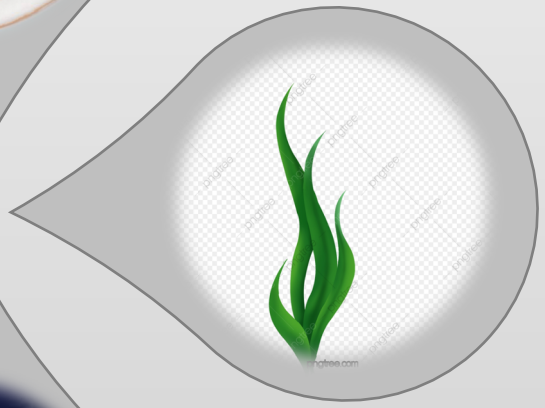
Trace metal composition of selected marine macroalgae species in southern coastal belt of Sri Lanka

H.M.S.R.B. Herath (Index No – 168509)
Department of Aquaculture & Fisheries, Wayamba University of Sri Lanka

Background of the study

As a power house of nutrient

Elemental composition



Trace metals

As a primary producer

As a source of phycocolloids

Research Gaps

Biochemical nutritional compositions and toxic heavy metal levels of seaweeds available in marine waters are poorly known.

Objectives

- **Analysis of trace metal (Cu, Zn and Fe) and heavy metal (Cd) content of *Ulva fasciata* Delile and *Caulerpa racemosa* var. *racemose* species in southern costal belt of Srilanka.**

Sampling sites

Figure 1: map showed sampling sites (map generated from goggle earth).

