

Color

Color in water is due primarily to the presence of natural organic matter in addition to some of the color problems already discussed as being associated with the metallic complexes. In ground waters, color is frequently associated with tannin. It may also be caused by ground water contamination from liquid or solid waste disposal. Color is measured by determining light absorption. Insofar as health is concerned, the level of color does not directly measure the safety of water, although as mentioned above, color may be indicative of contaminated water. The recommended limit is based on the color which is objectionable to most people. The recommended limit for aesthetics is 15 color units.

While tannin in itself is not a health risk, it may be associated with the presence of surface waters because tannin is a plant constituent and enters the water supply through the process of vegetative degradation. Since organic decomposition is associated with water in the upper ground water formations, the probability of a relationship with bacteriological problems is increased. The consumer complains whenever the level of tannin in ground water reaches perceptible limits. While tannin concentrations may be reduced by treatment described in the attached table, treatment is not very effective and information on economical units for small individual water systems is not available. It also should be noted that the presence of tannin in a ground water aquifer complicates the treatment for removal of iron and manganese.

Our laboratories currently report tannin as present or not present and the adoption of color units as a “standard” will require a change in laboratory procedures. Disclosure for subdivisions and on the transfer of property for any commercial enterprise should require sample analysis for tannin or other color units and complete disclosure of the concentration and treatability. The results of treatment are not easily predictable. The methods are oxidation, that is, chlorination, coagulation (alum), and absorption (activated carbon). The extent of treatment should determine the requirements for disclosure, including effectiveness and cost analysis. Some treatment systems, while effective on large scale basis, are not economical on an individual basis

*The 1973 revision of the Drinking Water Standards, prepared by the EPA Advisory Committee, broadly classifies color solids as aromatic, polyhydroxy, methoxy, and carboxylic acid. Natural color is also often reported to contain fulvic and humic acid fractions. The report refers to extensive research in the area of color by the American Water Works Association Research Committee on Color Problems.

Color (tannins)

Quality (1)	Concentration (2)	Effect* (3)	Significance (4)	Treatment (5)	Disclosure
Good	< 5 color units	No health risk Below recommended limit minimal aesthetic problem	No health impact. Insignificant aesthetic or economic impact.	None necessary.	None
Marginal	5-15 units	No health risk- above recommended limit. May be aesthetically undesirable. Color noticeable in white and clear vessels.	No health impact Affects treatability of iron and manganese	May be treated with some reduction in color by oxidation, and/or adsorption. Difficult to remove completely on a private water system. Treatability must be demonstrated, including cost definition.	1, 2, 3, 4, 5
Poor	> 15 units	No health risk. Above recommended limit. Water has yellow to brown color which is aesthetically undesirable. Associated with reduced pH and corrosiveness.	No health impact Aesthetically undesirable Affects treatability of iron and manganese. Economic impact due to cost of treatment.	Coagulation and sedimentation required for complete removal. Some reduction in color may be achieved by oxidation and/or adsorption treatment. Treatment usually a problem on a private water system. Treatability must be demonstrated, including cost definition.	1, 2, 3, 4, 5
<p>*Effects are of aesthetic and economic concern rather than health risks. Health risk is only indirectly related since tannins may be associated with surface water influence on ground water quality. Proper well construction and isolation should preclude surface influence problem.</p>					

