

## Effect Extract Rosella (*Hibiscus sabdariffa*) As An Alternative To Natural Tooth Bleaching Agent On External Discoloration Case

### Efekekstrak Rosella (*Hibiscus sabdariffa*) Sebagai Bahan alternative pemutih Gigi Alami Pada Kasus Pewarnaan Eksternal

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#### Abstract

**Background:** Tooth bleaching is one effort that has long been known in the science of dentistry. Unfortunately material used to whiten tooth until now they are still nature are toxic to tissues of the mouth cavity. Whereas with traditional natural materials exploration in Indonesia, give all one plant used as a safe teeth bleaching, rosella (*Hibiscus sabdariffa*). The research to find out effect extract rosella (*Hibiscus sabdariffa*) to external discoloration. **Methods:** An experimental research with Pre and Post Controlled Group Design. The sample consist of 12 teeth which divided into two groups. The first group, as control, were soaked in aquadest and the second group, as treatment were soaked in extract rosella (*Hibiscus sabdariffa*) for 3 days. Colour analysis is conducted by CIELAB method. The collected data were analyzed by Pairing t-test. **Discussion:** Rosella (*Hibiscus sabdariffa*) containing bioactive compounds, saponins that foam can bind colourants. With the power of his work which can bind the colourants can be used to whiten teeth. In addition, vitamin C (Ascorbic acid) that high can cause email erosion. The compound is capable of damaging colour substance molecules become neutral color so that the color and causing bleaching effects. **Conclusion:** Rosella (*Hibiscus sabdariffa*) can be used as an alternative natural tooth bleaching agent because it contains the active agent of saponin and vitamin C are high.

**Key words:** rosella, tooth bleaching, external discoloration

#### Abstrak

**Pendahuluan:** Pemutihan gigi merupakan salah satu upaya yang sudah lama dikenal dalam ilmu kedokteran gigi. Sayangnya bahan yang digunakan untuk memutihkan gigi hingga saat ini masih banyak yang bersifat toksik terhadap jaringan rongga mulut. Padahal dengan eksplorasi bahan alam tradisional yang banyak terdapat di Indonesia, didapatkanlah satu tanaman yang aman dimanfaatkan sebagai pemutih gigi, yaitu rosella (*Hibiscus sabdariffa*). Penelitian ini dilakukan untuk mengetahui pengaruh ekstrak rosella pada kasus diskolorasi eksternal. **Metode:** Jenis penelitian ini merupakan eksperimental laboratoris dengan *pre* dan *post test group design*. Sampel terdiri dari 12 gigi yang dibagi menjadi dua kelompok. Kelompok pertama, merupakan kelompok kontrol yang direndam pada aquades sedangkan kelompok kedua, merupakan kelompok perlakuan yang drendam dalam ekstrak rosella (*Hibiscus sabdariffa*) selama 3 hari. Analisis warna menggunakan metode CIELAB. Data yang diperoleh dianalisis menggunakan T-test berpasangan. **Diskusi:** Rosella (*Hibiscus sabdariffa*) mengandung senyawa bioaktif saponin yakni busa yang dapat mengikat zat warna. Dengan daya kerjanya

yang dapat mengikat zat warna maka dapat digunakan untuk memutihkan gigi. Selain itu, kandungan vitamin C (asam askorbat) yang tinggi dapat menyebabkan pengikisan email. Senyawa tersebut mampu merusak molekul-molekul zat warna sehingga warna menjadi netral dan menyebabkan efek pemutihan. **Kesimpulan:** Rosella (*Hibiscus sabdariffa*) bisa digunakan sebagai bahan alternatif pemutih gigi alami karena mengandung bahan aktif, yaitu saponin dan vitamin C yang tinggi.

**Kata kunci:** rosella, pemutih gigi, diskolorasi eksternal

## Background

Currently whiten tooth has become the needs of the public. Staining on the teeth is the problem æsthetics psychology that can affect a person. Of the color of a tooth that changes will reduce wonderfulness appearance and reduce the confidence. Therefore, a sunny smile with teeth that white is every-oneyear. This causes the increasing needs of dental aesthetic service, especially bleaching teeth. Bleaching tooth is one effort that has long known in the science of dentistry<sup>1</sup>. Unfortunately material used to whiten tooth until now they are still nature are toxic to tissues of the mouth cavity. Whereas with traditional natural materials exploration in Indonesia, to give a safe plant is utilized as a teeth bleaching<sup>1,2</sup>.

Rosella (*Hibiscussabdariffa*) is this herbal plants known as the world diamond, the plants because it has medicinal is high. Rosella in Indonesian society has long been used as traditional medicine. And now many experts on the world health experts who did research on rosella benefits for health<sup>3</sup>.