Two species

Caulerpa racemosa var. *racemosa*

Ulva fasciata Delile

Methodology

Groundwork

↓

Field works

↓

Samples preparation

↓

Analyzing of samples

- ✓ **Samples were analyzed by using atomic absorption spectrophotometer**

Cu level analysis

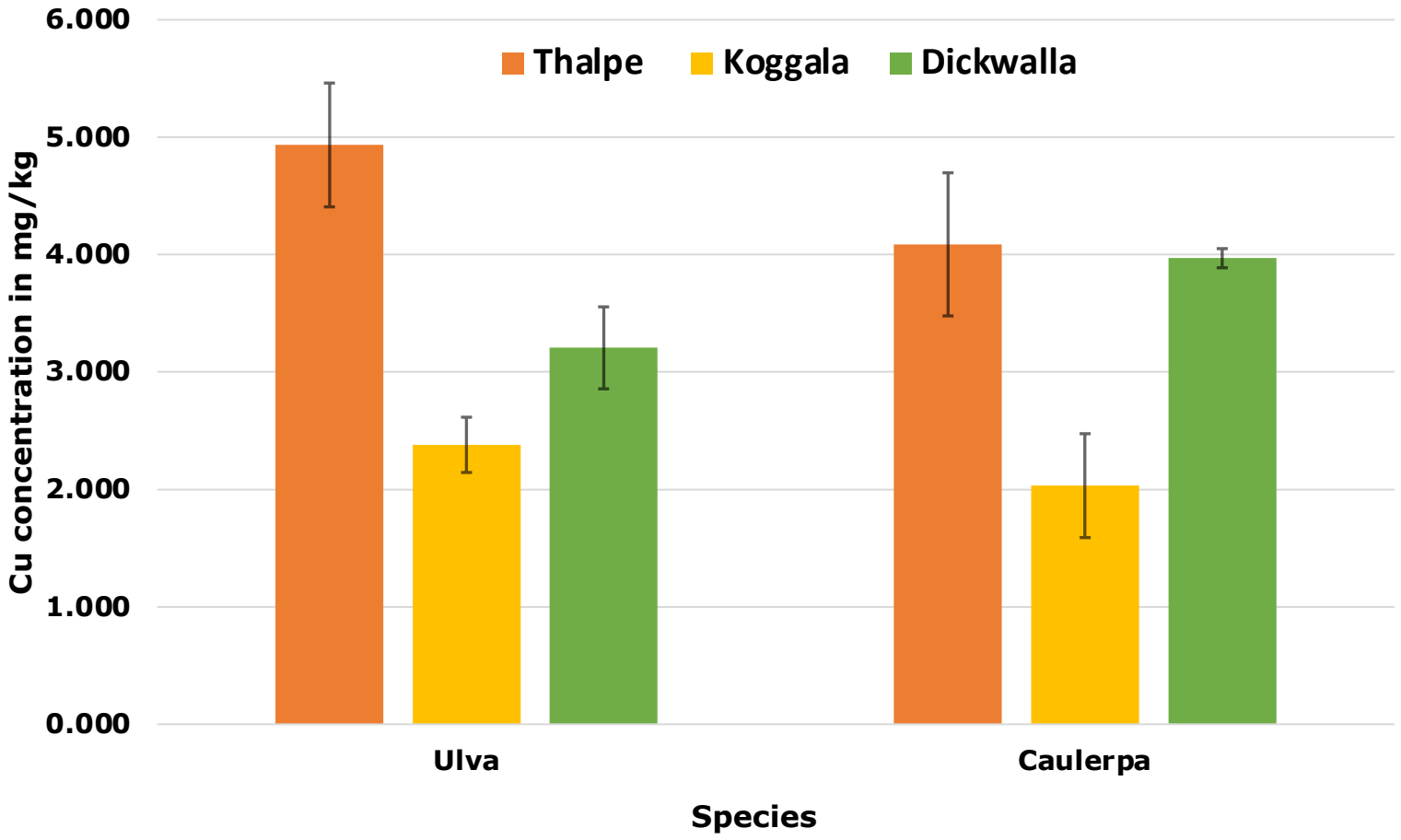


Figure 2: Cu concentration of two seaweed species in three sampling sites. (result expressed as a mean± SD)

