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Do not call me by your name: The commercially traded "*cottonii*" seaweed is not *Eucheuma cottonii* – an obsolete nomenclature now reclassified under a new genus

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ABSTRACT

The continued use of the red seaweed name *Eucheuma cottonii* in applied research reflects a persistent gap between taxonomic revisions and their adoption in the scientific literature. Although widely reported in food and industrial studies, *E. cottonii* is an obsolete name now reclassified as *Kappaphycopsis cottonii*, a species not currently known to be cultivated commercially. Most studies are therefore referring to commonly cultivated carrageenophytes *Kappaphycus alvarezii* or *K. striatus*, which may result in misidentification of the biological material. This issue is evident across diverse applications, including food fermentation, bioethanol production, animal nutrition, and biomaterials development, and is particularly apparent in publications originating from Southeast Asia, particularly Indonesia. This suggests that taxonomic inaccuracies may not be consistently recognized during peer review and editorial processes. Given that carrageenan composition and biochemical properties are species-specific, incorrect naming can affect reproducibility, product performance, and process optimization, and may also have implications for regulatory compliance, including food labeling and clean-label claims. This letter outlines the implications of taxonomic inaccuracies and draws attention to the importance of accurate species identification, and the use of taxonomic verification in applied research.

1. Background

Eucheumatoid seaweeds are widely used across food, pharmaceutical, agricultural, and industrial sectors due to their diverse functional properties (Hossain et al., 2024; Loureiro et al., 2017; Rath et al., 2025; Rupert et al., 2022). Beyond their well-known role as sources of carrageenan, these red algae are increasingly explored for applications in fermented foods, nutraceuticals, animal feed, bioenergy production, biomaterials, and environmental technologies. As these applications expand, accurate species identification becomes increasingly important, given that biochemical composition and functional performance can vary among taxa (Campo et al., 2009; Hale et al., 2024; van de Velde, 2008). Despite advances in eucheumatoid taxonomy, the name *Eucheuma cottonii* continues to be used in applied research, including recent work in *LWT - Food Science and Technology* (Du et al., 2026) and other studies within the journal (e.g., Bhatia et al., 2025; Huang & Yang, 2019; Kim et al., 2023). Similar usage is also widespread across food, biotechnology, and industrial studies (e.g., Ali et al., 2025; Mahardika et al., 2025; Purbosari et al., 2022; Sumardianto et al., 2021; Tan & Lee, 2016; Wahyuni et al., 2026; Widiawati et al., 2025), indicating that the use of this name remains common in contemporary literature. Taxonomically, *E. cottonii* is no longer a valid name and has been reclassified under a different genus as *Kappaphycopsis cottonii*, based on combined morphological and molecular data (Dumilag & Zuccarello, 2022). This species is not currently known to be cultivated or harvested at an industrial scale and has only been collected from wild populations in limited quantities. In contrast, commercial eucheumatoid farming is dominated by *Kappaphycus alvarezii*, *K. striatus*, and *E. denticulatum*, which are widely used as raw materials for carrageenan extraction in food and industrial applications. The continued used of the name *E. cottonii* in applied studies therefore raises confusions regarding the actual identity of the biological material used and concerns about the implications of using incorrect names and their functional components in different industrial applications.

2. Comment

Eucheumatoid seaweeds were initially classified under the genus *Eucheuma*, based primarily on morphological characteristics such as branching patterns, thallus form, and cellular structure (Agardh, 1847; Weber van Bosse, 1928). Within this broadly circumscribed genus, several species were described, including, *Eucheuma spinosum*, *E. cottonii*, *E. alvarezii*, and *E. striatum*, among others (Doty, 1985, 1988). With the expansion of the carrageenan industry, functional differences among taxa became more clearly differentiated, particularly in relation to carrageenan composition. This led to revised classification framework distinguishing taxa based on carrageenan chemistry (e.g., iota, kappa, and beta-carrageenan) and the establishment of new genera. Species producing iota-carrageenan were retained under the genus *Eucheuma*, with *E. spinosum* later recognized as *E. denticulatum* (Agardh, 1847; Collins & Hervey, 1917), although the trade name "*spinosum*" remained in use. On the other hand, species producing primarily kappa-carrageenan, including *E. cottonii*, were transferred to the genus *Kappaphycus*, becoming *Kappaphycus cottonii* alongside *K. alvarezii* and *K. striatus* (Silva et al., 1996). Subsequent advances in molecular phylogenetics further refined the eucheumatoid taxonomy. Analyses using DNA markers demonstrated that eucheumatoids comprise multiple genetically distinct lineages, providing stronger resolution for species boundaries (Dumilag et al., 2016; Lim et al., 2014; Saunders, 2005; Saunders & Moore, 2013; Zuccarello et al., 1999). Within this revised

