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Image Processing and Optical-Electricity Property of Traditional Medicine Products from Kian Sand Worm (*Siphonosoma ur-pulau*)

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Abstract

Kian sandworm (*Siphonosoma ur-pulau*), a kind of sandworm originally found in Ur-pulau island of Tual region, southeast part of Maluku province, Indonesia is one of the longest sand worm with the length of 27.5 cm exhibited unique physical and chemical properties [1]. This work presents image processing and optical-electricity property of **traditional medicine products (TMPs)** from Kian sandworm. Based on the image processing with **fast Fourier transform (FFT)** technique, the density of two different types of **TMPs** can be identified exactly. Furthermore, optical-electricity (OE) properties of the products tested in a standard toxic medicine, Betadine normally used to heal outer wounds of human body in Indonesia has been studied briefly under the influence of room temperature up to $\sim 65^\circ\text{C}$. **The significant findings in this paper show that at the same concentration of two TMPs, the smooth grain size exhibits large absorbance (Abs) and pH higher than that of the rough grain size due to its high density. Moreover, it was observed that such smooth grain size TMPs shown a very sensitive voltage dependence on temperature with the peak of voltage obtained at $\sim 50^\circ\text{C}$.**

Keywords: Kian sandworm (*Siphonosoma ur-pulau*), Traditional medicine products (TMPs), Optical-electricity (OE), Image processing.

The invented contribution: A novel technique by incorporating image processing and physical properties findings to study a medicine.

ARTICLES

I. Introduction

Worms are interesting because of its simplicity of anatomy with a simple life in different areas on earth [1-14]. Recently, about 7000 sites obtained on earth land from 56 nations in which earthworms consisted of three different types in their land living geo-ecology of *epigeic*, *anecic* and *endogeic* were identified [2, 3]. Sandworms and sea-worms were also discovered in another place from the former one such as beach sand of different islands and seas areas of various continents, respectively [1, 4-14]. Herbal medicines from plants and

traditional medicines of different animal body parts and products are currently attractive fields in conjunction with pharmaceutical and interdisciplinary fields due to their origin of multitasking healing system [1, 7, 8, 11, 15-31].

In this short communication, the image processing such as filtering and density calculation as well as optical-electricity (OE) property for **traditional medicine products (TMPs)** fabricated using Kian sandworm (*Siphonosoma ur-pulau*) is discussed. The discovery of such **novel technique to study a medicine was by incorporating image processing and physical properties findings.**

II. Experimental Method and Techniques

TMPs fabricated using Kian sandworm (*Siphonosoma ur-pulau*) was for first time fabricated according to **Ref. [1]**. The filtering and density calculation of **TMPs** were processed using fast Fourier transform (**FFT**) technique with its **flowchart procedure** is shortly shown in **Fig. 1**.

Figure 1. A brief procedure in processing image: from initial data to naked information embedded inside the unseen image.

The **FFT** method described in **Fig. 1** was actually used to analyze many different types of images such as the enhancement of x-ray image, brain tumors image captured by ct-scan, many different kinds of magnetic and soft gamma rays images of human bodies as well as the image processing of universe pictures of

galaxies, quasars, blackholes, and many other far objects from the earth.

In this research, a cooperation of image processing technique and physical behaviors is for the first time applied in exposing the mystery of medicine.

III. Results and Discussion

Figure 2 shows measurement output of the grain sizes of traditional medicine based Kian sandworm and its image processing. The density of the as-fabricated medicines with two different types has been identified. The mystery inside the medicines had been finally revealed with significant pictures. In order to find out a more detail content embedded inside the medicine taken with a microscope, **Table 1** depicts the calculation of **mean density** in each **TMPs** using the help of *Mathlab* software based on **FFT** method. As a matter of fact, mean density, μ of each medicine image was uncovered as large as **98.175** and **120.966** for rough grain and smooth grain traditional medicines, respectively.

