

Literature Review: Content Analysis And Synthesis Of Natural Dyes In Food And Beverages Circulating In The Community

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ABSTRACT

Food additives are ingredients added to food to improve color, shape, taste and texture, as well as to extend the shelf life, and are not the main ingredient. Colorants are often used to increase the attractiveness of food and drinks. There are generally two types of dyes, namely natural dyes and synthetic dyes. The method used in this literature review is derived from 16 journals from reliable sources. The results show of the 16 food and beverage samples used, there were 3 negative results of food and beverage ingredients that were prohibited from being used in food products and 13 of them were positive for containing prohibited food ingredients and exceeding the maximum dose permitted in accordance with existing regulations.

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1. INTRODUCTION

Food additives or commonly called food additives are ingredients added to food to improve color, shape, taste and texture, as well as extend shelf life, and are not the main ingredient. Based on PERMENKES RI No. 033 of 2012, BTM that are allowed to circulate include Antioxidants, Anti-caking Agents, Acidity Regulators, Artificial Sweeteners, Bleach and Flour Treatment Agents, Emulsifiers, Stabilizers, thickener (Emulsifier, Stabilizer, Thickener), Preservative, Firming Agent, Color, and Causes of Taste and Aroma, Flavor enhancer (Flavour, Flavor, Enhancer).

Coloring agents are one of the groups of Food Additives listed in PERMENKES RI No. 033 of 2012. Colorants are often used to increase the attractiveness of food and drinks. There are generally two types of dyes, namely natural dyes and synthetic dyes. Natural dyes come from natural ingredients such as vegetable, animal or mineral ingredients. Meanwhile, synthetic dyes come from the results of artificial chemical synthesis by combining various chemical elements, for example, quinoline yellow, sunset yellow, tartrazine, carmoisine, erythrosine, ponceau 4R, allura red, indigotine, brilliant blue FCF, fast green FCF and brown HT.

The use of dyes as Food Additives, especially synthetic dyes such as Rhodamine B and Methanyl Yellow, can have a negative impact on the health of the body, both in the long and short term. Based on PERMENKES RI No. 033 of 2012 concerning certain dyes which are declared as hazardous materials, the use of synthetic dyes Rhodamine B and Methanyl Yellow is prohibited from being added to food. As for synthetic dyes that are allowed to be used as Food Additives according to PERMENKES RI No. 033 of 2012 including Ponceau 4R and Tartrazine.

Misuse of dyes such as dyes for textiles and leather used as food coloring is still common in Indonesia. This is very dangerous for the health of the body because there are heavy metal residues in these dyes which are carcinogenic. If Rhodamine B is ingested it can cause irritation to the digestive

tract, impaired liver function, and liver cancer, whereas if ingested the Methanyl Yellow dye can cause nausea, vomiting, stomach pain, and bladder cancer.

The choice of synthetic dyes rather than natural dyes as Food Additives has several reasons that are beneficial for producers, such as the colors produced by synthetic dyes have brighter and more homogeneous results, while natural dyes have a faded color and inhomogeneous; synthetic dyes have a wide variety of color choices, while only a few natural dyes; synthetic coloring agents are relatively cheaper in price compared to natural dyes; Synthetic dyes are more stable than natural dyes.

2. METHOD

The method used in compiling this journal review is a literature review with sources taken from <https://scholar.google.com/> and <https://www.google.co.id/>. Journals, articles, and guidelines that are selected as references for a maximum of 10 years previously. In addition, other

criteria use the keywords Colorants, Food additives, Natural, Synthetic. After getting 20 journals that almost met these criteria, there were only 16 journals that really fit the topic and theme raised.

3. RESULTS AND DISCUSSION

Tabel 1. Results

Researcher	Dye Type	Sample	Method	Results
(Sasiang et al.,2021)	Methanyl Yellow	Yellow rice	Paper Chromatography (KK)	Negative
(Pratiwi et al.,2015)	Methanyl Yellow	Yellow Tofu	High PerformanceLiquid Chromatography (HPLC)	Positive
(Masthura.,2019)	Methanyl Yellow	CandiedMango	Qualitative Test with Methanyl Yellow Reagent Test Kit	Negative
(Indrawati, A., & Mutmainnah., 2020)	Methanyl Yellow	Traditional Herbal Medicine	Thin Layer Chromatography (TLC)	Negative
Tjiptaningdyah et al., 2017)	Rhodamine B	Sugar palm fruit	UV and UV-vis spectrophotometry	Positive
(Pratiwi et al.,2013)	Rhodamine B	Syrup	Paper Chromatography(KK)	Positive
(Widayanti et al., 2018)	Rhodamine B	Chili sauce	Qualitative test with Wool Yarn media	Positive
(Chikmah, AM, & Maulida, I.,2019)	Rhodamine B	Ice Coconut Jelly	Qualitative Test with the Rhodamin BRapid Test Kit	Positive
(Ahmad et al.,2016)	Ponceau 4R	Sugar Candy	UV-Visible Spectrophotometry	Positive
(Princess et al., 2012)	Ponceau 4R	Jelly	Paper Chromatography (KK) and Spectrophotometry	Positive
(Fithriani et al., 2015)	Ponceau 4R	Chili sauce	TLC-Densitometry	Positive
(Adriani, A., & Zarwinda, I., 2019)	Ponceau 4R	Chili sauce	Thin Layer Chromatography (TLC)	Positive
(Lamsamigi etal., 2021)	Tartrazine	Orange CarbonatedSoft Drinks	High PerformanceLiquid Chromatography (HPLC)	Positive