Zn level analysis

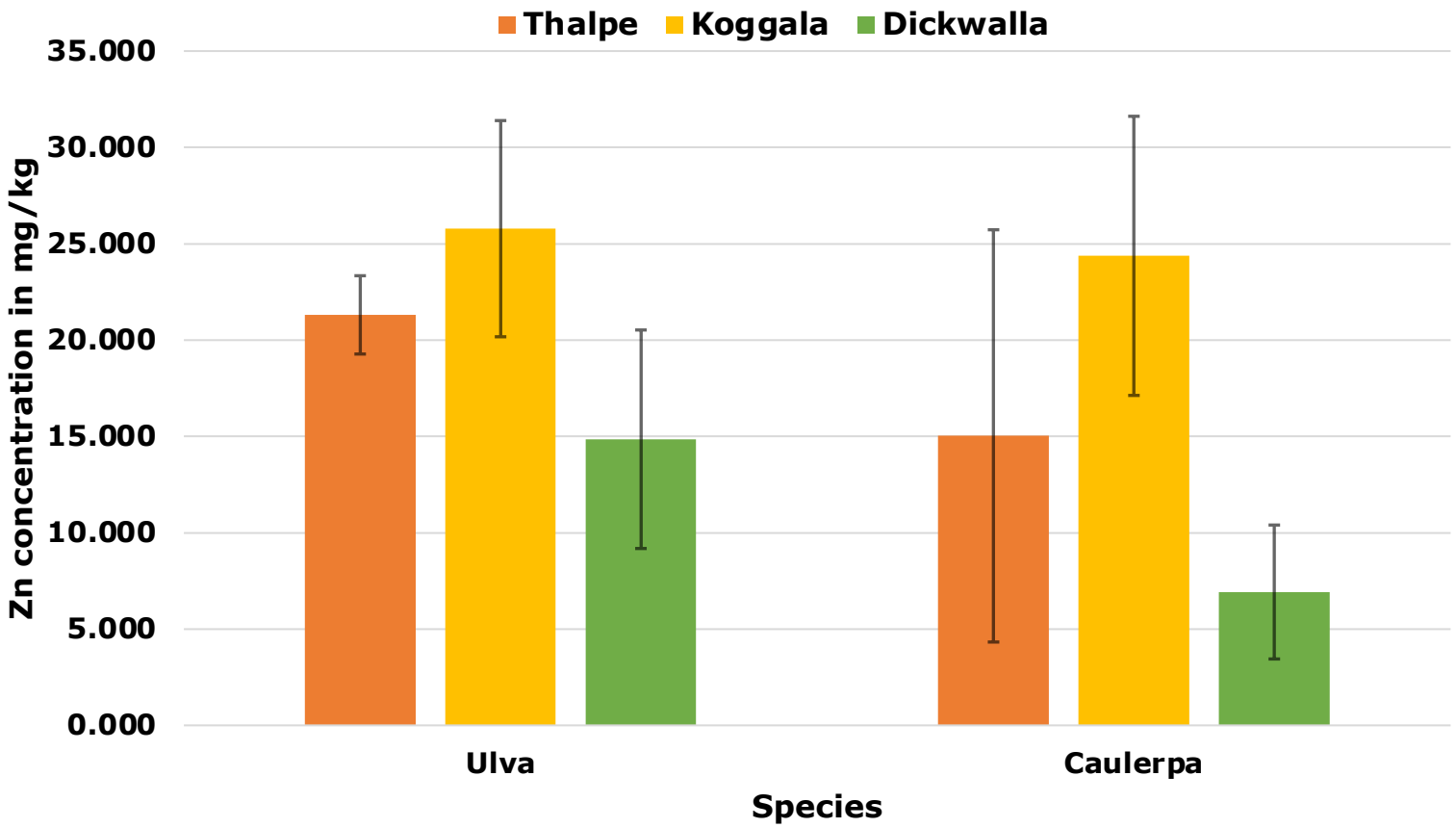


Figure 3: Zn concentration of two seaweed species in three sampling sites. (result expressed as a mean± SD)