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classification, *K. cottonii* was reassessed and reclassified as *Kappaphycopsis cottonii* (Dumilag & Zuccarello, 2022). This progression from *E. cottonii* to *K. cottonii*, and ultimately to *Ka. cottonii* illustrates the cumulative refinement of taxonomic understanding in this group and indicates that it is distinct from commonly cultivated species such as *K. alvarezii* and *K. striatus*.

Despite these revisions, obsolete names and incorrect combinations remain widely used in scientific literature, industry reports, and aquaculture practice. Names such as *Eucheuma cottonii* (Mansa et al., 2013; Matanjun et al., 2009; Purbosari et al., 2022; Teo et al., 2021), *Eucheuma spinosum* (Bouanati et al., 2020; Damongilala et al., 2021; Ngonyamana et al., 2026), and even a non-existent combination like *Kappaphycus spinosum* (Adharini et al., 2019) continue to appear. In some cases, even the updated *Ka. cottonii* has been misapplied to cultivated *Kappaphycus* species (Firdayanti et al., 2023), further compounding the confusion. This taxonomic inconsistency becomes particularly consequential when considered alongside the wide range applications attributed to "*Eucheuma cottonii*". This name has been used across food, industrial and biotechnological studies to refer to biomass utilized in bioethanol production (Tan & Lee, 2016), aquaculture applications such as anesthetic agents (Purbosari et al., 2022), fermented food products (Ali et al., 2025), animal feed additives for methane mitigation (Widiawati et al., 2025), and material development including biopolymer films (Mahardika et al., 2025) and activated carbon (Amir et al., 2026). Across literature, the name appears in titles or is used uncritically within the text, implicitly treating the material as taxonomically uniform. This pattern is particularly evident in studies originating from regions with intensive eucheumatoid aquaculture, notably Indonesia. However, eucheumatoid species differ significantly in their structural and biochemical composition (Campo et al., 2009; Hale et al., 2024; van de Velde, 2008), and these differences underpin functional properties that are central to their applications. When species identity is uncertain or incorrectly assigned, these variations may be overlooked, which can lead to inconsistent results, reduced reproducibility, and challenges in scaling, standardizing processes, or registering products.

Furthermore, the continued use of the vernacular "*cottonii*" or "*kotony*" by farmers and traders as a trade name likely originated from its early association with *E. cottonii* and was subsequently applied broadly to cultivated eucheumatoid seaweeds. While its use in commercial contexts is practical, its direct translation into scientific nomenclature introduces ambiguity. This ambiguity is further compounded by the high morphological plasticity of commercially cultivated "*cottonii*" seaweeds. These taxa are well known to exhibit considerable variation, often requiring DNA barcoding when the traceability of seedstock cannot be confirmed. Currently, 45 cultivars from three cultivated *Kappaphycus* species (i.e., *K. alvarezii*, *K. striatus*, and *K. malesianus*) have been named by Filipino seaweed farmers, largely based on morphology (Dumilag et al., 2023). Similar plasticity has been observed in wild populations (Aguilar et al., 2025; Roleda et al., 2021), and individual thalli can change in size, shape, branching pattern, and color when transferred between environments, such as from the wild to land-based hatchery systems (Narvarte et al., 2022; Tabonda-Nabor et al., 2026) and back to field conditions (Gacura et al., 2026). Such variability demonstrates the limitation of morphology-based identification and reinforces the need for taxonomic verification. In this context, a clear distinction must therefore be maintained between trade names and validated scientific identities. Addressing this issue requires greater integration of taxonomic knowledge into applied research. When publishing articles with seaweed species, generic and scientific names should be verified against authoritative databases such as AlgaeBase (https://www.algaebase.org) and the World Register of Marine Species (WoRMS; https://www.marinespecies.org), supported by nomenclatural and supplementary databases including Index Nominum Algarum (INA; https://ucjeps.berkeley.edu/CPD/) and AlgaeVision (https://algaevision.myspecies.info). The NCBI Taxonomy Browser (https://www.ncbi.nlm.nih.gov/taxonomy) may also be used as a supplementary reference, but nomenclature should be confirmed against primary taxonomic literature. Studies should also include adequate documentation of the material used, including photographs and source information, and where possible, voucher specimens should be deposited to enable verification. Reviewers and editors also play a key role in ensuring that updated nomenclature is consistently applied.