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(Bhernama, GB, 2016)	Tartrazine	Ice Candle	Paper Chromatography (KK) and UV-Vis Spectrophotometry	Positive
(Sari et al., 2021)	Tartrazine	Hard Candy Candy	UV-Vis Spectrophotometry	Positive

In the study with the type of Methanyl Yellow dye, tests were carried out using samples of yellow rice, yellow tofu, candied mango and traditional herbal medicine. The methods used were Paper Chromatography (KK) with yellow rice samples, High Performance Liquid Chromatography (HPLC) with yellow tofu samples, Qualitative Test with Methanyl Yellow Reagent Test Kit with candied mango samples and Thin Layer Chromatography (TLC) with traditional herbal medicine samples. From the results obtained, the samples of yellow rice, candied mango and traditional herbal medicine tested negative for the dye methanyl yellow. Meanwhile, the yellow tofu sample tested positive for containing methanyl yellow dye.

Research with the type of Rhodamine B dye was tested using samples of fro and fro, syrup, chili sauce, coconut jelly ice. The methods used were UV and UV-vis spectrophotometry with fro and fro samples, Paper Chromatography (KK) with syrup samples, Qualitative Test with wool yarn media with chili sauce samples and Qualitative Test with Rhodamin B Rapid Test Kit with coconut jelly ice samples. From the results obtained, namely samples of fro and fro, syrup, chili sauce and coconut jelly ice tested positive for containing rhodamine B dye. From these samples it can be stated that they are unsafe for consumption because they are proven to contain methanyl yellow dye which is prohibited for use in the addition of dyes for food and Drink.

Research with the type of Ponceau 4R dye was tested using cotton candy samples, jelly, chili sauce and chili sauce. The methods used were positive UV-visible spectrophotometry with cotton candy samples, Paper Chromatography (KK) and positive spectrophotometry with jelly samples, positive TLC-Densitometry with chili sauce samples and Thin Layer Chromatography (TLC) with chili sauce samples. From the results obtained, the cotton candy, jelly, chili sauce and chili sauce samples tested positive for containing Rhodamin B dye. The use of Ponceau 4R dye as a synthetic coloring agent is still permitted for types/ingredients of food and beverages with a maximum usage limit of 30 mg – 300 mg/kg.

Research with the type of Tartrazine dye was tested using samples of orange-flavored carbonated soft drinks, ice lolly, hard candy and yellow sirat snacks. The methods used were High Performance Liquid Chromatography (HPLC) with orange-flavored carbonated soft drink samples, Paper Chromatography (KK) and UV/Vis Spectrophotometry with ice lolly samples, UV-Vis Spectrophotometry with hard candy samples and Paper Chromatography (KK) and UV-Vis Spectrophotometry Positive with a yellow sirat snack sample. From the results obtained, namely the samples of orange-flavored carbonated soft drinks, ice lolly, candyhard candy and tested positive for Tartrazine dye. The use of tartrazine dye as a coloring agent is still permitted with a maximum dose limit of 70 ppm, but in the samples it was found that the tartrazine dye used exceeded the maximum dose limit allowed based on BPOM RI regulation no. 37 of 2013.

4. CONCLUSION

Based on the results of an analysis of the 16 food and beverage samples used, there were 3 negative results for food and beverage ingredients that were prohibited from being used in food products and 13 of them were positive for containing prohibited food ingredients and exceeding the maximum dose permitted in accordance with existing regulations.

REFERENCE

- [1] Sasiang, D. K., Umboh, J. M., & Sondakh, R. C. (2021). Analisis Kandungan Methanyl Yellow Pada Nasi Kuning Di Area Kampus Universitas Sam Ratulangi, Jalan Betesdha, AnJalan Piere Tendea Kota Manado Tahun 2020. *Kesmas*, 10(4).
- [2] BPOM, 2016. Bahaya Methanyl Yellow Pada Pangan. *Jurnal Info Pom*. Online. Vol 14, No 2. *Literature Review : Content Analysis And Synthesis Of Natural Dyes In Food And Beverages Circulating In The Community. Andien Ravelliani, et.al*