These plants containing antosianin, protocatekuat acid, ascorbic acid, an extract saliks, cardiac glikosida, flavonoid, saponin, alkaloid, sardenolea, anthocyanins delphinidin-3-o-sambubioside, cyanidin-3-o-sambubioside, dry rosella containing flavonoid gossypetin, hibiscetine and sabdaretine. The main pigment previously reported as hibiscin has been identified as daphniphylline. A small number of myrtillin (delphinidin 3-monoglucoside), chrysanthenin (cyanidin 3-

monoglucoside), and delphinidin also lies on this plant<sup>4</sup>. The flower petals known contain important substances needed by the body, such as vitamin C, vitamin A, essential proteins, calcium and 18 amino acids, include darginina and legnin that's benefit body cells rejuvenation<sup>4</sup>.

Rosella (*Hibiscussabdariffa*) contains bioactive compounds, saponins that foam can bind colourants. With a capacity of a substance which can bind the colourants can be used to whiten teeth<sup>2</sup>. In addition, a high vitamin C can help the process allegedly whitening the teeth. Based on the above background, the author is interested in researching the effect of extracts rosella (*Hibiscussabdariffa*) as an alternative to natural teeth bleaching agent on external discoloration case.



**Figure 1.** Rosella (*Hibiscussabdariffa*)

**Methods**

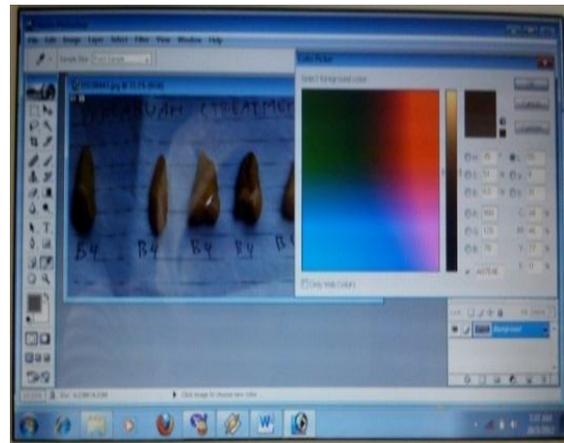
This research is experimental laboratories. Selected this type of research because the samples and more controlled, scalable treatment and influence treatment more trustworthy. As for the design of the research is the Pre and Post Test Controlled Group Design to tooth<sup>5</sup>. The population of this research is the dental insisivus, premolars and molar with Crown and root criteria intact (no caries). Number of samples used in this study is based on the formula Daniel (2005) is 4, but in this study, the number of samples that are used by 50% more than the minimal sample. So, number of sample used in this study are 6 samples for each observation (sub group). In this study there are two research groups, namely the control group and group treatment (test). So the total sample is needed are 12 sample teeth<sup>6</sup>.

Dental samples are divided into two groups, namely the control group and group treatment (test). Group I (control): dental sample soak in aquadest for three days. Group II (treatment): dental sample soak in extract rosella for three days.

The sample collection used technique purposivesampling, the sample collection is

conducted based on the consideration with specific criteria based on the applied research purposes<sup>5</sup>.

Dental colour analyzed by CIELAB method. Data were analyzed by Pairing T-test with trust level is 95% (p>0,05).



**Figure 2. Dental colour analyzed by CIE-LAB method**

**Result**

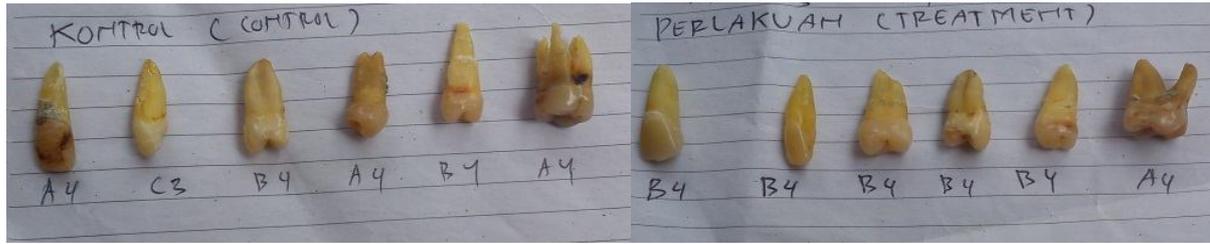
The observations obtained the mean lightness level for control group is 52.166, whereas the mean for treatment group is 53 (table 2

**Table 1. Dental lightness level on group control and treatment before soak in extract rosella**

Sampel	Lightness Level					
	Insisivus 1	Insisivus 2	Premolar 1	Premolar 2	Premolar bawah	Molar
Kontrol	26	53	59	52	59	64
Perlakuan	37	41	55	46	51	40