CRediT authorship contribution statement

Ronel T. Aguilar: Conceptualization, Validation, Writing – original draft. **Alan T. Critchley:** Conceptualization, Writing – review & editing. **Michael Y. Roleda:** Conceptualization, Supervision, Validation, Writing – review & editing.

Declaration of competing interest

The authors declare no known competing financial interests or personal relationships that could have influenced the work reported in this paper.

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References

Adharini, R. I., Suyono, E. A., Suadi, Jayanti, A. D., & Setyawan, A. R. (2019). A comparison of nutritional values of *Kappaphycus alvarezii, Kappaphycus striatum*, and *Kappaphycus spinosum* from the farming sites in Gorontalo Province, Sulawesi, Indonesia. *Journal of Applied Phycology, 31*(1), 725–730. https://doi.org/10.1007/s10811-018-1540-0/tables/3

Agardh, J. G. (1847). Nya alger från Mexico. *Öfversigt af Kongl. Vetenskaps-Adademiens Förhandlingar, 4*, 5–15.

Aguilar, R. T., Crisostomo, B. A., Gacura, J. R. L., Hinaloc, L. A. R., & Roleda, M. Y. (2025). Wider than expected: Geographic range and genetic diversity of a commercially farmed and traded "Cottonii" seaweed *Kappaphycus malesianus*. *Ecology and Evolution, 15*(12), Article e72762. https://doi.org/10.1002/ece3.72762

Ali, M. Q., Azhar, M. A., Munaim, M. S. A., Ruslan, N. F., Nour, A. H., Ahmad, N., Noman, A. E., & Alsubhi, L. M. (2025). Quality characteristics and antioxidant activity of fermented symbiotic beverages supplemented with *Eucheuma cottonii*. *Discover Food, 5*(1), 292. https://doi.org/10.1007/S44187-025-00444-0

Amir, N., Hussin, F., Aroua, M. K., & Gozan, M. (2026). Valorization of seaweed industrial by-products as potentially sustainable activated carbon precursors: Production routes, preparation, and characterization. *Biomass and Bioenergy, 208*, Article 108819. https://doi.org/10.1016/j.biombioe.2025.108819

Bhatia, S., Jawad, M., Chinnam, S., Al-Harrasi, A., Shah, Y. A., Khan, T. S., Koca, E., Aydemir, L. Y., Dıblan, S., Thekkuden, D. T., Alshabrmi, F. M., & Anwer, M. K. (2025). *Origanum majorana* essential oil-enriched collagen/K-carrageenan films with enhanced thermal, hydrophobic, anti-oxidant and anti-microbial properties for active Packaging. *Lebensmittel-Wissenschaft & Technologie, 222*. https://doi.org/10.1016/j.lwt.2025.117646

Bouanati, T., Colson, E., Moins, S., Cabrera, J. C., Eeckhaut, I., Raquez, J. M., & Gerbaux, P. (2020). Microwave-assisted depolymerization of carrageenans from *Kappaphycus alvarezii* and *Eucheuma spinosum*: Controlled and green production of oligosaccharides from the algae biomass. *Algal Research, 51*, Article 102054. https://doi.org/10.1016/j.algal.2020.102054

Campo, V. L., Kawano, D. F., Silva, D. B. da, & Carvalho, I. (2009). Carrageenans: Biological properties, chemical modifications and structural analysis – A review. *Carbohydrate Polymers, 77*(2), 167–180. https://doi.org/10.1016/j.carbpol.2009.01.020

Collins, F. S., & Hervey, A. B. (1917). The algae of Bermuda. *Proceedings of the American Academy of Arts and Sciences, 53*, 1–195. https://doi.org/10.5962/bhl.title.64273

Damongilala, L. J., Wewengkang, D. S., Losung, F., & Tallei, T. E. (2021). Phytochemical and antioxidant activities of *Eucheuma spinosum* as natural functional food from North Sulawesi waters, Indonesia. *Pakistan Journal of Biological Sciences: PJBS, 24*(1), 132–138. https://doi.org/10.3923/pjbs.2021.132.138

Doty, M. S. (1985). *Eucheuma alvarezii* sp. Nov. In I. A. Abbott, & J. N. Norris (Eds.), *Taxonomy of economic seaweeds* (pp. 37–45).

