

Develop Together for a Better Future



—2015 Beijing World Potato Congress

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Fresh mashed potato as the partial substitution to wheat flour in bread, chiffon cake and cookies

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The potato will soon be the latest staple diet in China after rice, wheat and corn. It's been predicted that about 50% of annual production of potatoes will be consumed as the staple food by 2020 to feed the most populous nation. The aim of this study was to develop bread, chiffon cake and cookies with fresh mashed potatoes. Preparation of mashed potatoes: washed, peeled and then simply cut potato into cubes. Placed the prepared potatoes in a large saucepan and filled with cold water, boiled for 10 to 20 min. Mash the potatoes with a potato ricer, and the moisture content of the mashed potatoes was 70%. Recipe for potato bread: 300 g mashed potatoes, 275 g high gluten flour, 55 g castor sugar, 5 g salt, 6 g active dry yeast, 100 g water, 50 g egg, 125 g milk, 30 g butter, 20 g milk powder. Recipe for potato chiffon cake: 150 g mashed potatoes, 113 g castor sugar (for yolk), 6 g baking powder, 100 g low gluten flour, 4 g salt, 70 g vegetable oil, 71 g yolk, 106 g water, 71 g castor sugar (for egg white), 142 g egg white. Recipe for potato cookies: 400 g mashed potatoes, 100 g castor sugar, 6 g baking powder, 240 g low gluten flour, 2 g salt, 125 g butter, 90 g vegetable oil, 50 g water. Preparation of potato bread: dissolve the active dry yeast in warm water. Mix the flour, castor sugar, milk powder, and salt. Make a well in the centre, add the oil, mashed potato and water, and mix well. Tip the dough onto a lightly floured work surface and knead it until the dough became satiny

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smooth, place it in a lightly oiled bowl to ferment, after 1 hour ferment or until doubled in size, knock back the dough, then gently shape it into a ball. Place it on a baking tray lined with parchment to ferment for a further hour until doubled in size. Preheat the oven to 220°C and bake for 25-30 min, bake until golden brown and the loaf sounds hollow when tap underneath. Cool on a wire rack. Preparation of potato chiffon cake: preheat the oven to 180°C, separate the egg whites from the yolks, and mix well with the dry ingredients (flour, sugar, baking powder, and salt) . Make a well in the center of this mixture, add the mashed potatoes, oil, egg yolks, and other liquid to the well and mix well. In a separate plastic basin, beat the egg whites and sugar on medium to medium-high speed until stiff peaks form. Pour the egg-yolk batter in a thin stream over the beaten egg white, gently fold the batter into the egg whites, until the ingredients were combined. Pour the batter into an ungreased 10-inch tube pan and bake for 10 min. The cake was done when the top of it springs back when lightly touched. Preparation of potato cookies: preheat the oven to 170 °C, cream the butter in a large bowl until soft and creamy. Add the sugar and beat until the mixture is pale and fluffy. Sift in the flour and add the other ingredients, bring the mixture together to form the firm dough. Roll the dough into walnut-sized balls and place them slightly apart on a baking tray. Flatten them slightly with the back of a damp fork and bake in the oven for 13-15 min, until they were light golden brown and slightly firm on top. Transfer the cookies carefully to a wire rack to cool. Bread, chiffon cake and cookies made with fresh mashed potatoes possess and retain amazing potato flavor compared with those made with the dehydrated mashed potato. Ordinary people can make these baked potato products in their kitchen at home, and the costs are lower. Turn the potato to bread should consider the processing properties of the dough, hydrogen bonding among amide and hydroxyl groups, hydrophobic interactions, and sulfhydryl-disulfide interchange reactions all contribute to the development of the unique viscoelastic properties of the dough. To make bread must use high gluten flour, and the potato has played an important role in regulating the content of gluten. The content of fresh mashed potatoes cannot be too high, or else the rheological characteristics, microstructure and mechanical properties of the dough will be adversely affected. When potato cake and cookie were made, However, the effects of the gluten content is not so obvious.

