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CHAPTER 2

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LITERATURE REVIEW

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2.1 Previous Related Studies

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Stratigos et al. (2000) considered treatment of cutaneous pigmentation as one of the most interesting areas of cutaneous laser surgery. They reviewed the 4 main short-pulsed, pigment-selective lasers in clinical use at that time, and Q-switched ruby laser (694 nm, 25-40 nanoseconds) was one of them which used successfully for decades in treatment of superficial pigmented lesions, such as ephelides, solar and labial lentigines, and flat seborrheic keratoses. Dermal and mixed epidermal/dermal pigmented lesions like melasma show variable responses.

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2.1.1 Indications for Facial Resurfacing

Laser facial resurfacing treat extensive cutaneous changes duo to solar damage, and other skin lesions including (Goodman, 2007; Kilmer & Semchyshyn, 2005)

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2.2.2.1 Irregular pigmentation and Dyschromia: Many epidermal pigmented lesions that are due to photoaging, such as ephelides, lentignes, seborrheic keratoses, dermatosis papulosa.

2.2.2.2 Vascular lesions: Like telangiectasia, angiomas with venous lakes, standing erythema, and flushing disorders.

2.1.2 Contraindications to Nonablative Technologies

Because of the possible varied side effects and complications after cutaneous laser surgery, it is essential that each patient receive consultation before treatment to assess the risk factors of adverse sequelae and contraindications (Tanzi & Alster, 2008; Goodman, 2007; Kilmer & Semchyshyn, 2005) which include:

2.2.3.1 Concurrent isotretinoin remains a controversial issue.

2.2.3.2 Current or recent tan or intention to expose to high-dosage ultraviolet radiation. This is of much greater concern in patients who seek visible laser or light source treatment.

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1. Pregnant or breast feeding women.

2. Personal history of hypertrophic scar.

-1.25 inch-→ 1) It is accomplished by Patient Satisfaction Score (PSS), where all participants in the study are given questionnaire to evaluate their response after one month of the last laser session, they have been asked to choose one of four choices to answer the appreciation question.

-1.5 inch-→ A. The three dermatologists assess the photos individually by choosing one of percentages (0-100%) to indicate the rate of regimentation for each lesion for all of the participants.

B. All the patients completed the three sessions of laser therapy. They visited the clinic every two weeks after each laser session for follow up and photography. One month after the last laser session, photographs were taken to all treated patches to be used in the assessment.

-1.75 inch-→ a. After all assessors completed their assessment, results taken and were scored into numbers to be analyzed statistically, as shown in table 2.1.

Table 2.1 Characteristics of the Participants in the Study

Item	Pt.1	Pt.2	Pt.3	Pt.4	Pt.5	Pt.6
Age(yr.)	35	50	25	36	34	65
Sex	Male	Male	Female	Female	Female	Male
Age of onset of vitiligo (yr.)	5-6	10	11	11-12	32	64
Type of vitiligo	Focal	Generalized	Generalized	Acrof-acial	Generalized	Segmental
Skin phototype	III	III	IV-V	III-IV	III	IV
Duration of vitiligo (yr.)	30	40	14	25	2	1
Number of treated Vetiligo patches	1	1	3	4	5	3
Race	Thai	Thai	Thai	Thai	Thai	Thai

This is a prospective randomized controlled bilateral left-right comparison trial. It was performed in accordance with Good Clinical Practice. The treatment protocol has been reviewed with each patient who then signed the informed consent. The research was accomplished at Mae Fah Luang University Hospital, Bangkok (Outpatient department).

According to the Clinical Assessment of Repigmentation degree, the mean results of the three dermatologists assessment showed 14 patches (82%) out of the 17 patches were given score 1 which means 1%-24% repigmentation, while only 3 patches (18%) were given 0 score, 6 his means that carbon dioxide laser has achieved mild repigmentation effect in vitiligo patches.

One patient noticed repigmentation in areas not treated by laser, she claimed that repigmenation started to occur in her neck and chest during period of the study, this encouraging news need to be verified in the light of any immunological effects of carbon dioxide laser or it is just an accidental event or something else. But we know that Vitiligo is known as a slowly responding disease so three months of laser sessions may be not enough to achieve complete clinical improvement in repigmentation.