To study the meaning of the above mentioned findings, physical properties of both medicines were further investigated as shown in **Fig. 3**. **Figure 3** demonstrates optical-electricity (**OE**) property of traditional medicine based on an intimate link of a linear optical behavior with measured electricity under temperature influence. Both samples with **the same weight of 2.10 g** were taken to be tested in betadine toxic of pH ~ 6.39 diluted in water. The UV-Vis spectra of the samples were recorded few minutes later as soon as the medicine reactions that made a changing in color indicator. The above inset of **Fig. 3** shows that the absorbance of smooth grain **TMPs** is

superior to the rough grain one. Furthermore, its has decreased the pH of toxic solvent to be 5.40, a little bit higher than that of the rough grain **TMPs** with pH ~ 5.22 . In addition, the voltage responses are dependence on temperature in which both types of **TMPs** have contributed to improve the increasing of toxic solvent as large as about twice. However, the smooth grain one has been observed to dramatically reduce its voltage from ~ 0.65 V to be ~ 0.40 V.

The observation data in **Fig. 3** is absolutely associated with the image proceesing data in **Fig. 2**. Such connections have been analyzed in such a way so that the smooth grain **TMPs** can be judged to be consistent on her job up to ~ 50 $^{\circ}\text{C}$. While the rough grain **TMPs** is very strong enough to handle temperature up to ~ 65 $^{\circ}\text{C}$ without any changing in her inner structures.

Table 1. The calculation of **mean density** in each traditional medicine products (**TMPs**) using the help of *Mathlab* software based on **FFT** method.

No.	Image Sample	Area of dimension	Type	Mean density, μ (a.u.)	Deviation standard, σ (a.u.)	Correlation coefficient, R
1.	Rough grain traditional medicine	1600 x 1200	gray	98.175	42.8269	0.9996
2.	Smooth grain traditional medicine	1600 x 1200	gray	120.966	32.1570	0.9984

Figure 2. Measurement of the grain sizes of traditional medicine based Kian sand worm and its image processing to obtain the density of the as-fabricated medicine, respectively. The scale in the background of top and bottom inset was a caliper with the smallest scale of 0.5 mm.

Figure 3. Optical-Electricity (OE) property of traditional medicine based on an intimate links of a linear optical behavior with measured electricity under temperature influence. The **filled brown triangles ($\blacktriangle$)**, **red circles ($\bullet$)**, and **cyan diamonds ($\blacklozenge$)** are **betadine in drinkable water (betadine solvent)**, **smooth grain medicine in the toxic solvent** and **the rough grain in the toxic solvent**, respectively.

IV. Remark and Conclusion

In conclusion, the significant findings in piece of work show that by using image processing system, the density embedded inside a medicine can be exposed. Furthermore, by making a special link with the physical properties of medicine, ones could get a deep knowledge that the smooth grain size exhibits larger absorbance (*Abs*) with pH higher than that of the rough grain size **due to its high density**. Finally, such smooth grain size **TMPs** provides a very sensitive voltage dependence on temperature with the peak of voltage obtained at $\sim 50^{\circ}\text{C}$.

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Conflict of interest statement

All authors declare that they have no any conflicts both financial and ideas during these research collaboration works.

