

Vegetable Juice: A Double Edged Sword

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Vegetables have always been part of human diet from the time immemorial. Various studies have shown that they contribute to nutrition and good health of man and other animals owing to their minerals and other phytochemical constituents [1,2]. In different cultures of the world various processing methods are used before consumption and this confers various advantages such as palatability, availability of nutrients and removal of anti nutrients and other toxicants [3]. Recently, there is a renewed interest in the use of vegetable juice due to its acclaimed benefits such as: weight loss and general improvement of health which may be due to its concentrating effect of nutrients and beneficial phytochemicals [4]. Though, in the past and even at present; the use of vegetable juice in phytomedicine; *Telefararia occidentalis* for anaemia; *Vernonia amygdalinia* for diabetes mellitus among the people of South western region of Nigeria, was not uncommon [5,6].

As good as this method appears, it has two sides, while concentrating nutrients and other beneficial phytochemicals side, the concentration effect on non nutrient otherwise toxic which includes secondary metabolites, pollutants and other intrinsic and extrinsic factors in plant material that further processing method usually reduce, may therefore accumulate to a toxic level [7]. Beyond this, juicing allows intake of more of the vegetable constituents (nutrient and non nutrients) which might be improbable for consumption in conventional way, and may trigger intake of higher concentration of (good and bad constituents) nutrients and toxicants [8].

In our laboratory various analyses were carried out to determine changes in contents of trace elements, toxic metals and secondary metabolites in fresh vegetables and juiced forms.

Trace Elements

In our study there is increase in Zinc, Molybdenum and Manganese which may be beneficial to the body because of immense importance of these elements in various metabolic functions [9].

On other hand there is increase in chromium content of the various vegetable juice [10] thus the accumulation of chromium in the juice may represent a potential hazard to humans especially infants and pregnant women. Also there is increase in copper content to a toxic level in most of the vegetable juices examined [9] and regular intake of such juice may induce reactive oxygen stress production, a risk factor in diseases of ageing particularly atherosclerosis and Alzheimer disease [11]. More so, consumption of high doses of chromium and copper competes with uptake and bioavailability of iron which may be a devastating complication in the subject susceptible to iron deficiency [12]. Though, in some conditions high level of copper and chromium may be required in some rare cases, such as in gastric bypass (Cu) and glucose intolerance (Cr), such subject may benefit from high intake which vegetable juice may provide [13,14].

Heavy Metals

The concentration effect of juicing on heavy metals such as lead and cadmium assayed for in our studies showed that juicing raises some of the toxic elements beyond upper tolerable limit thus posing dangers to juices of vegetables collected which might be due to polluted environment [15].

Phytochemical

Plants are known for consisting of secondary metabolites which may have positive or negative effect on the consumers [13,16-18].

The studies showed increase of some phytochemical such as saponins though, rarely causes toxicity in human [16]. However, its high content in plants may suggest heavy metal pollution such as lead and being a growth retardant, it may affect growing subjects adversely [17]. Fortunately, presence of saponin may confer benefit such as antioxidant, anticancer, hypolipidemic, hypoglycemic and an antidote of lead poisoning [16]. Also in most vegetables studied juicing increased flavonoids content which may engender a lot of health enhancement features such as antioxidant cardio protection, modulation of inflammation as well as platelet aggregation [18].

In our study, juicing of vegetables increases oxalates in most of the vegetables studied [19] which may trigger disorders such as renal stone, impairment of red blood cells and oxidative stress; a scaffold for many diseases such as cancers, atherosclerosis and diabetes mellitus [20].

In the same study, juicing increased tannin contents in multiple folds in many vegetables [21], the consumption of such juices on frequent basis may lead to problems of tannins toxicity such as anaemia, growth retardation, hypoglycemia as well as diarrhea [21]. Juicing also increased alkaloid to a considerable level [21] and because of diverse effects as medicine and poison, frequent intake of such juice must be exercised with caution. Cyanogenic glycosides, a toxic principle in plant has its level increased in the juice of vegetable when compared with the fresh vegetable [22] thus an indication of possible cyanide poisoning of vegetable with high content is consumed frequently.

From the ongoing it shows that juicing concentrates both beneficial and harmful content of vegetables which in totality may adversely affect the health of the consumer. From our research the balance of evidence is not in support of vegetable juice intake especially on frequent basis as in some cases the bad constituents may override the good ones whereas on other hand constituent of the harmful substances may be at minimal level and all these depend on genetic and environmental factors.

Conclusion

In light of the aforementioned we opined that more studies should be conducted on vegetable juice in area of type of vegetables to be used, environmental condition of such vegetable and the physiological status of the consumer should be put into consideration, so that consumption may not be a double edged sword.

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