New food colorants: a study of their stability and properties

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Food additives such as food colorants can have a natural or a synthetic origin. Consumers tend to have a preference for the natural ones, since these also imply antioxidant and medicinal properties [1]. Two of the main candidates are Anthocyanins and Chrozophora tinctoria. Anthocyanins are polyphenolic compounds that possess a wide range of colors such as red blue and purple and can be found in fruits and flowers [2]. This variety of colors is directly related with pH changes, since they undergo a rearrangement of their structure under these changes [3]. Chrozophora tinctoria is a reference found in medieval manuscripts, used to dye Dutch cheeses. It is also known for its potential antimicrobial and medicinal properties [4].

Objective

1. Widen the color spectrum of Cy3glic and stabilize the anthocyanin.
2. Study the potential antimicrobial properties of Chrozophora tinctoria against two bacteria strains.

Methods

○ **Cy3glic extraction:**

- Model solutions:
  - Acetate buffer 0.2M, pH 5.2
- Final concentration:
  - Cy3glic: 1x10^{-5}M
- Metal:Anthocyanin ratios:
  - FeSO_4: 1.0 ± 0.1
  - AlCl_3: 2.0±0.1

○ **Chrozophora tinctoria extraction:**

- A single strain of E.coli and S.aureus were cultivated in NA (nutrient agar) medium and incubated at 30°C for one day. Posteriorly, a pre-inoculum was made using liquid NA medium (24h).
- Cultures were diluted with medium till a 0.2 arbitrary units final absorbance.
- Positive control, Negative control and two different concentrations of Chrozophora Extract (10 mg/mL and 1 mg/mL) were tested.

Results

○ At pH 5.2 Cy3glic has no color. With complexation with Iron and Aluminium, the quinoidal base form was stabilized and different colors were obtained namely blue/violet.

○ Gum Arabic prevented precipitation and promoted color stabilization.

Discussion

Results revealed that C. tinctoria extract shows high antimicrobial effects on S. aureus, while also showing some effect on the growth of E. coli. As such, C. tinctoria extracts may prove to be valuable sources of color while imparting anti-spoilage properties [5].

Conclusions

Preliminary results showed that Cy3glic/Metal complexes can be stabilized with Gum Arabic. Also C. tinctoria extract evidenced high antimicrobial effects in one food disease related bacteria. More studies must be conducted in the future to enrich the knowledge about these extracts’ properties.

References


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