Doty, M. S. (1988). Podromus ad systematica Eucheumatoideorum. In I. A. Abbott (Ed.), *Taxonomy of economic SeaweedsVol* (Vol. 2, pp. 159–207).

Du, X., Lin, M., Hong, T., Li, Z., Zhu, Y., Li, L., Jiang, Z., Ni, H., & Zheng, M. (2026). *Lactiplantibacillus plantarum* fermentation improves the flavor of *Eucheuma cottonii* and its transformation mechanism. *Lebensmittel-Wissenschaft & Technologie, 245*, Article 119218. https://doi.org/10.1016/j.lwt.2026.119218

Dumilag, R. V., Crisostomo, B. A., Aguinaldo, Z. Z. A., Hinaloc, L. A. R., Liao, L. M., Roa-Quiaoit, H. A., Dangan-Galon, F., Zuccarello, G. C., Guillemin, M. L., Brodie, J., Cottier-Cook, E. J., & Roleda, M. Y. (2023). The diversity of eucheumatoid seaweed cultivars in the Philippines. *Reviews in Fisheries Science & Aquaculture, 31*(1), 47–65. https://doi.org/10.1080/23308249.2022.2060038

Dumilag, R. V., Orosco, F. L., & Lluisma, A. O. (2016). Genetic diversity of *Kappaphycus* species (Gigartinales, Rhodophyta) in the Philippines. *Systematics and Biodiversity, 14*(5), 441–451. https://doi.org/10.1080/14772000.2016.1157643

Dumilag, R. V., & Zuccarello, G. C. (2022). Phylogeny and genetic diversity of the Philippine eucheumatoid genus *Mimica* (Solieriaceae, Rhodophyta), and the proposal for *Kappaphycopsis* gen. nov. to include the anomalous species of *Kappaphycus, K. cottonii*. *Phycologia, 61*(5), 496–503. https://doi.org/10.1080/00318884.2022.2079283

Firdayanti, L., Yanti, R., Rahayu, E. S., & Hidayat, C. (2023). Carrageenan extraction from red seaweed (*Kappaphycopsis cottonii*) using the bead mill method. *Algal Research, 69*, Article 102906. https://doi.org/10.1016/j.algal.2022.102906

Gacura, J. R. L., Hinaloc, L. A. R., Oguira, R. N., Narvarte, B. C. V., Aguilar, R. T., Mendoza, E. M., Projimo, V. Z., & Roleda, M. Y. (2026). Exploiting the untapped wild resources: Developing new diploid tetrasporophyte *Kappaphycus alvarezii* cultivars from sporelings of wild cystocarpic parental plants. *Aquaculture, 610*, Article 742916. https://doi.org/10.1016/j.aquaculture.2025.742916

Hale, J., Gerhäuser, J., Gaukel, V., & Wefers, D. (2024). Commercially available carrageenans show broad variation in their structure, composition, and functionality. *European Food Research and Technology, 250*(12), 2989–3003. https://doi.org/10.1007/s00217-024-04605-w

Hossain, M. M., Sultana, F., Khan, S., Nayeema, J., Mostafa, M., Ferdus, H., Tran, L. S. P., & Mostofa, M. G. (2024). Carrageenans as biostimulants and bio-elicitors: Plant growth and defense responses. *Stress Biol., 4*(1), 3. https://doi.org/10.1007/s44154-023-00143-9, 2024 4:1.

Huang, M., & Yang, H. (2019). *Eucheuma* powder as a partial flour replacement and its effect on the properties of sponge cake. *Lebensmittel-Wissenschaft & Technologie, 110*, 262–268. https://doi.org/10.1016/j.lwt.2019.04.087

Kim, S., Kim, B. S., Bai, J., & Chang, Y. (2023). Antibacterial κ-carrageenan/konjac glucomannan-based edible hydrogel film containing *Salmonella* phage PBSE191 and its application in chicken meat. *Lebensmittel-Wissenschaft & Technologie, 180*. https://doi.org/10.1016/j.lwt.2023.114707

