PHYTOCHEMICAL ANALYSIS OF BROAD BEANS

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ABSTRACT

Faba bean being incredible and crop complete food, unfortunately some part of world including India, it is still underutilized crop and not fully exploited so far, though it is seen as an agronomically viable alternative crop to cereal. Though, legumes build soil fertility and thus considered as an integral part of any cropping system, but in central Himalayan region, these are also important as an essential component of socio-economic, cultural and traditional life of the local communities. Several varieties of legumes are grown in many parts of the Himalayan region for their uses during festivals, marriages or other auspicious occasions, several others are grown for their nutritional values, taste, colour or smell, yet other for their medicinal and soil fertility enhancement characteristics. The crop contributes to human nutrition as a result of its high protein content and other essential nutrients. Faba beans though are less consumed in countries as human food, it is considered as one of the main sources of cheap protein and energy.Phytochemical analysis was also done with respect to total carbohydrate , total soluble sugar , total soluble sugar and total starch .Total carbohydrate Similarly in case of total soluble sugar minimum (9.90% and 8.53) is recorded .

INTRODUCTION

Presently faba beans are a major crop in many countries including India, China, Ethiopia, and Egypt[1] . In India it is categorized as minor, unutilized underutilized, less utilized, and still not fully exploited crops[2] . Faba bean (*Vicia faba*) is among the oldest crops in the world but in India it is not much popular as in case of other countries [3]. Faba beans are small-seeded relatives of the garden broad bean. Faba bean, a nitrogen- fixing legume plant, is capable of fixing atmospheric nitrogen, which results in increased residual soil nitrogen for use by subsequent crops[4] . Faba bean is an annual legume and globally, third most important feed grain legume after soybean and pea [5.] The faba bean is very cold hardy, but cannot take excessive heat during flowering. As faba beans mature, the lower leaves darken and drop, pods turn black and dry progressively up the stem [67]. This annual legume grows best under cool, moist conditions. Hot, dry weather is injurious to the crop, so early planting is important. Faba bean tolerates frost. Rainfall of 650 to 1000 mm per annum evenly distributed is ideal for faba bean[8 9].. kept in various seed/field gene bank of respective countryis more than 30000 accessions [10].Characterization and preliminary evaluation is the one of the important technique which helps in to elucidate the extent and pattern of agro-morphological as well as molecular diversity in this crop [10].

Faba bean is widely cultivated and ranked it the fourth most important legume crop in the world next to dry beans, dry peas and chickpea

[11]. Seeds of faba bean greatly varied in size, shape, specific gravity, bulk density etc.[12 13].To make faba bean into a perfect candidate for a sustainable agriculture, the crop should be beneficial both to farmers/producers and to users (human and/or animal nutrition), there is need to development of high yielding nutritionally rich and free of anti-nutritional factors like *tannin* and *phytate* genotypes along with resistant to diseases and abiotic constrains such as over-wintering ability, frost resistance and drought avoidance, and free of anti-nutritional factors [14]. Lack of suitable varietal technology is one of the major bottlenecks to adopt this crop[15]. phytochemicals along with the antioxidant activity of faba bean parts at different maturity stage.

MATERIALS AND METHODS

Sample Preparation The faba bean seeds were first grounded into powdered flour and stored in a closed container at room temperature for research purposes. 50 g of the *faba* bean flour was then mixed with 200 ml of methanol. The mixture was incubated for 24h and then filtered. The solvent was evaporated under vacuum and resulting extracts were stored at 4^{o}C.

MOISTURE CONTENT

The samples were dried at 65°C in a hot-air ovenfor 72 h until constant dry weight (DW) was achieved. Moisture content was determined as 100 x [(FW-DW) / FW)] and expressed in per cent [16].

EXTRACTION OF SOLUBLE SUGARS

100 mg sample was extracted with 5.0 ml of 80% ethanol in ultrasonic bath at 700C for 60 min.
Contents were centrifuged at 5000 g for 20 min and supernatants were collected. Residue was reextracted in 5 ml of 80% ethanol thrice, supernatants were pooled and volume was made up to 25 ml. This supernatant was stored in -200C in the dark until analysis. Residue left from centrifugation after extraction used for starch estimation.

ESTIMATION OF TOTAL SOLUBLE SUGARS

Total soluble sugar in 80% ethanolic extract of the sample was estimated using anthrone reagent
and glucose as standard[17] . One hundred µl of extract was evaporated to dryness in test
tubes on water bath. Residue was dissolved in 1.0 ml of water and 4.0 ml of anthrone reagent was added. Absorbance was read at 660 nm and corrected against sample blank. Total soluble
sugars include sucrose, hexose, pentose and their phosphate derivatives as well as soluble oligosaccharides.

The amount of total soluble sugars was also determined as per the method described by [18].300 mg of seed sample was extracted with 80 % ethanol and the colour of final product was read at 600 nm against glucose standard (100 µg/ml). The same extract were used for estimation of reducing sugars as described in case of total soluble sugar and the method was followed as per the procedure described by [19].Blue colour produced in reaction mixture was measured at the absorbance level of 520 nm and amount of reducing sugars were calculated against standard of glucose. Non-reducing sugars were estimated by subtracting the total soluble sugar and reducing sugar. Starch was estimated in different samples by following the method described by [20] . The intensity of colour formed was read at 620 nm against glucose standard solution (100 µg/ml). The readings were multiplied by a factor 0.9 as 0.9 g of starch yields 1 g of glucose on hydrolysis.

RESULTS AND DISCUSSION

Phytochemical analysis was also done with respect to total carbohydrate, total soluble sugar , total soluble sugar and total starch .Total carbohydrate Similarly in case of total soluble sugar minimum

(9.90% and 8.53) is recorded . Likewise in case of total starch, It is hypothesized that carbon from starch is used either for lipid synthesis or for protein synthesis especially in pulses seed where proteins are by far the major storage compounds. Amino acids needed for reserve protein synthesis, especially those that are not provided by maternal seed parts are also synthesized by the hydrolysis of starch. Thus this type of information can become valuable in future studies to regulate the quantity of these constituents in maturing seeds by possibly altering certain genetic and agronomic factors. Although different soluble sugars were not determined separately in present study but major soluble sugars present in seeds are sucrose and raffinose family oligosaccharides.

CONCLUSION

India, is a country blessed with nature's immense treasures of fruits and vegetables, many of which still remain unexplored and are restricted for regional use only. Broad beans are one such example. It is an annual legume botanically known as *Vicia faba* (L.), also known as Bakala in Hindi. On the basis of the results presented here, the legume is a rich source of bioactive compounds and offers opportunities to develop value added products and other food applications to boost health. These results are useful to provide more value addition and usefulness from this legume. *faba* beans exhibit several medicinal properties, acting as antihypertensive, diuretic, anti-diabetic, etc. Apart from being used as food for humans and livestock, they play a critical role in some agricultural systems due to their ability to fix atmospheric nitrogen under a broad spectrum of environmental conditions like experiments.

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