

# Electronics Physical System of Large Antioxidant Structure in Herbal Medicine based Zingiberaceae Fruit: Understanding and Application

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## ABSTRACT

*In this present letter, we introduce an electronic physical system of a large antioxidant chemical structure based on herbal medicine fabricated using zingiberaceae fruit (Maluku Golobe) consisted of many different varieties mainly such as Halmahera rambutan Golobe, Halmahera original Golobe, and Ambon durian Golobe. A simple electronics circuit model as a prototype of nanoscale antioxidant structure with the size of 15 carbon atoms plus 2 oxygen atoms was employed to understand the highest antioxidant herbal fruit associated with highly carbon-carbon bonding and carbon-oxygen bonding as well as its interaction with water, the remarkable substance in human body of the immune system. Such electronic physical system in herbal medicine is discussed with their prominent applications particularly as HIV herbal medicine. A brief discussion on how the large antioxidant system can handle HIV virus hiding inside the CD4 T cell of lymphocyte.*

## Keywords

Electronics physical, Antioxidant, Herbal medicine, Nanomedicine.

## Introduction

One of the breakthroughs in human life is mostly associated with their life improvement especially related to their happiness and joyful heart supported by excellent health as well as healthy environment in the scale of a city with a very low pollution and clean

water. Pharmaceutical nanotechnology [1-15] and nanomedicine [16-32] are the dynamics and kinetics fields of interdisciplinary sciences closely to contribute in the development of human kind quality life. For instance, in supporting the immune system of healthy body [16-20], the food and drink consumption should have a good enough supplement and antioxidant ingredients. In 2016 [21], it was invented one of the largest antioxidant in fruits obtained in zingiberaceae fruit (Halmahera Golobe).

In fact, there are at least 4 types of zingiberaceae fruits (called as golobe in Indonesia language) found in ~1740 small islands including 5 big islands in them of two provinces in the eastern part of Indonesia namely North Maluku and Maluku provinces, respectively. Figure 1 shows the 4 golobe types from North Maluku and Maluku provinces: (1). Halmahera susu golobe (*Hornstedtia alliacea*), (2). Halmahera golobe or Ambon golobe (*Zingiberaceae alliacea*), (3). Halmahera rambutan golobe (*Amomum* sp.), and (4). Ambon halia golobe/ Halmahera kelereng golobe (*Etlingera alba* (Blume) A.D. Poulsen). These all fruits are normally growing in the healthy forest in North Maluku and Maluku provinces with high moisture, and recently they are hard to find near villagers housing areas or only grow wildly inside the forests.

In this paper, we introduce an electronic molecular simple system to understand the electricity system of healing using flavonoids as a prototype of our method. This technique can also be used to discuss and understand the other types of electronic molecular system in nanostructures. The advantages of this method are to exactly recognize the total resistant links of two atoms in a molecule system for example in a four water molecules ( $4H_2O$ ) [20], and in flavonoid of this study. Flavonoid structure formed by 2 types of atom C and O was chosen due to its future excellence impacts for hybrid nanomedicine.

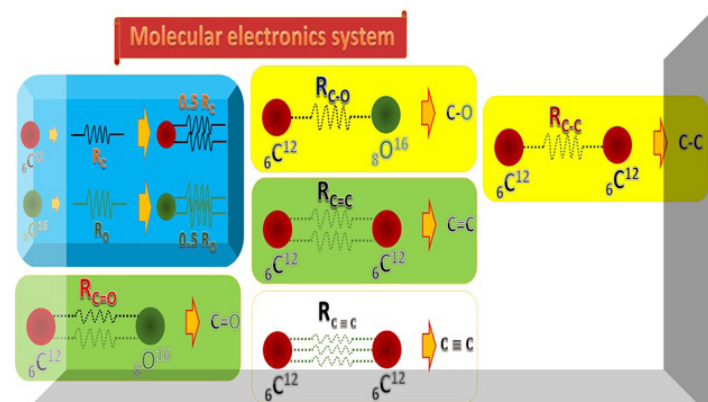


**Figure 1:** Four types of zingiberaceae fruits called in Indonesia language as golobe found in Halmahera island, North Maluku province of Indonesia, and in Ambon and Seram islands of Maluku province, Indonesia.

## Research Method

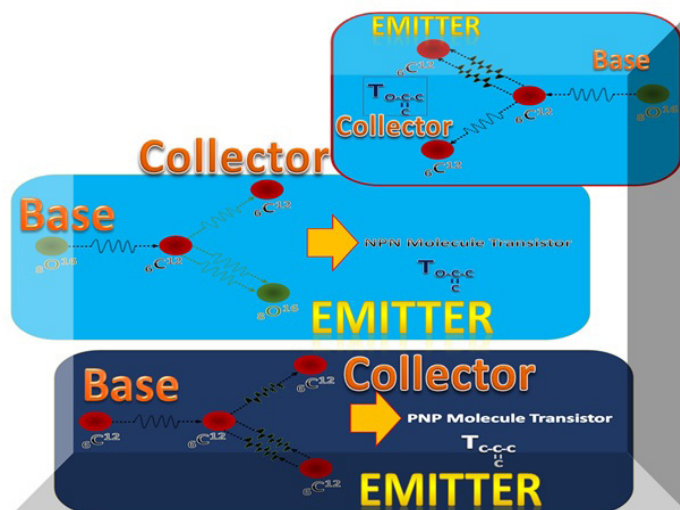
In order to provide wisdom and understanding in a molecular system of electricity transformation to be medicinal healing system, we introduce two to three atomic interactions like electronic components such as resistor as described briefly in

Figure 2. This electronic system is different from the mechanical system of molecule in which the mechanical system used to employ the connections between two atoms as a spring. The two parallel resistances connected to an atom are half of its single resistant.



