SIFAT FISIK DAN KIMIA *FLAKES* PATI GARUT DENGAN PENAMBAHAN EKSTRAK DAUN KELOR SERTA POTENSINYA DALAM PENURUNAN GULA DARAH TIKUS WISTAR *DIABETES MELLITUS* DENGAN INDUKSI *STZ-NA*

INTISARI

Daun kelor (*Moringa oleifera*) saat ini sedang populer di masyarakat karena memiliki banyak manfaat bagi kesehatan. Beberapa hasil penelitian telah membuktikan bahwa daun kelor memiliki efek sebagai antidiabetik dan antihiperglikemik. Mengingat besarnya potensi daun kelor maka sangat menarik apabila diaplikasikan dalam produk pangan. Namun, bubuk daun kelor apabila diaplikasikan pada produk pangan menghasilkan warna produk yang cenderung hijau gelap, rasa astringent dan bau langu. Hal tersebut merupakan batasan serius apabila diaplikasikan dalam produk makanan.

Dalam penelitian ini dilakukan inovasi pembuatan *flakes* pati garut dengan penambahan ekstrak bubuk daun kelor. Penambahan ekstrak daun kelor diharapkan mampu meningkatkan kandungan senyawa bioaktif yang mempengaruhi proses fisologis sehingga meningkatkan kesehatan atau mencegah timbulnya penyakit. Penelitian ini bertujuan mengetahui pengaruh penambahan ekstrak daun kelor pada *flakes* pati garut terhadap sifat fisik, kimia, tingkat kesukaan panelis serta potensinya terhadap penurunan kadar gula darah tikus diabetes dengan induksi *Streptozotocin* - *Nicotinamide*.

Flakes dianalisa sifat fisik, kimia dan sensoris dengan uji hedonik dan deskriptif. Uji *Bioassay* dilakukan pada *flakes* terpilih, kemudian dievaluasi terhadap penurunan kadar gula darah, kadar insulin, HOMA IR, HOMA β serta nilai MDA. Dalam uji *Bioassay*, digunakan tikus Wistar jantan sebanyak 25 ekor umur 2 bulan dengan berat berkisar 170 – 200 gram/ekor. *Flakes* diberikan sebanyak 5 g/hari dengan cara disonde.

Hasil penelitian menunjukkan penambahan ekstrak daun kelor mampu meningkatkan kandungan protein, lemak, abu, fenolik, flavonoid dan aktivitas antioksian, namun tidak mempengaruhi sifat fisik (tekstur) *flakes*. *Flakes* pati garut masih bisa diterima oleh panelis dengan penambahan ekstrak daun kelor 0,8% hingga 4,0 %. Hasil uji *bioassay* menunjukkan pemberian *flakes* pati garut dengan penambahan ekstrak daun kelor sebanyak 2,4 % dan 4,0 % selama 28 hari masa intervensi mampu menurunkan kadar gula darah tikus diabetes. Pemberian *flakes* pati garut dengan penambahan ekstrak daun kelor 2,4% memiliki potensi penurunan kadar gula darah paling tinggi yaitu 63,67 %, kenaikan kadar insulin 30,52%, penurunan HOMA IR 53,77%, kenaikan HOMA β 718,51% atau 7 kali lipat dan penurunan kadar MDA 77,44% dibanding kelompok DM tanpa pemberian *flakes*.

Kata kunci : Ekstrak daun kelor, pati garut, *Diabetes Mellitus*, gula darah dan kadar insulin

PHYSIC AND CHEMICAL PROPERTIES OF ARROWROOT FLAKES ADDED WITH (Moringa oleifera) LEAVES EXTRACT AND THE EFECT ON BLOOD GLUCOSE LEVEL IN STZ – NA INDUCED DIABETIC RATS

ABSTRACT

Currently, (Moringa oleifera) leaf are popular because they have health benefits. Moringa leaf have an antidiabetic and antihyperglycemic effect. It is very interesting if moringa leaf are applied in food products because they have potential bioactive compound. The dark green color, astringency,after taste, and off-flavor are also the serious limitations for use of moringa leaf powder in food formulations. In this study, the innovation of flakes product was made from arrowroot starch with the added moringa leaf extract. The addition of moringa leaf extract is expected to increase the content of bioactive compounds that affect physiological to improve health or prevent disease. This study aims to determine the effect of arrowroot flakes with added moringa leaf extract on physic, chemical properties, the level of preference and the ability to reduce blood glucose levels in STZ-NA induced diabetes rats.

Physical, chemical properties, and sensory characteristics analyzed using hedonic and descriptive tests. The selected flakes were subjected to a Bioassay test on the effect of their consumption on diabetic rats on reducing blood sugar levels, insulin levels, HOMA IR, HOMA β, and MDA values. The Bioassay test used 25 male Wistar rats of the same age and bodyweight 170-200 grams. The animals were offered a flake (5 g/200g of body weight) dissolved in water and given orally by gavage.

The results showed that added moringa leaf extract was effective to increase the content of protein, fat, ash, phenolic, flavonoids, and antioxidant activity, but did not affect the physical properties (texture) of the flakes. Arrowroot starch flakes were still acceptable to the panelists with the added 0.8% to 4.0% moringa leaf extract. The bioassay test showed that the requirement of arrowroot flakes with added moringa leaf extract as much as 2.4% and 4.0% for 28 days intervention period was able to reduce blood glucose levels of diabetic rats. The requirement of arrowroot flakes with the added 2.4% moringa leaf extract has the highest potential to reduce blood sugar levels, i.e 63.67%, increase insulin levels 30.52%, decrease HOMA IR 53.77%, increase HOMA β 718.51% or 7 fold and decrease MDA levels 77.44% compared the DM group.

Keywords: *Moringa leaf extract, arrowroot starch, Diabetes Mellitus, blood glucose, and insulin levels*