Lim, P. E., Tan, J., Phang, S. M., Nikmatullah, A., Hong, D. D., Sunarpi, H., & Hurtado, A. Q. (2014). Genetic diversity of *Kappaphycus* Doty and *Eucheuma* J. Agardh (Solieriaceae, Rhodophyta) in Southeast Asia. *Journal of Applied Phycology, 26*(2), 1253–1272. https://doi.org/10.1007/s10811-013-0197-y

Loureiro, R. R., Cornish, M. L., & Neish, I. C. (2017). Applications of carrageenan: With special reference to Iota and Kappa forms as derived from the eucheumatoid seaweeds. *Tropical Seaweed Farming Trends, Problems and Opportunities*, 165–171. https://doi.org/10.1007/978-3-319-63498-2_11

Mahardika, M., Jatul Fitri, M. V., Kusumastuti, Y., Suryanegara, L., Fitriani, A. D., Holilah, Sapuan, S. M., Siddiqui, V. U., & Mohamad Haafiz, M. K. (2025). Effect of plasticizer on biodegradability, physical, and morphological properties of κ-carrageenan biopolymer films. *Biomass and Bioenergy, 201*, Article 108096. https://doi.org/10.1016/j.biombioe.2025.108096

Mansa, R. F., Chen, W. F., Yeo, S. J., Farm, Y. Y., Bakar, H. A., & Sipaut, C. S. (2013). Fermentation study on Macroalgae *Eucheuma cottonii* for bioethanol production via varying acid hydrolysis. *Adv. Biofuels, 9781461462491*, 219–240. https://doi.org/10.1007/978-1-4614-6249-1_13

Matanjun, P., Mohamed, S., Mustapha, N. M., & Muhammad, K. (2009). Nutrient content of tropical edible seaweeds, *Eucheuma cottonii, Caulerpa lentillifera* and *Sargassum polycystum*. *Journal of Applied Phycology, 21*(1), 75–80. https://doi.org/10.1007/s10811-008-9326-4

Narvarte, B. C. V., Hinaloc, L. A. R., Genovia, T. G. T., Gonzaga, S. M. C., Tabonda-Nabor, A. M., & Roleda, M. Y. (2022). Physiological and biochemical characterization of new wild strains of *Kappaphycus alvarezii* (Gigartinales, Rhodophyta) cultivated under land-based hatchery conditions. *Aquatic Botany, 183*, Article 103567. https://doi.org/10.1016/j.aquabot.2022.103567

Ngonyamana, A., Nyoni, B., Mnyango, J. I., Kandirai, I. T., Hlangothi, S. P., & Muniyasamy, S. (2026). Bioplastic films from *Sargassum oligocystum* and *Eucheuma spinosum* seaweeds: Preparation, thermal degradation, and kinetics analysis. *Polymer Degradation and Stability, 245*, Article 111873. https://doi.org/10.1016/j.polymdegradstab.2025.111873

Purbosari, N., Warsiki, E., Syamsu, K., & Santoso, J. (2022). The potential of *Eucheuma cottonii* extract as a candidate for fish anesthetic agent. *Aquaculture and Fisheries, 7*(4), 427–432. https://doi.org/10.1016/j.aaf.2021.06.003

Rath, S., Sahoo, S. S., Samantaray, A., Parhi, P., Sahoo, C. R., & Thatoi, H. (2025). Commercial importance of seaweeds: An overview. *Bioresources and Bioprocessing, 12*(1), 119. https://doi.org/10.1186/s40643-025-00944-y, 2025 12:1.

Roleda, M. Y., Aguinaldo, Z.-Z. A., Crisostomo, B. A., Hinaloc, L. A. R., Projimo, V. Z., Dumilag, R. V., Lluisma, A. O., Roleda, M. Y., Aguinaldo, Z.-Z. A., Crisostomo, B. A., Hinaloc, L. A. R., Projimo, V. Z., Dumilag, R. V., & Lluisma, A. O. (2021). Discovery of novel haplotypes from wild populations of *Kappaphycus* (Gigartinales, Rhodophyta) in the Philippines. *Algae, 36*(1), 1–12. https://doi.org/10.4490/algae.2021.36.2.18

Rupert, R., Rodrigues, K. F., Thien, V. Y., & Yong, W. T. L. (2022). Carrageenan from *Kappaphycus alvarezii* (Rhodophyta, Solieriaceae): Metabolism, structure, production, and application. *Frontiers in Plant Science, 13*. https://doi.org/10.3389/fpls.2022.859635