- Bbpom, 2017. Laporan Kerja Tahunan
- [3] Tjiptaningdyah, R., Sucahyo, M. B. S., & Faradiba, S. (2017). Analisis Zat Pewarna Rhodamin B Pada Jajanan Yang Dipasarkan Di Lingkungan Sekolah. *Agriekstensia: Jurnal Penelitian Terapan Bidang Pertanian*, 16(2), 303-309.
- [4] Ahmad, T. F., Rusdi, B., & Aprilia, H. (2016). Analisis Kualitatif Dan Kuantitatif Pewarna Ponceau 4r Ci 16255 (E 124) Pada Permen Gulali Dan Sirup Jajanan Dengan Metode Spektrofotometri Uv-Sinar Tampak.
- [5] Ahmad, T. F., Rusdi, B., & Aprilia, H. (2016). Analisis Kualitatif Dan Kuantitatif Pewarna Ponceau 4r Ci 16255 (E 124) Pada Permen Gulali Dan Sirup Jajanan Dengan Metode Spektrofotometri Uv-Sinar Tampak.
- [6] Indrawati, A., & Mutmainnah. (2020). Identifikasi Methanil Yellow Pada Jamu Tradisional Yang Dijual Di Pasar Karuwisi Kota Makassar. *Jurnal Media Laboran*, 10(1),48–52.
- [7] Adriani, A., & Zarwinda, I. (2019). Pendidikan Untuk Masyarakat Tentang Bahaya Pewarna Melalui Publikasi Hasil Analisis Kualitatif Pewarna Sintetis Dalam Saus. *JurnalSerambi Ilmu*, 20(2), 217.
- [8] Chikmah, A. M., & Maulida, I. (2019). Identifikasi Bahan Tambahan Pangan Yang Berbahaya (Rhodamin B Dan Borak) Pada Jajanan Di Lingkungan Jl. Kartini KecamatanTegal Timur Kota Tegal. *Parapemikir : Jurnal Ilmiah Farmasi*, 8(2), 1–4.
- [9] Andika, I. K. A., Ina, P. T., & Putra, I. N. K. (2016). Identifikasi Bahan Pewarna Pada Jajan Sirat Yang Dijual Di Pasar Umum Negara, Kecamatan Negara, KabupatenJembrana, Provinsi Bali. 3(1), 71–78.
- [10] Masthura. 2019. Identifikasi Rhodamin B Dan Methanyl Yellow Pada Manisan BuahYang Beredar Di Kota Banda Aceh Secara Kualitatif. *Jurnal Amina*, 1(1), 39-44.
- [11] Laksmi W, Ayu Saka., Ni Putu Widayanti., Maria Agustina Fitriayu Refi. 2018. *Identifikasi Rhodamin B Dalam Saus Sambal Yang Beredar Di Pasar Tradisional Dan Modern Kota Denpasar*. *Jurnal Media Sains*, 2(1), 8-13.
- [12] Armin, Fithriani., Bitu Revira., Adek Zamrud Adnan. 2015. *Pengembangan Dan Validasi Metode Kromatografi Lapis Tipis-Densitometri Untuk Analisis Pewarna Merah Sintetik Pada Beberapa Merek Saus Sambal Sachet*. *Jurnal Sains Farmasi & Klinis*, 2(1),60-65.
- [13] Sari, Eka N.I., Dkk. 2021. Analisis Kadar Tartrazin Dalam Hard Candy Di Kecamatan Tirto Kabupaten Pekalongan. *Jurnal Seminar Nasional Kesehatan*, 478-486.
- [14] Ni Putu Dian Pratiwi, *Et.Al.* 2013. Identifikasi Rhodamin B Pada Sirup Yang Digunakan Pedagang Di Desa Kesiman Kertalangu Kecamatan Denpasar Timur. *Jurnal Ilmu Gizi*, Vol.04 Nomor 2, Agustus 2013 : 77 – 81.
- [15] Isti Pratiwi, *Et.Al.* 2015. Analisis Kadar Kuning Metanil Dalam Tahu Kuning Dengan Metode Kromatografi Cair Kinerja Tinggi. *Prosiding Penelitian Sivitas Akademika (Kesehatan Dan Farmasi)*. Program Studi Farmasi, Fakultas Mipa, Unisba.
- [16] Kemenkes RI. Peraturan Permenkes Ri No. 239/Menkes/Per/V/1985.
- [17] Princess Et Al., 2012. Penentuan Jenis Dan Kadar Zat Pewarna Merah Pada Makanan Yang Beredar Di Sekolah Dasar Di Kelurahan Jimbaran, Kecamatan Kota Selatan, Kabupaten Badung-Bali. *Jurnal Biologi Xvi* (2):48-51
- [18] Bhernama, 2016. Analisis Zat Warna Tartrazin Pada Jajanan Minuman Ringan Tak Berlabel Yang Dijual Pedagang Kaki Lima Di Banda Aceh. *J. Ris.Kim* Vol. 9 No. 2.