References

- [1]. A. Masrikat and H.I. Elim, Unique Physical and Chemical Properties of Kian Sand Worm (*Siphonosoma ur-pulau*) Traditional Medicine: Electrical, Optical and Chemical Response of Edible Powder with Different Sizes, *Biochemistry and Modern Applications* 2(1), 51-54 (2019). <https://doi.org/10.33805/2638-7735.123>
- [2]. N. Fierer, Earthworms' place on Earth: A new study provides a global view of earthworm ecology, *Science* 366 (6464), p. 425 (2019).
- [3]. H.R.P. Phillips, et al., Global distribution of earthworm diversity, *Science* 366 (6464), pp. 480-485 (2019).
- [4]. T-H. Hsu, Y. Ning, J-C. Gwo and Z-N. Zeng, DNA barcoding reveals cryptic diversity in the peanut worm *Sipunculus nudus*, *Molecular Ecology Resources* 13, pp. 596-606 (2013). DOI: [10.1111/1755-0998.12097](https://doi.org/10.1111/1755-0998.12097)
- [5]. Y. Wang, T.T. Shi, G. Huang, and J. Gong, Molecular Detection of Eukaryotic Diets and Gut Mycobiomes in Two Marine Sediment-Dwelling Worms, *Sipunculus nudus* and *Urechis unicinctus*, *Microbes Environ.* (2018). <https://www.jstage.jst.go.jp/browse/jsme2>. DOI: [10.1264/jsme2.ME18065](https://doi.org/10.1264/jsme2.ME18065)
- [6]. S. C. S. Andrade, M. Strand, M. Schwartz, H. Chen, H. Kajihara, J. von Dohren, S. Sun, J. Junoy, M. Thiel, J.L. Norenburg, J. M. Turbeville, G. Giribet, and P. Sundberg, Disentangling ribbon worm relationships: multi-locus analysis supports traditional classification of the phylum Nemertea, *Cladistics* 27, pp. 1-19 (2011). DOI: [10.1111/j.1096-0031.2011.00376.x](https://doi.org/10.1111/j.1096-0031.2011.00376.x)
- [7]. Y.-H. Ge, P. Liu, Y.-Y. Chen, G.-S. Zhou, X. Liu, Y.-P. Tang, R. Liu, N. Li, J. Yang, J. Wang, S.-J. Yu, H. Zhou and J.-A. Duan, A Novel Antithrombotic Protease from Marine Worm *Sipunculus nudus*, *Int. J. Mol. Sci.* 19, p. 3023 (2018). DOI: [10.3390/ijms19103023](https://doi.org/10.3390/ijms19103023)
- [8]. F. Cui, X. Shen, M. Li, Y. Chen, Y. Liu, Y. He, D. Jiang, J. Tong, and J. Li, Protective Effects of Polysaccharides from *Sipunculus nudus* on Beagle Dogs Exposed to c-Radiation, *PLOS ONE* 9 (8), e104299 (2014). www.plosone.org
- [9]. J. Li, R. Hu, Y. Guo, S. Chen, X. Xie, J.G. Qin, Z. Ma, C. Zhu, and S. Pei, Bioturbation of peanut worms *Sipunculus nudus* on the composition of prokaryotic communities in a tidal flat as revealed by 16S rRNA gene sequences, *Microbiology Open* 8, e802 (2019). <https://doi.org/10.1002/mbo3.802>
- [10]. J. LI, X. XIE, C. ZHU, Y. GUO, and S. CHEN, Edible Peanut Worm (*Sipunculus nudus*) in the Beibu Gulf: Resource, Aquaculture, Ecological Impact and Counterplan, *J. Ocean Univ. China* (Oceanic and Coastal Sea Research) 16 (5), pp. 823-830 (2017). DOI: [10.1007/s11802-017-3310-z](https://doi.org/10.1007/s11802-017-3310-z)