**Figure 2:** An introduction of molecular electronic system component closely connected to their chemical bonds in order to understand the working system of a molecule consisted of few different atoms is provided.

On the other hand, for three to four atomic interactions, two molecule transistor types of the NPN and PNP transistors are presented as depicted in Figure 3. Here, the molecular transistors consist of 4 atoms with at least 2 different atoms in the structure with the function as the power of healing ( $\beta = I_c/I_b$ , where  $I_c$  and  $I_b$  are molecule currents in collector, and base, respectively). However, it is interesting to point out that both molecular resistors linked to the molecular transistor can be simplified by supposing the whole system is just like electricity resistance of a molecular circuit. Therefore, the exact calculation of the electricity circuit in a large molecule system such as flavonoids as an example of the understanding of this simple method can be obtained using a common electronics principles based on Kirchhoff as well as Thevenin rules of current and voltage (invented by G. Kirchhoff (1824-1887), and Leon C. Thevenin (1857)) in each single loop connected one another to the other loop.



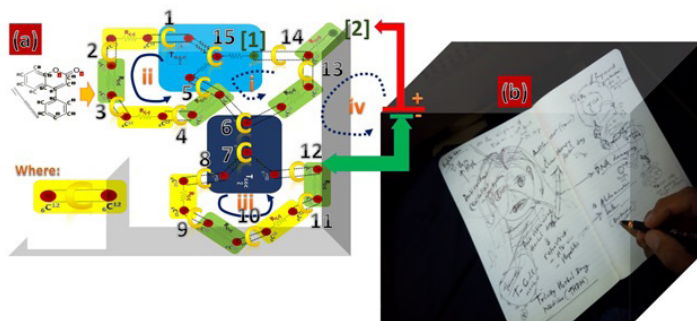
**Figure 3:** Two types of basic molecular transistors are introduced with NPN and PNP molecular transistor types as depicted in the picture,

respectively.

## Results and Discussion

There are at least 14 basic structure (skeleton) of non-enzymatic antioxidant of flavonoid [16] are as follows: 1. Flavones; 2. Flavonones; 3. Flavonols; 4. Flavanonols; 5. Anthocyanidins; 6. Aurones; 7. Flavanoid; 8. Furan chromones; 9. Biflavones; 10. Isoflavones; 11. Isoflavanones; 12. Chalcones; 13. Xanthones; and 14. Dihydrochalcones. Figure 4(a) shows 4-phenylcoumarin-Neoflavonoids structure, for example as a prototype to understand the introduced electronic molecular system. While Figure 4(b) is the illustration of trinity herbal drug medicine (THDM) involving 3 personalities of healing system in the 1 medicine [18]. The three personalities or the function of THDM are in the following points: 1. High antioxidant with good immune system of the body, 2. Antiretroviral drug for handling the retrovirus such as HIV virus and hepatitis, and 3. Anticancer function like a chemotherapy herbal drug.

The understanding of electronic physical system of a large antioxidant chemical structure based on herbal medicine fabricated using zingiberaceae fruit (Maluku Golobe) consisted of many different varieties mainly such as Halmahera susu golobe (*Hornstedtia alliacea*), Halmahera golobe or Ambon golobe (*Zingiberaceae alliacea*), Halmahera rambutan golobe (*Amomum* sp.), and Ambon halia golobe/ Halmahera kelereng golobe (*Etlingera alba* (Blume) A.D. Poulsen), for instance with a significant chemical molecule of 4-phenylcoumarin-Neoflavonoids content as depicted in Figure 4 can be analyzed by applying our method as introduced in Section II with the 4 loops. The loop (i), (ii), and (iii) have been calculated and analyzed to induce the molecular resistances of  $R(i)=33/49$  Rc,  $R(ii)=10/13$  Rc, and  $R(iii)=23/13$  Rc. As a matter of facts, one could obtain the total resistant in loop (iv) is as large as  $R_t=2.79519$  Rc. In which we have inserted the relationship of C and O resistances as  $R(C-O)=8/6$  Rc, just like  $R(H)=1/8$   $R(O)$  [20]. In which the value of loop (iv) here is actually the total resistance of 4-phenylcoumarin-Neoflavonoids when another substance is interacted to it by inducing a direct current or voltage from atom O and an atom C in loop (iii) based on the description in Figure 4.



**Figure 4:** From 14 types of identified flavonoids [16], (a) here, one chooses 4-phenylcoumarin-Neoflavonoids structure for example as a prototype to understand the introduced electronic molecular system. When another substance in human body is interacted with the oxygen (8O) and carbon (6C) parts, they will make an electricity flow in the whole flavonoid circuit consisted of three different loops as depicted in (a). (b). The illustration of

trinity herbal drug medicine (THDM) involves 3 personalities of healing system in the 1 medicine of THDM.

## Conclusion

A simple novel method to analyze the electricity system of healing using a molecular circuit of a nanomedicine with the size of 15 C plus 2O atoms in the structure of 4-phenylcoumarin-Neoflavonoids has been presented. As a prototype of the application of this method, we used 4-phenylcoumarin-Neoflavonoids as an example to understand how other substances can interact with such large molecule, and then make a source of direct current and electricity in the molecule. The total resistance of neoflavonoid structure,  $R_t$  was found as 2.79519 Rc. When a direct current or voltage was flowing from atom O with a double bond with atom C, to an atom C in loop (iii). Therefore, we believe that this simple technique can be applicable to analyze another molecular electronics system.

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