Umami related compounds in macroalgae from the Portuguese coast

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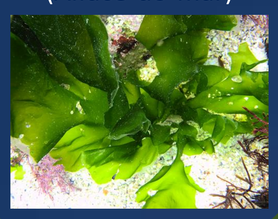
INTRODUCTION

The fifth basic taste - Umami, described as the essence of deliciousness[1], is based on hydrosoluble monosodium glutamate (MSG) which can be found in the free form in macroalgae. The umami taste can be increased by the synergistic effect of L-aspartic amino acid (L-Asp), as well as with 5'-nucleotides, such as guanosine-5'-monophosphate (GMP) and inosine-5'-monophosphate (IMP).

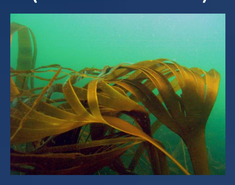
Following the trends of traditional cuisine in South East Asia and Polynesia, recently an increased interest in phycogastronomy, by introducing macroalgae in modern dishes in Europe, can be observed[2]. In order to evaluate the umami potentials of edible macroalgae used in gastronomy, we have analyzed umami related amino acids and nucleotides in green, brown and red macroalgae from the Portuguese coast.

MATERIALS AND METHODS

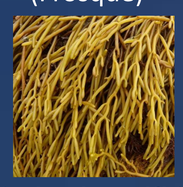
Ulva rigida
(Alface-do-mar)



Saccorhiza polyschides
(Limo-Corriola)



Bifurcaria bifurcata
(Frosque)

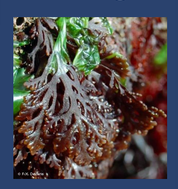


Fucus vesiculosus
(Tremoço-do-mar)

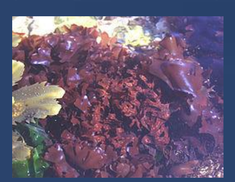
Undaria pinnatifida
(Wakame)

Gracilaria gracilis
(Cabelo-de-velha)

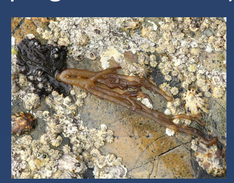
Osmundea pinnatifida
(Erva-malagueta)



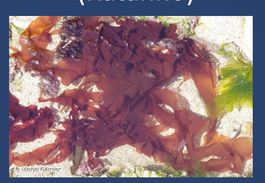
Chondrus crispus
(Musgos irlandês)



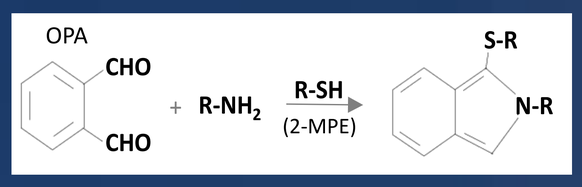
Nemalion helminthoides
(Esparguete-da-costa)



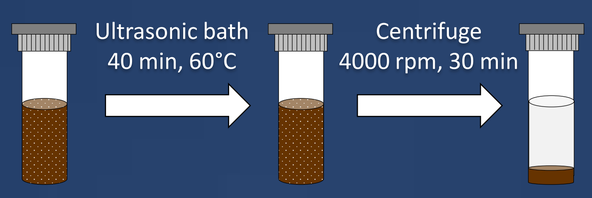
Grateloupia turuturu
(Ratanho)



Method of derivatization



Sample extraction



Sample of macroalgae
in Mili-Q water (1:50, w:w)

Sample aliquot
+ borate buffer (pH 9.5)
+ OPA/2-MPE

Vortex 30 s

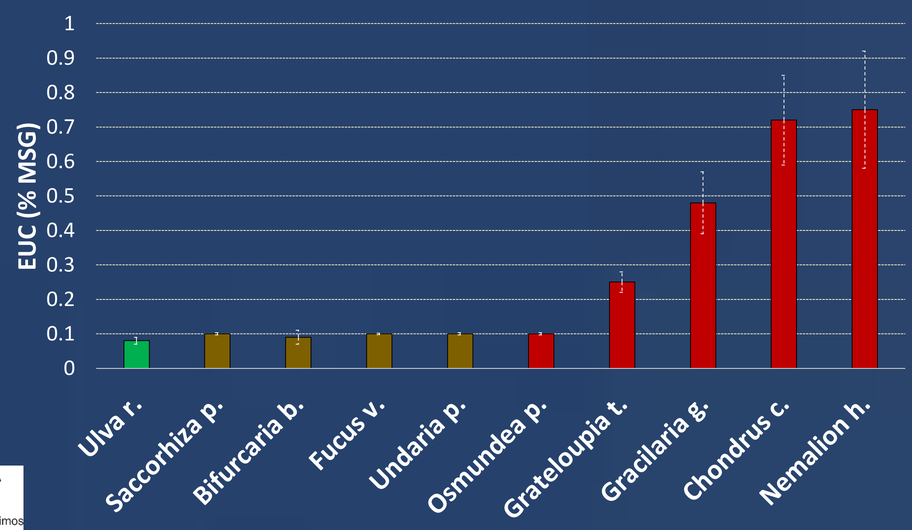
HPLC-DAD (Ultimate 3000):
ACN/$HCOONH_4$ buffer (pH 4.0)
Kinetex 2.6 µm, XB-C18 column
UV-detection (220 - 450 nm)

RESULTS AND CONCLUSIONS

Equivalent Umami Concentration (EUC)[3,4] of the solution:

$$EUC = u + ruv$$

u (%) - the concentration of MSG in solution
v (%) - the concentration of 5'-IMP
r - a synergistic constant equal to 1218



References
1) K. Ikeda. *Chemical Senses*, 2002, 27, 847-849.
2) O. G. Mouritsen, L. Williams, R. Bjerregaard, L. Duelund. *Flavour,* 2012, 1, 1-12.
3) Y. Liu and C. Qiu. *Journal of Aquatic Food Product Technology*, 2016, 25, 177-184.
4) J.L. Mau. *International Journal of Medicinal Mushrooms*, 2005, 7, 119-125.

Cofinanciado por:

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