- [11]. Nurhikma, T. Nurhayati, and S. Purwaningsih, Amino Acid, Fatty Acid, and Mineral Content of Marine Worm From South East Sulawesi, **JPHPI** 20(1), pp. 36-44 (2017). DOI: [10.17844/jphpi.2017.20.1.36](https://doi.org/10.17844/jphpi.2017.20.1.36)
- [12]. B. Silaban, *Analysis Mineral Content Siasia (Sipunculus nudus) from Coastal Waters of Nalahia Nusalaut Island*, **Majalah Biam** 14(01), 22-27 (2018). e-ISSN: 2548-4842/ p-ISSN: 0215-1464 (ejournal.kemenperin.go.id/bpbiam).
- [13]. Y. Ge, S. Ding, Y. Tang, S. Guo, X. Liu, Z. Zhu, L. Zhang, P. Liu, X. Lin, R. Lin, and J. Duan, Simultaneous Quantitation of Free Amino Acids, Nucleosides and Nucleobases in Sipunculus nudus by Ultra-High Performance Liquid Chromatography with Triple Quadrupole Mass Spectrometry, **Molecules** 21, 408 (2016). DOI: [10.3390/molecules21040408](https://doi.org/10.3390/molecules21040408)
- [14]. G.Y. Kawauchi, and G. Giribet, Sipunculus nudus Linnaeus, 1766 (Sipuncula): cosmopolitan or a group of pseudo-cryptic species? An integrated molecular and morphological approach, **Marine Ecology** 35, 478–491 (2014). ISSN 0173-9565
- [15]. H.I. Elim, Physics of Multitasking Nanomedicine, **IJHMCR** (<http://www.ijhmcr.com>) 2(03), 509-519 (2017). DOI: [10.22301/IJHMCR.2528-3189.509](https://doi.org/10.22301/IJHMCR.2528-3189.509)
- [16]. H.I. Elim, Nanomedicine with Its Multitasking Applications: A View for Better Health, **IJHMCR** 2(02), 353-357 (2017). DOI: [10.22301/IJHMCR.2528-3189.353](https://doi.org/10.22301/IJHMCR.2528-3189.353)
- [17]. Hendry Izaac Elim (Elim Heaven), The Discovery of NEW Golobe and Its Amazing Healing System, **Science Nature** 2(1), pp. 66-70 (2019). DOI: [10.30598/SNVol2Iss1pp066-070y2019](https://doi.org/10.30598/SNVol2Iss1pp066-070y2019) (e-ISSN: 2654-6264)
- [18]. H.I. Elim, Scientific Breakthrough Based on Natural Creation: “1 Diamond with 7 Eyes”, **COJ Reviews and Research** Vol. 1(1), pp. 1-4 (2018). DOI: [10.31031/COJRR.2018.01.000502](https://doi.org/10.31031/COJRR.2018.01.000502)
- [19]. H.I. Elim, Multitasking Herbal Nanomedicine: A Frontier Report, **Nanoscale Reports** Vol. 2(1), pp. 22-30 (2019). DOI: [10.26524/nr1914](https://doi.org/10.26524/nr1914)
- [20]. H.I. Elim, Theory, Implementation and the Nature of Truth (TIN) in Nanoscience, Nanotechnology, and Nanomedicine (NNN): From the Beginning of Universe to nm Scale Behavior, **Kenkyu Journal of Nanotechnology & Nanoscience** 5:33-36 (2019). DOI: [10.31872/2018/KJNN-100122](https://doi.org/10.31872/2018/KJNN-100122). ISSN: 2455-183X
- [21]. H.I. Elim, The First 1000 Atoms in Healing Process: From Nanotechnology to Nanomedicine, **International Journal of Health Medicine and Current Research** Vol. 3, Issue 04, pp.1044-1046, December, 2018. DOI: [10.22301/IJHMCR.2528-3189.1044](https://doi.org/10.22301/IJHMCR.2528-3189.1044)
- [22]. H.I. Elim (Elim Heaven), A.L. Mapanawang, and M.V. Reddy, A Creative Proposal to Improve Woman and Child Health: from the Knowledge of Physical Nanoscience to Nanotechnology Implementation and Products, **CPQ Women and Child Health**, 1(6), 01-11 (2019).
- [23]. H.I. Elim, **Nonlinear Optics and the Frontier of Nanoscience and Nanotechnology**, Pattimura University Press, pp. 1-144 (2018). ISBN: 987-602-61906-9-7.
- [24]. H.I. Elim, **METODE FISIKA EKSPERIMEN: PELENGKAP TEORI FISIKA**: “To be Perfect like The 1 Who Created Our Incredible Universe”, Pattimura university press, Indonesia, pp. 1-155 (2018). ISBN: 978-602-5943-05-8.
- [25]. H.I. Elim, and A.L. Mapanawang, The attractive differences of two types of herbal medicine from zingiberaceae fruit (golobe Halmahera), **IJHMCR** 3 (01), 799-806 (2018). DOI: [10.22301/IJHMCR.2528-3189.826](https://doi.org/10.22301/IJHMCR.2528-3189.826)
- [26]. A.L. Mapanawang, and H.I. Elim, Chemical Bonding Character of Love Herbal Medicine: A Prominent Medicine Candidate for Preventing HIV virus, **Nanotechnology & Applications** 1 (1), 1-4 (2018). DOI: [10.33425/2639-9466.1003](https://doi.org/10.33425/2639-9466.1003) (ISSN: 2639-9466).
- [27]. H.I. Elim, and A.L. Mapanawang, Electronics Physical System of Large Antioxidant Structure in Herbal Medicine based Zingiberaceae Fruit: Understanding and Application, **Nanotechnology & Applications** 1 (1), (2018). DOI: [10.33425/2639-9466.1004](https://doi.org/10.33425/2639-9466.1004) (ISSN: 2639-9466).
- [28]. A.L. Mapanawang, and H.I. Elim, Unique Chemical Bonding Behavior of Love Herbal Medicine and Its Conjunction with Chemotherapy Drug, **Journal of Nanomedicine and Nanotechnology** 9 (3), 1000503 (2018). DOI: [10.4172/2157-7439.1000503](https://doi.org/10.4172/2157-7439.1000503)
- [29]. H.I. Elim, and L.Y. Chiang, Nanochip Medicine: Physical Chemistry Engineering, **Science Nature** 2(1), pp. 86-89 (2019). DOI: [10.30598/SNVol2Iss1pp086-089year2019](https://doi.org/10.30598/SNVol2Iss1pp086-089year2019) (e-ISSN: 2654-6264)

