Is ISO 3632-2 method precise enough for saffron qualification in pharma industry?

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Abstract

Saffron is one of the most valuable medicinal herbs which application is getting more important in dietary supplements with approved medical indications. Therefore, the quality control method and the content of its API (Active Pharmaceutical Ingredient), namely, crocins and safranal, needs to be analyzed in a harmonized way. In current method of ISIRI 259-2:1391 and ISO 3632-2:2011 determination is based on specific absorption, $E_{1cm}^{1\%}$, which is more a screening method than a reliable quantitative method to measure the secondary metabolites or active components in saffron. There are efforts for its artificial production or defraud as well. As saffron is considered one of the most strategic plants in Iran, and with regard to the growing market in pharma industry, Zardband has done intra-laboratory comparison on the assays obtained by methods of UV-Vis and HPLC-DAD. The reliable method for pharma industry concluded to be routine analysis using HPLC-DAD.

Keywords: Crocin, HPLC-DAD, Picrocrocin, Saffron, Safranal.

Introduction

The most popular spice which is able to provide the combination of color, taste, and aroma to the foods and beverages is saffron, the "Red Gold". The stigmas of saffron contain more than 100 components but three main secondary metabolites include: crocins (the characteristic color of saffron); safranal (the characteristic odor of saffron), picrocrocin (the characteristic bitter taste of saffron).

Saffron has received much attention by scientists in recent years regarding its therapeutic indications most of which are ascribed to crocins and safranal (Examamine.com and Srivastava et al., 2010):

Antioxidant, improvement of mild and moderate depression, improvement of PMS, treatment of amenorrhea, age related macular degeneration, anti-obesity effect (weight loss promoter), prevention and treatment of cancer/anti-tumor, nervous system booster, aphrodisiac effect, antinociceptive/anti-inflammatory, cardiovascular and antiarteriosclerotic effect, digestion stimulant, skin whitening and radiating agent, UV absorbing agent (anti-solar)

The quality of saffron is currently determined according to ISIRI 259:1391 (in Iran) and in international commercial agreements is determined according to the ISO 3632:2011, both of which classify saffron into three categories depending upon their physical and chemical characteristics. The three foremost parameters used to define the quality of saffron are color, taste, and aroma. These parameters are determined by UV−vis (ISO 3632-2:2011), that is, the $E_{1cm}^{1\%}$at 440 nm (coloring strength), the $E_{1cm}^{1\%}$ at 257 nm (the wavelength of picrocrocin maximum absorbance), and the $E_{1cm}^{1\%}$at 330 nm (the wavelength of safranal maximum absorbance). The problem is that: In pharmaceutical dosage it is very important to have

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