

## CORRESPONDENCE

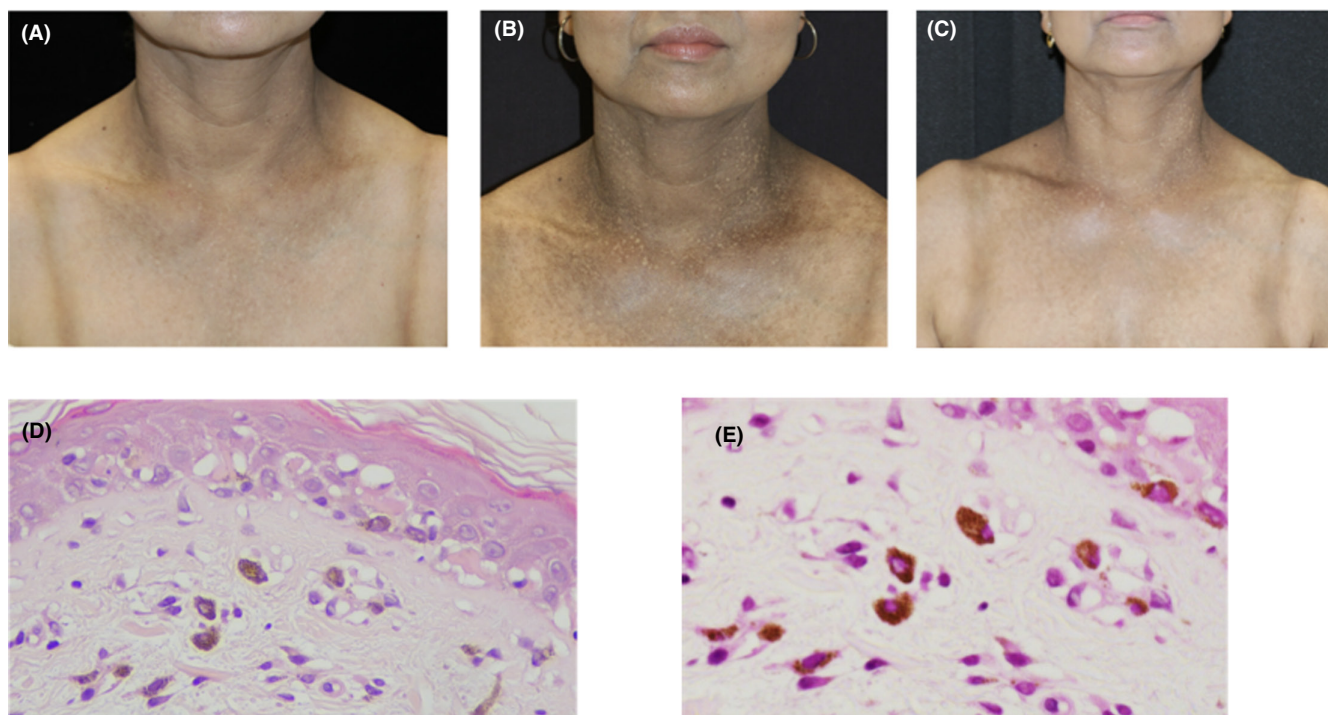
## Case of hyperpigmentation associated with the use of *Morinda citrifolia* (noni)

*Morinda citrifolia* (noni) is an evergreen tree of the family *Rubiaceae* and generally used as a healthy food or supplement.<sup>1</sup> To our knowledge, there are no reports on skin lesions associated with noni. Here, we report the first case of hyperpigmentation possibly induced by noni.

A 63-year-old Japanese woman visited our hospital with gray-brownish pigmentation extending from the mouth to the neck for 6–7 years (Figure 1A). The pigmentation was not prominent on the rest of her face. There was no history of common causes of hyperpigmentation or contact dermatitis. Patch testing using the Japanese Standard Allergen series showed positive results of nickel, fragrance mix, and thiuram mix. Despite avoiding intake or contact with these substances, her pigmentation worsened (Figure 1B). After detailed interviews, she was found to have been consuming noni juice nearly four times the usual amount daily (approximately 100 ml/day) for

7 years. Additionally, she had a history of wrapping a noni juice-soaked towel around her neck for 2 weeks, one year before her hospital visit. The pigmentation started to improve within a month after stopping noni juice consumption (Figure 1C). Skin biopsy performed at her first visit showed hyperpigmentation of the basal layer, liquid degeneration, and melanophages in the dermis (Figure 1D,E). Patch testing with noni juice performed at both the pigmented and healthy lesions showed negative results according to the ICDRG criteria.

Noni comprises iridoids, alkaloids, anthraquinone, and potassium.<sup>2</sup> Although no report of skin lesions associated with noni exists, few cases with similar pigmentation have been associated with *Gardenia jasminoides* (Sanshishi) intake, a member of the same *Rubiaceae* family.<sup>3,4</sup> Geniposide, a type of iridoid and main ingredient of *G. jasminoides*, causes mesenteric phlebosclerosis, which is characterized by bronze



**FIGURE 1** Clinical and histological examination. (A) Clinical findings at the time of the first visit to our hospital. (B) Clinical findings one year after the visit. (C) Clinical findings a month after discontinuation of noni juice intake. (D) Histological findings. Liquid degeneration of the basal epidermal layer and many melanophages in the dermis was observed. Hematoxylin and eosin staining: (D)  $\times 200$  and (E)  $\times 400$

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coloration of the colonic membrane. Its exact mechanism of action is unclear; however, genipin, a metabolite of geniposide, is implicated. Genipin spontaneously reacts with amino acids and proteins to form blue particles.<sup>5</sup> Geniposide promotes melanogenesis in the epidermis when exposed to norepinephrine.<sup>6</sup> The reason for pigmentation in our case was unknown. However, since melanin production depends on geniposide concentration, the local iridoid concentration could have increased. Contact dermatitis caused by noni was also a differential diagnosis in the case. However, the following points are inconsistent: (1) pigmentation existed prior to contact with the noni-soaked towel; (2) pigmentation was not limited to the contact area; (3) no reddish dermatitis was observed; (4) patch test with noni was negative; and (5) it was rapidly improved after discontinuation of noni intake. Previously reported hyperpigmentation caused by *G. jasminoides* showed similar histopathological features, with increased melanin and melano- phages; however, the presence of liquid degeneration was unknown.<sup>4</sup> Considering the above-mentioned mechanism of action of *G. jasmin- oide*, a similar species containing iridoid, in our case, hyperpigmenta- tion owing to excessive noni intake was more strongly considered.

In conclusion, we encountered a rare case of hyperpigmentation possibly associated with the consumption of noni. Dermatologists should be aware of pigmentation caused by healthy foods, including their dosage and frequency.

#### CONFLICT OF INTEREST

The authors declare no conflicts of interest.



#### DECLARATION SECTION

Approval of the research protocol: N/A

Informed Consent: Informed consent was given to the patient, and approval was received.

Registry and the Registration No. of the study/trial: N/A.

Animal Studies: N/A.

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