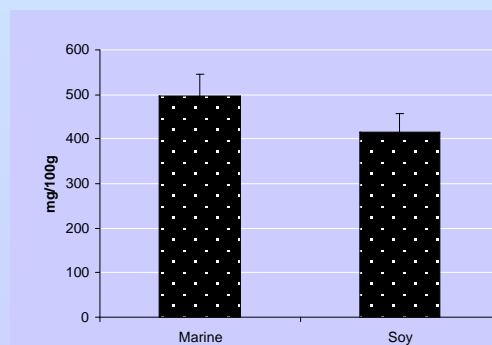
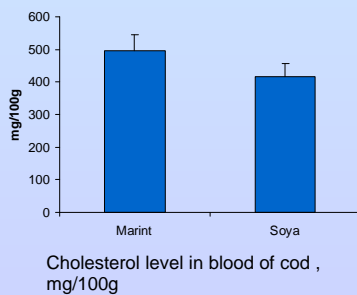
Plant sterols : sitosterol

- Added to functional foods as a cholesterol lowering beneficial compound in human nutrition
- Are lipid soluble
- Are found in plant oils 1-3% of the oil



Fish vs soy oil in cod feeds

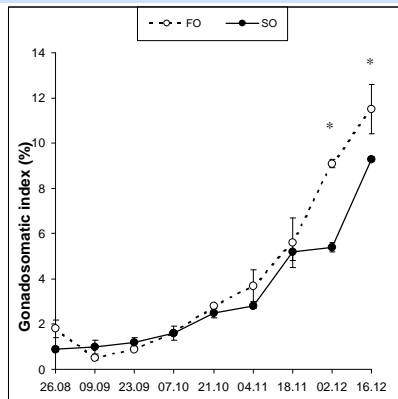
cod were fed diets based on either 100% marine oil or diets substituted with 40% soybean oil



Cholesterol content in liver samples of cod.

Development in gonadosomatic index (GSI) during the experiment for the FO and SO

- (●) fish oil group
- (○) soy oil group



Cod fed
soy oil
supplement

Asterisks denote significant difference between dietary treatments within sampling time ($P \leq 0.05$). The GSI% was calculated as (weight of gonads) x (total fish weight)⁻¹ x 100

Sitosterol

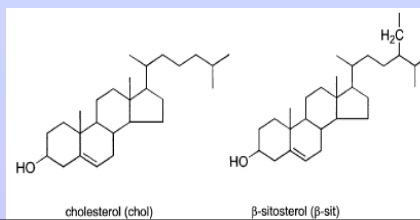
Potential cause of effects on reproduction failures in fish living downstream of pulp mills

Fish exposed to phytosterols (sitosterol/campesterol) show

- delayed sexual maturity
- smaller gonad
- reduced levels of plasma sex steroid
- reduced steroidal biosynthetic capacity of the gonads

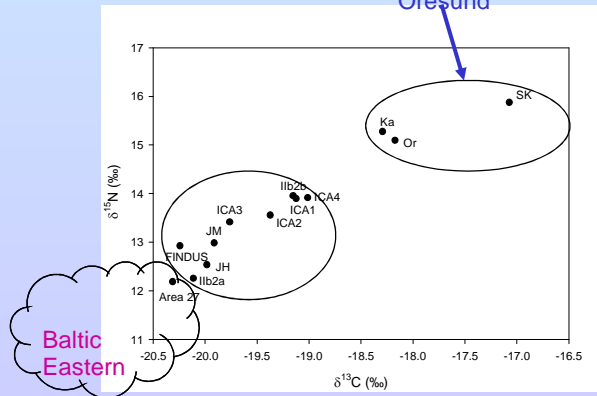
Phytosterols may lower steroid levels in fish because of their similarity in structure to cholesterol via:

- effects on cholesterol delivery to gonadal tissue
- effects on tissue steroidogenesis



Traceability by natural isotops

- $\delta^{13}C$ ‰; $\delta^{15}N$ ‰; Kategatt, Skagerrak, Öresund

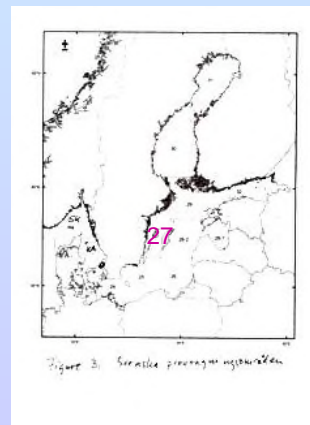


Position of sampels by area and C/N isotop trace

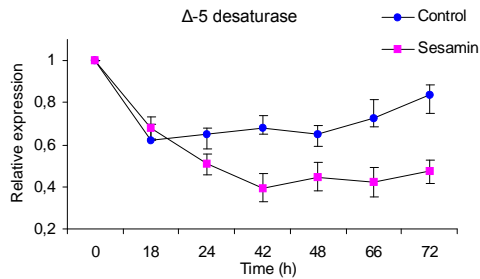


Gotland area

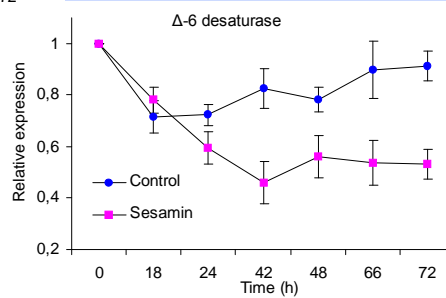
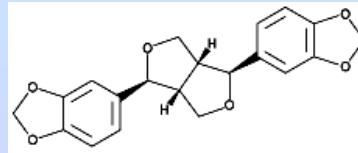
Barrents sea



Effects of lignan on Δ -5 desaturase and Δ -6 desaturase over time



(in salmon)

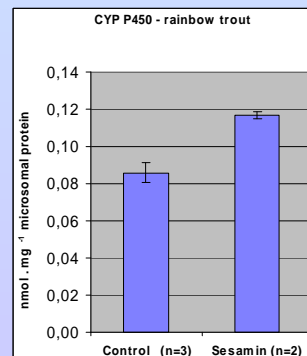
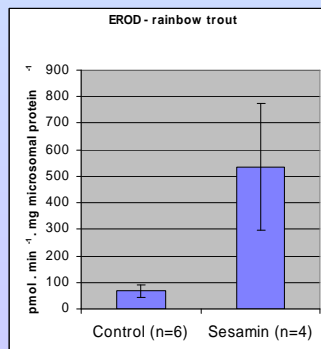


Lignan in rainbow trout

in vivo administrations of compounds to animals exhibits an effect on CYP and microsomal oxidation act isoenzymes of the cyt P450 system such as CYP1A specific for the biotransformation of xenobiotics.



CYP_{1A} is expressed as ethoxyresorufin O-deethylase (EROD)



Conclusions

Bioactivity of xenobiotics in different fish species

(consequence of use of vegetable meals and oils to carnivorous fish feeds)

Effect of bioactive compounds on sex steroid hormones and gonad development (sitosterol)

Fish welfare

Traceability of fish products origin