**Table 2. Dental lightness level on group control and treatment after soaked in extract rosella for three days**

Sampel	Lightness Level						
	Insisivus 1	Insisivus 2	Premolar 1	Premolar 2	Premolar bawah	Molar	Mean
Kontrol	26	53	59	52	59	64	52.166
Perlakuan	55	45	57	61	54	49	53.5



**Figure 3. Dental lightness level on group control and treatment before soak in extract rosella**



**Figure 4. Dental lightness level on group control and treatment after soaked in extract rosella for**

## Discussion

This research was conducted to determine the effect of extract rosella (*Hibiscus sabdariffa*) as an alternative to natural teeth bleaching agent. Dental colour was analyzed by CIELAB method. A Labcolor space is a coloropponent space with dimension  $L$  for lightness and  $a$  and  $b$  for the coloropponent dimensions, based on nonlinearly compressed CIE XYZ color space coordinates. The coordinates of the Hunter (1948)  $L, a, b$  color space are  $L, a,$  and  $b$ . However,  $Lab$  is now more often used as an informal abbreviation for the CIE (1976)  $L^*, a^*, b^*$  color space (also called CIELAB, whose coordinates are actually  $L^*, a^*,$  and  $b^*$ ). Thus the initials  $Lab$  by themselves are somewhat ambiguous. The color spaces are related in purpose, but differ in implementation<sup>8,9,10</sup>.

This is a dental sample that meets the criteria of the research sample. Test analysis of the statistical significance of the group shows the value of control and treatment before and after soaked extract rosella is 0.001, means there is a significant difference in tooth color treatment group before and after soaked in extracts rosella. Types of this plant contain saponins bioactive compounds,

which. foam can bind colourants. With his power that can bind the colourants and dirt on the surface of the teeth so it can be used to whiten teeth<sup>2</sup>. In addition, vitamin C (Ascorbic acid) can cause email erosion so that the teeth be more white discharge way of hydroxyl number C 2 and 3 which donates H together with the electrons headed for a variety of oxidants such as free radicals compounds diffuse through email to get to the dentin tubuli and serves as a strong oxidizing agent that can produce free radicals are highly reactive. The compound is capable of damaging substance molecules become neutral color so that the color and causes the effect of bleaching<sup>7</sup>.

## Conclusion

There are effect soaking extract rosella on tooth color, it can be observed from the differences the brightness of the color of the teeth on the control group and treatment, which is a color of sample to a group of treatment teeth whiter than a control group. Rosella (*Hibiscus sabdariffa*) can be used as an alternative natural tooth bleaching agent because it contains the active agent of saponin and vitamin C are high.

## References

1. Anonymous. *Pemutih Gigi dari Tanaman Gelagah*. Makasar: Kajian Pustaka Farmasi. 2010. Serial online [http://kajianpus-takafarmasi.blogspot.com/p/farmakognosi-fitokimia\\_24.html](http://kajianpus-takafarmasi.blogspot.com/p/farmakognosi-fitokimia_24.html) November 21, 2011
2. Xiang ling, Liem. 2010. *Pemutih Gigi*. Serial online <http://pemutihgigi.com/> November 21, 2011
3. Anonymous. 2007. *Industri Pengolahan Rosella*. Serial online <http://www.rosella-online.net/2007/12/budidaya-tanaman-rosella-petani-binaan.html> November 20, 2011
4. Wikipedia. 2012. Rosella. Serial online <http://id.wikipedia.org/wiki/Rosela> December 1, 2011
5. Notoatmojdo, S. 2005. *Metodologi Penelitian Kesehatan*. Jakarta: Rineka Cipta.
6. Daniel, W. W. 2005. *Biostatistic A Foundation for Analysis in the Health Sciences*. Eight Edition. Georgia: Wiley.
7. Wikipedia. 2010. *Ascorbic Acid*. Serial online [http://en.wikipedia.org/wiki/Ascorbic\\_acid](http://en.wikipedia.org/wiki/Ascorbic_acid) January 3, 2012
8. Anonymous. 2011. *Pengembangan Metode Pengukuran Warna Menggunakan Kamera CCD (Charge Coupled Device) dan Image Processing*. Bogor: Institut Pertanian Bogor. Serial online [http://repository.ipb.ac.id/bitstream/handle/123456789/51961/F11rnu1\\_BAB%20II%20Tinjauan%20Pustaka.pdf?sequence=6](http://repository.ipb.ac.id/bitstream/handle/123456789/51961/F11rnu1_BAB%20II%20Tinjauan%20Pustaka.pdf?sequence=6) January 3, 2012
9. Wikipedia. 2007. *Lab Color Space*. Serial online [http://en.wikipedia.org/wiki/Lab\\_color\\_space](http://en.wikipedia.org/wiki/Lab_color_space) 3 January 2012
10. Jeff. 2011. *CIE / Lab (L\*a\*b) coding*. Serial online <http://en.kioskea.net/contents/video/cie-lab.php3> January 3, 2012