Table 2.2 The Features of the CICU RF Laser Device

Item	Feature
Laser type	RF CO2 ALL METAL SEALED TYPE
Laser power	up to 30 watt
Laser mode	TEMoo (10.6 μm)
Pulse duration	100-5000 μs
Repetition	0.2-1 s/single
Overlap	1-10 TH
Distance	0.1-2 mm
Treatment area	1*1 - 20*20 mm
Text	Text
Text	Text
Text	Text
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Table 2.2 (continued)

Item	Feature
Pixel quantity	up to 40,401
Pixel size	> 100 micron
Cooling	Air Cooling
Optical guide	Articulated arm

Note Pt. for (patient), CAR for (Clinical Assessment of the Repigmentation)

Source Manstein et al. (2010)

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Figure 2.1 CICU RF CO2 Laser Device

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After this relatively short period of follow up, the results, in conclusion, showed patient satisfaction score 16.7% (1 patient) were really satisfied, 66.7% (4 patients) were slightly satisfied and 16.7% (1 patient) with poor satisfaction.

References

Litz, R. E. (2008). Mango. In C. Kole & T. C. Hall (Eds.), *Compendium of transgenic crop plants: Transgenic tropical and subtropical fruits and nuts* (pp. 163-174). Blackwell.

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1. American Psychological Association (APA)
2. Vancouver Style
3. Chicago Style
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CHAPTER 3

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INVESTIGATION AND EVALUATION OF IMPACT BRUISING IN GUAVA USING IMAGE PROCESSING AND RESPONSE SURFACE METHODOLOGY[1]

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Abstract

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Simulated impact damage testing was investigated by fractal image analysis using response surface methodology (RSM) with a central composite design (CCF) on quality of 'Glom Sali' guava for drop heights (0.2, 0.4, and 0.6 m), number of drops (1, 3, and 5) and storage temperature conditions (10, 20, and 30 °C). After 48 h, impacted fruit were determined and analyzed for bruise area (BA), bruise volume (BV), browning index (BI), total color difference (ΔE), image analysis for bruise area (BAI), and fractal dimension (FD) at the bruising region on peeled guava. Results showed that the correlation coefficient (r = −0.6055) between ΔE and FD value was higher than ΔE and either BA (r = 0.3132) or BV (r = 0.2095). The FD variable was determined as a better indicator than conventional measurement (BA or BV) for pulp browning and impact bruising susceptibility. The FD variable also exhibited highest R2adj value (81.69%) among the other five variables, as the highest precision model with high determination coefficient value (R2adj) (> 0.8) for impact bruising prediction. Recommended condition of the FD variable to minimize impact bruising was drop height of 0.53 m for five drops under storage at 30 °C. FD variable assessed by image analysis was shown to be a highly capable measurement to determine impact bruising susceptibility in guava fruit.

Keywords: Bruise Susceptibility, Impact Bruise, Mechanical Injury, Transportation

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[1]This paper has been published in *Horticulturae Journal*, 2021, *7*(10), 411. https://doi.org/10.3390/horticulturae7100411

3.1 Introduction

-0.5 inch-Guava (Psidium guajava L.) is one of the most famous and economically important fruits in Thailand, with an export value in 2020 worth 5.50 million USD [1]. Guava is a climacteric fruit with a round shape and thin skin that bruises easily. To maintain fruit quality and shelf life and minimize losses, guava fruit needs proper postharvest handling practices [2]. Thai agriculture and ASEAN standards of guava require slight defects on the skin not exceeding 10% of the total surface area of guava fruit [3,4]. Bruising effects can be distinguished from quality changes in guava such as browning, softening of the fruit peel, cell destruction, and reduction in intercellular air spaces resulting in the bruised tissue losing moisture and becoming desiccated [5]. Impact damage to fruit is more severe than vibration and compression damages. When a fruit falls with sufficient force against a surface, impact damage occurs, while dynamic damage of a single fruit occurs through fruit-to-fruit impact between packaging. Fruit dropping from trees to the ground during harvesting, dynamic impact between single fruit, and between the fruit and packaging or containers are all causes of impact damage [6].

Acknowledgments

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Li, Z., & Thomas, C. (2014). Quantitative evaluation of mechanical damage to fresh fruits. *Trends Food Science & Technology*, *35*, 138–150.

Shafie, M., Rajabipour, A., & Mobli, H. (2017). Determination of bruise incidence of pomegranate fruit under drop case. *International Journal of Fruit Sciences*, *17*, 1–14.