- [30]. I.F. Seay, and H.I. Elim, The Observation of Fast, Long Term, and Stable Performance of Toxic Absorption in Herbal Blessing Product Based on Galoba Maluku (Zingiberaceae Fruits), *Science Nature* 2(2), pp. 122-127 (2019). DOI: [10.30598/SNVol2Iss2pp122-127year2019](https://doi.org/10.30598/SNVol2Iss2pp122-127year2019) (e-ISSN: 2654-6264)
- [31]. A.L. Mapanawang, and H.I. Elim, Pangi Leaf (*Pangium edule Reinw*) Herbal Medicine: A Marvelous Candidate for the Prominent HIV Herbal Medicine, *Science Nature* 2(2), pp. 97-104 (2019). DOI: [10.30598/SNVol2Iss2pp097-104year2019](https://doi.org/10.30598/SNVol2Iss2pp097-104year2019) (e-ISSN: 2654-6264).

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Assoc.Prof. H.I. Elim, Ph.D is an experience scientist particularly in the field of multitasking physics which made him the 22nd best Indonesia scientist in the end of 2019 based on **SINTA index (RistekDikti, Indonesia)**. Dr. Elim has developed physics since he took his B.Sc in physics at Gadjah Mada university (UGM) in 1995 up to present. His Ph.D was from National university of Singapore (NUS) following by about 2 years postdoctoral job in Physics department of NUS as well as ~4.5 years research assistant professor position at Tohoku university. Moreover, after exploring multitasking physics for over 15 years, he has been successfully educating more than 75 research students in the first nanotechnology research center and innovative creation (PPNRI) in the eastern part of Indonesia with h index of 24 and citations of ~2300 contributed by about 51 international publications recorded in SCOPUS/ Web of Science. In 2017, he was awarded as the best Indonesia young scientist from the president of Pattimura university as soon as his civil servant award of xx Satya Lancana Karya Satya from Mr president of Indonesia. *ORCID ID of H. I. E.: [0000-0002-4272-7115](https://orcid.org/0000-0002-4272-7115)

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