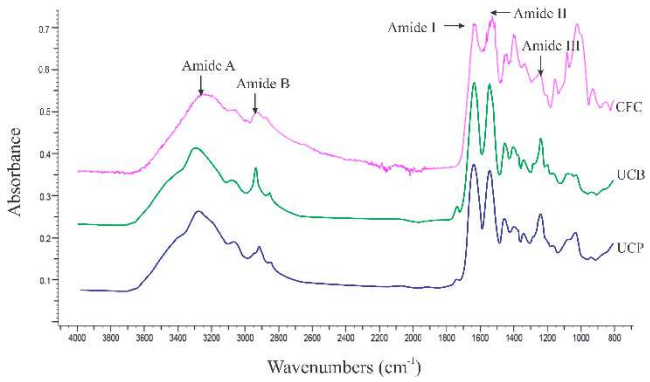

Fig. 3 FTIR spectra of the pepsin soluble collagen from unicorn fish (*N. reticulatus*) skin. UCP: Unicorn fish skin hydrolyzed with pepsin from porcine; UCB: Unicorn fish skin hydrolyzed with pepsin from bovine; CFC: Commercial fish collagen.

TABLE II
THE PEAK AREA AND DESCRIPTION OF PSC DERIVED FROM UNICORN FISH (*N. RETICULATUS*) SKIN

Peak	Type of collagen			Peak assignment
	UCP	UCB	CFC	
Amide A	3280.14 cm^{-1}	3285.73 cm^{-1}	3259.64 cm^{-1}	Stretching of N-H with hydrogen chain
Amide B	2926.03 cm^{-1}	2922.31 cm^{-1}	2931.62 cm^{-1}	Asymmetric stretching of CH_2
Amide I	1628.89 cm^{-1}	1628.89 cm^{-1}	1636.34 cm^{-1}	Stretching of C=O / hydrogen chain with COO-
Amide II	1541.29 cm^{-1}	1541.29 cm^{-1}	1522.66 cm^{-1}	N-H bond with stretching of C-N
Amide III	1235.64 cm^{-1}	1235.64 cm^{-1}	1241.23 cm^{-1}	N-H bond with C-H dan C-O stretching

UCP: Unicorn fish skin hydrolyzed with pepsin from porcine.
UCB: Unicorn fish skin hydrolyzed with pepsin from bovine.
CFC: Commercial fish collagen.

G. Thermostability Assessment

Fig. 4. presents the thermograms of extracted collagens from the unicorn fish (*N. reticulatus*) skin. The thermostability of UCP sample (T_{max} = 43.63°C) was greater than that of UCB (T_{max} = 35.25°C). The reason might be due to the content of hydroxyproline in the fish collagens, which play an essential role in the formation of pyrrolidine rings partially stabilized by hydrogen bonding through the hydroxyl group of hydroxyproline, as suggested by Benjakul et al. [34]. Furthermore, hydroxyproline has the capacity to enhance the stability of the triple helical structure through hydrogen bonding within the coiled-coil alpha chains, as elucidated by Bae et al. [37]. The mentioned data (Table 1) showed a high content of hydroxyproline. These findings also agreed with the experiments on fish collagens, including lizardfish (*S. tumbil*) (T_{max} = 40.24°C) [8], seabass (*Lates calcarifer*) skin (T_{max} = 39.32°C) [38], and loach (*Misgurnus anguillicaudatus*) skin (T_{max} = 36.03°C) [39].

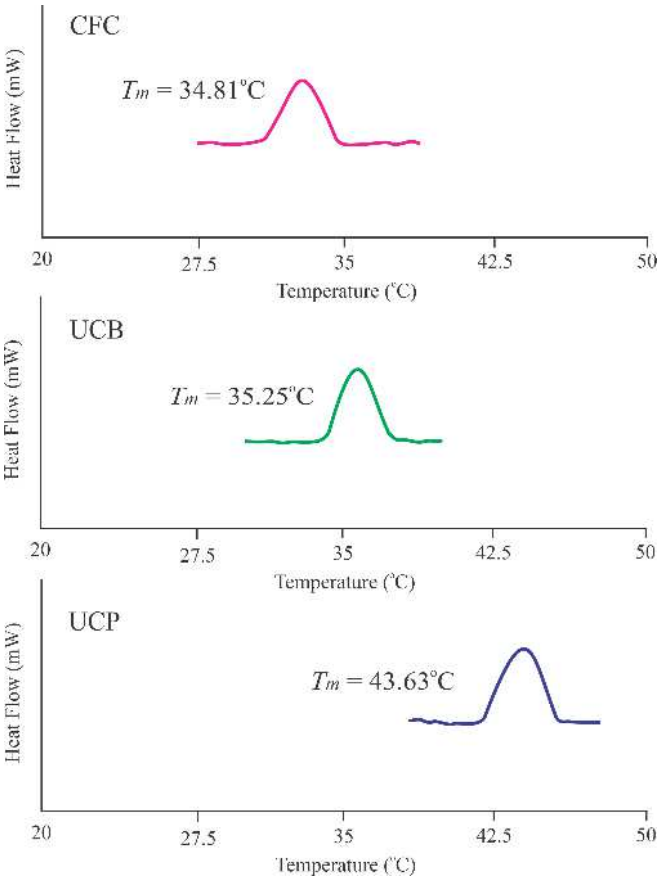

Fig. 4 Thermogram graph of the pepsin soluble collagen from unicorn fish (*N. reticulatus*) skin. UCP: Unicorn fish skin hydrolyzed with pepsin from porcine; UCB: Unicorn fish skin hydrolyzed with pepsin from bovine; CFC: Commercial fish collagen.

IV. CONCLUSION

The pepsin-soluble collagens derived from the skin of unicorn fish (*N. reticulatus*) have been isolated using two pepsin sources. UCP sample had a significantly higher yield (15.60%) than UCB (10.40%), which might be due to the swelling rate during the pre-treatment process. Both UCP and UCB were thought of as type I owing to the two alpha chains available after SDS-PAGE analysis, and the triple helical structures of those collagens were preserved, indicating no structural change during the extraction process. These analyses were proved using FTIR and UV-visible experiments. Interestingly, all collagens showed high thermal ability, with a higher observed in UCP compared to the UCB sample. This result could be influenced by the hydroxyproline content that plays a vital role in stabilizing the triple helical structure of fish collagen. Overall, the UCP sample may be electable in this study because it also has a high collagen extractability and thermostability.

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