

Counterfeits in Food; Dietary Supplements and ingredients –A Global Issue- Quality and safety - A dire need today

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INTERPOL joint operation targeted fake and substandard food and beverages, resulted in the total seizure of more than 3620 tonnes and 9.7 million liters of either counterfeit or substandard food and beverages, run over the course of 4 months (December 2017 - March 2018) across 67 countries.

This paper is confined to the counterfeits in Food; Dietary Supplements and ingredients from plant sources in our daily life.

Plants have always been a common source of medicament either in the form of traditional preparations or pure active principles.

In a survey done by WHO it has been estimated that 80% of more than 7000 million (7 billion) inhabitants of the world rely mainly on traditional medicine for their primary health care needs and it can safely be presumed that a major part of the traditional therapy involves the use of plant extracts or their active principles.

In developed countries too plant derived drugs are considered important. In USA for e.g. 25% of all the prescriptions dispensed from community pharmacies, contain plant extracts or their active principles, prepared from higher plants.

WHO noted that more than 120 plant-derived medicines are used in Modern Medicine? Major pharmaceutical companies are now performing research on plant materials for their potential medicinal values.

According to Global Industry Analysts, the global medicinal plant sector has reached 120 billion US\$ by 2018, and is expected to reach 196.87 billion by 2025 and US\$ 5 trillion by 2050.

Of the conservatively estimated 300,000-400,000 species of higher plants (flowering) that exist on earth, perhaps 10-20% i.e. 35,000 to 70,000 have been employed in food and traditional medicines. The efficacy of these plants is due to the presence of one or more biologically active constituents.

Unfortunately, quite a number of these plants are frequently adulterated with cheap, less potent and spurious plant materials either posing danger to the public health or not as beneficial and nutritive as expected.

Food fraud is a collective term used to encompass the deliberate and intentional substitution, addition, tampering, or misrepresentation of food, food ingredients, or food packaging.

According to DIETARY SUPPLEMENT HEALTH & EDUCATION ACT (DSHEA), Dietary supplements contains one or more dietary ingredients (including vitamins; minerals; herbs or other botanicals; amino acids; and other substances) or their constituents which intended to supplement the diet.

Purpose of The Article

Economically motivated adulteration (EMA)

FDA warned consumers to immediately discontinue use of aristolochic acid Mis-identification of two Chinese plants (in a slimming preparation) is believed to be responsible for serious toxicity (Renal Intestinal Fibrosis) experienced by some 70 Belgium women, 30 of them needed dialysis or Kidney transplantation. This was confusion between *Stephania tetrandra* and *Aristolochia fangchi* and is thought to have arisen because of the similarities for the two plants.

As aware, aristolochic acid are well known for their nephrotoxicity in humans and several animal species, they are also potent

carcinogens in rodents. That is the reason that restrictive regulations put in place in Germany since 1981 for preparations that contain them (Lancet 1994, 2000).

Saffron: Saffron i.e. the dried style and stigma of *Crocus sativus*, contains three crystalline matters α , β and γ crocetin having 0.7 to 0.3% of

Besides having refrigerant, tonic, diuretic and stimulant properties, saffron has anti-inflammatory, antiseptic and aphrodisiac properties for which it is incorporated in many composite preparations. Since it is a costly ingredient, the adulteration is on its peak. To determine the authenticity between the adulterated and the pure, the structure of the stigma, which is slightly expanded in the form of narrow tubular structure and is visible even with hand lens, plays an important role.

Cinnamon adulteration

Olive and Olive Oil

Unfortunately, many of these Dietary Supplements have been found to contain non-prescription or even prescription drugs such as phosphodiesterase-5-inhibitors e.g. Sildenafil, tadalafil, verdenafil and their analogues.

The imperceptible use of these analogues is very dangerous because they have not been tested formally for safety & efficacy. In view of the potential harm to the public health, more effective and proactive measures are required to guard against the illicit use of pharmaceutical analogues.

Analgesics e.g. paracetamol, indomethacin, diclofenac are frequently found adulterated in herbal analgesics.

Slimming drugs e.g. sibutramine HCl, Diethyl propion, phenolphthalein, Orlistat, Xenical, Pencillamine, are commonly found admixed with herbal drugs, inspite of fact that some of the synthetic drugs are banned e.g., Phenolphthalein as it causes cancer, Sibutramine HCl.

Most of the cholesterol lowering dietary supplements contain Statistins, e.g. Pravastatin, Simvastatin Atorvastatin; Steroidal drugs e.g. Cortisone, cyproheptadine HCl are found in many of the herbal medicines.

Antidiabetic dietary supplements contains sulphonyl ureas e.g., glibenclamide, tolbutamide, metformin, rosiglitazone and many of them are found to contain two at a time. The abnormal presence of sulphonyl urea and it is over dose causes profound hypoglycemia.

In case of the herbal dietary Supplements, the adulterated chemicals are obviously not shown in the list of ingredients. Hence, the severity is many folded as physicians and pharmacists are not aware of those undeclared chemicals, for any advice, causing serious risk to the public health.

Reference

1. Mohammad Kamil. Counterfeits in Food; Dietary Supplements and ingredients –A Global Issue-Quality and safety - A dire need today. Nutrition, Food Science and Technology, 2019.