Fe level analysis

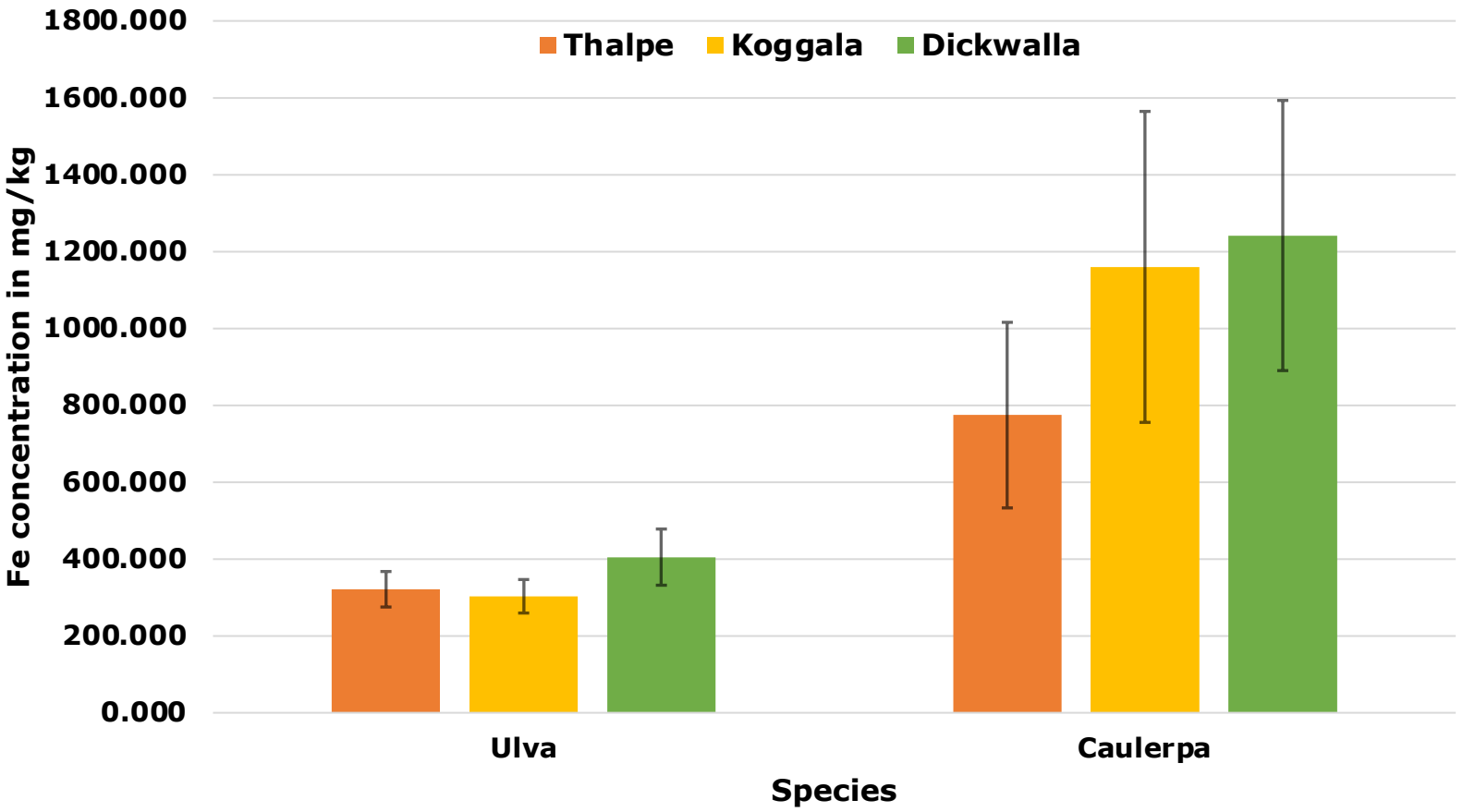


Figure 4: Fe concentration of two seaweed species in three sampling sites. (result expressed as a mean± SD)

Results

Table 3: The mean concentration (mg/kg) of metals in three samples (d.w)

Species	Sampling sites	Cu	Fe	Zn	Cd
U. fasciata Delile	Thalpe	4.933±0.527	321.370±46.193	21.306±2.032	N.D.
	Koggala	2.379±0.235	303.058±43.585	25.781±5.611	N.D.
	Dickwalla	3.205±0.349	404.941±73.079	14.851±5.671	N.D.
C. racemosa var. racemosa	Thalpe	4.087±0.609	774.412±241.41	15.025±10.699	N.D.
	Koggala	2.032±0.442	1160.022±404.539	24.370±7.244	N.D.
	Dickwalla	3.969±0.081	1241.719±351.455	6.921±3.476	N.D.

Results are mean values±SD of three replications
Cu=Copper; Zn=Zinc; Fe=Iron; Cd=Cadmium; N.D.=Not detected; d.w=Dry weight; SD=Standard deviation

Table 4: Upper limit for analyzed metals in European union

Element	Cu	Zn	Fe
UL of EU (mg/day)	**5**	**25**	**50-150**

UL = Upper limit of intakes; EU = European union

Conclusion

- The relative abundance of these metals in *U. fasciata* Delile and *C. racemosa* var. *racemosa* in order of **Fe > Zn > Cu**
- Cadmium (Cd) was below the limit of detection (0.02ppm)
- Fe concentration is significantly higher in *Caulerpa* compared to *Ulva*
- These metal concentrations were lower than the European Union (EU) maximum allowable value because that these two species are potentially rich sources of minerals thus can help to address food scarcity and security.

References

- Jayasinghe, G., Jinadasa, B. and Chinthaka, S. D. M. (2018) 'Nutritional composition and heavy metal content of five tropical seaweeds', *Open Sci J Anall Chem*, 3(2), pp. 17–22.

- Roy, S. and Anantharaman, P. (2007) 'Minerals Composition of Marine Macro Algae Collected from Olaikuda, Rameshwaram, Gulf of Mannar, Southeast Coast of India', International Advanced Research Journal in Science, Engineering and Technology ISO, 3297.

Acknowledgement

- My research supervisor Dr. Sanchala Darshani, Senior lecturer, Department of Aquaculture & Fisheries
- All the academic and non academic staff , Department of Aquaculture & Fisheries,
- Laboratory Service, National Institute of Post Harvest Management, Research & Development Centre Anuradhapura
- Family and colleagues

THANK YOU!