Saunders, G. W. (2005). Applying DNA barcoding to red macroalgae: A preliminary appraisal holds promise for future applications. *Philosophical Transactions of the Royal Society B: Biological Sciences, 360*(1462), 1879. https://doi.org/10.1098/rstb.2005.1719

Saunders, G. W., & Moore, T. E. (2013). Refinements for the amplification and sequencing of red algal DNA barcode and RedToL phylogenetic markers: A summary of current primers, profiles and strategies. *Algae, 28*(1), 31–43. https://doi.org/10.4490/algae.2013.28.1.031

Silva, P. C., Basson, P. W., & Moe, R. L. (1996). *Catalogue of the benthic marine algae of the Indian Ocean*. University of California Publications in Botany, 79: [i]-xiv, 1–1259.

Sumardianto, R., Anggo, P. H., Romadhon, A. D., & Rianingsih, L. (2021). Phenol content and antioxidant activity in seaweed fermented with lactic acid bacteria. *Food Research, 5*(3), 7–13. https://doi.org/10.26656/fr.2017.5(S3).006

Tabonda-Nabor, A. M., Crisostomo, B. A., Armaos, A., Schweizer, G., Lluisma, A. O., Roleda, M. Y., & Fahrenkrug, S. C. (2026). Light stress regulates pigment concentrations, growth, and gene expression in hatchery-cultivated *Kappaphycus alvarezii* (Solieriaceae, Rhodophyta). *Journal of Phycology, 62*(2), 568–588. https://doi.org/10.1111/jpy.70148

Tan, I. S., & Lee, K. T. (2016). Comparison of different process strategies for bioethanol production from *Eucheuma cottonii*: An economic study. *Bioresource Technology, 199*, 336–346. https://doi.org/10.1016/j.biortech.2015.08.008

Teo, B. S. X., Gan, R. Y., Abdul Aziz, S., Sirirak, T., Mohd Asmani, M. F., & Yusuf, E. (2021). *In vitro* evaluation of antioxidant and antibacterial activities of *Eucheuma cottonii* extract and its *in vivo* evaluation of the wound-healing activity in mice. *Journal of Cosmetic Dermatology, 20*(3), 993–1001. https://doi.org/10.1111/jocd.13624

van de Velde, F. (2008). Structure and function of hybrid carrageenans. *Food Hydrocolloids, 22*(5), 727–734. https://doi.org/10.1016/j.foodhyd.2007.05.013

Wahyuni, D. S., Wiryawan, K. G., Ridwan, R., Gunawan, G., Sinurat, A. P., Surachman, M., Fidriyanto, R., Fitri, A., Pamungkas, D., Puastuti, W., Aji, G. K., Widiawati, Y., & Jayanegara, A. (2026). Comparative *in vitro* evaluation of native Indonesian macroalgae on rumen fermentation characteristics, digestibility, gas production kinetics, and enteric methane mitigation in ruminants. *Veterinary World, 19*(2), 693–713. https://doi.org/10.14202/vetworld.2026.693-713

Weber van Bosse, A. (1928). Liste des algues du Siboga, IV. Rhodophyceae. Troisème partie. Gigartinales et Rhodymeniales et tableau de la distribution des Chlorophycées, Phaeophycées et Rhodophycées de l'Archipel Malaisien. In E. J. Brill (Ed.), *Siboga-Expeditie Monographie 59d* (pp. 393–533). Leiden.

Widiawati, Y., Widodo, S., Adegbeye, M. J., Saputra, F., Alvarado-Ramírez, E. R., Sánchez Guerra, N. A., Anggraeny, Y. N., Puastuti, W., Yulistiani, D., Rohaeni, E. S., Handiwirawan, E., & Praharani, L. (2025). Potential of seaweed (*Eucheuma cottonii*) supplementation to reduce methane production, improve fermentation, and modulate the microbial composition of forages and crop by-products during in vitro rumen fermentation. *Frontiers in Veterinary Science, 12*, Article 1607879. https://doi.org/10.3389/fvets.2025.1607879

Zuccarello, G. C., Burger, G., West, J. A., & King, R. J. (1999). A mitochondrial marker for red algal intraspecific relationships. *Molecular Ecology, 8*(9), 1443–1447. https://doi.org/10.1046/j.1365-294x.1999.00710.x

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