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验、蠕变及蠕变回复试验和温度扫描试验。其中的稳态剪切试验选取剪切速率范围 $0.01\sim 10\text{ s}^{-1}$ ，测定了面团黏度随剪切速率的变化曲线。结果表明，面团黏度随剪切速率的增加逐渐降低，表现出剪切变稀的特性，具有假塑性。面团的黏度随剪切速率的增加而减小，属于非牛顿流体，并随着剪切速率的进一步变大，下降趋势逐渐变缓，曲线趋近平行，接近于 $100\text{ 帕}\cdot\text{秒}$ ，表明当剪切速率达到一定程度的时候面团的表观黏度逐渐趋于一个稳定值。与对照组相比，添加马铃薯全粉使面团黏度变大，且随马铃薯全粉添加量的增加而增大。频率扫描试验选取振荡频率的变化范围为 $0.01\sim 10\text{ 赫兹}$ ，检测面团弹性模量（储能模量 G' ）、黏性模量（损耗模量 G'' ）以及力学损耗因子（ $\tan\delta$ ）随频率的变化。结果表明，随振荡频率的增加，面团的弹性模量、黏性模量及损耗因子逐渐增加，表明面团黏弹性增加并逐渐接近凝胶状态。马铃薯全粉添加量越高，面团黏弹性越大，但随添加量的增加，损耗角（弹性模量与黏性模量的比值）越小，表明随马铃薯全粉添加量的增加，面团的黏性越大，弹性越小。设定初始应力为 50 帕 ，蠕变时间为 5 分钟 ，然后撤掉应力，回复 5 分钟 ，测定了面团蠕变过程以及回复过程曲线。结果显示，随马铃薯全粉添加量的增加，面团最大应变值明显降低。且随添加量的增加，面团的蠕变回复率逐渐降低，表明添加马铃薯全粉降低了面团的弹性。添加了马铃薯全粉后，面团黏滞性增大，蠕变回复率减小。设定初始应变值 2% ，温度以 $5^\circ\text{C}/\text{min}$ 上升，扫描范围 $30\sim 110^\circ\text{C}$ ，频率固定 1 赫兹 。记录了面团的弹性模量、黏性模量及损耗因子随温度的变化曲线。随温度的升高，面团黏弹性模量先上升，后下降。上升过程中，面团开始糊化，淀粉颗粒不断溶胀，当直链淀粉脱离淀粉颗粒时，慢慢形成了淀粉糊，且随温度的持续升高，淀粉颗粒仍在继续吸水膨胀。当其体积膨胀到一定程度后，颗粒便出现破裂现象，颗粒内的淀粉分子向各方向伸展扩散，溶出颗粒体外，导致面团黏弹性模量显著下降。同时，由于马铃薯全粉的添加，延迟了面团的糊化过程，并随全粉添加量的增加，面团糊化温度逐渐提高。

新鲜马铃薯泥部分替代面粉制作 面包、戚风蛋糕和曲奇饼干

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马铃薯将成为中国继水稻、小麦和玉米之后的第四大主粮作物。中国作为

* 为通讯作者。

副物: 面包: 副物/高筋面粉 1:5~1:10 1%~15%

蛋糕: 副物/低筋面粉 1:1-1:10 1%~50% 专题论文(摘要)

全球人口最多的国家,为了确保粮食安全,到2020年将会有一半以上的马铃薯作为主食进行消费。本研究的目的是采用新鲜马铃薯泥为原料,开发面包、戚风蛋糕和曲奇饼干。马铃薯泥制作:将马铃薯清洗、去皮、切块。将准备好的马铃薯放入锅中添加冷水,煮10~20分钟。用捣碎机将马铃薯捣成泥,马铃薯泥的水分含量为70%。马铃薯面包原料:300克马铃薯泥,275克高筋面粉,55克细白砂糖,5克食盐,6克活性干酵母,100克水,50克鸡蛋,125克牛奶,30克黄油,20克奶粉。戚风蛋糕原料:150克马铃薯泥,113克细白砂糖(蛋黄用),6克泡打粉,100克低筋面粉,4克食盐,70克植物油,71克蛋黄,106克水,71克细白砂糖(蛋白用),142克蛋白。曲奇饼干原料:400克马铃薯泥,100克细白砂糖,6克泡打粉,240克低筋面粉,2克食盐,125克黄油,90克植物油,50克水。制备马铃薯面包:将活性干酵母溶解于温水,混合面粉、细砂糖、奶粉和食盐,在混合粉中间捣一个坑,加入油脂、马铃薯泥和水,混合均匀。将混合物放在撒有少量面粉的工作台上进行揉面直到表面光滑,将面团置于涂有少量油脂的碗里进行发酵1小时,至面团体积增加到约为原来的两倍。将面团翻转,然后整形成球状。烤盘上放一张羊皮纸,将整型好的面团放在羊皮纸上排列好,继续发酵1小时,直到面团体积增加到约为原来的两倍。将烤箱预热到220℃,焙烤25~30分钟,将面包烤成轻微的金黄色,当敲打烤盘底部时感觉面包里面是空的。在线架上将面包进行冷却。制备马铃薯戚风蛋糕:预热烤箱到180℃,将蛋黄和蛋白分离,将干的原料混合(面粉、糖、泡打粉和食盐),在混合物中间捣一个坑,加入马铃薯泥,油脂、蛋黄和其他液体原料,混合均匀。在另外一个塑料盆中,逐步添加细砂糖,将蛋白进行打发,直到达到硬性发泡(提起打蛋器能拉出直立尖角)。将蛋黄糊慢慢倒入打发好的蛋白中,缓慢将蛋黄糊搅拌到蛋白液中,直到混合均匀。将蛋糕液倒入一个25.4厘米干净的圆形平底锅中,焙烤10分钟,当按压蛋糕表面能回弹说明蛋糕已经焙烤好。制备马铃薯曲奇饼干:将烤箱预热到170℃,将黄油在一个大碗里搅打成糊状,加入糖搅拌,直到呈现苍白色,将面粉和其他原料过筛,混合均匀。用裱花袋将混合好的原料在烤盘上挤成胡桃木型的球状,用沾有水的叉子的底部进行整形,放入烤箱焙烤13~15分钟,直到呈现轻微的金黄色,顶部变得结实。将曲奇饼干置于线架上冷却。用新鲜马铃薯泥制作的面包、戚风蛋糕和曲奇饼干比用脱水马铃薯泥为原料制作的产品具有更加浓郁的马铃薯风味,普通老百姓在自己家里的厨房就能制作,成本也比较低。将马铃薯开发成面包需要考虑面团的加工性能,—SH/S—S交换反应、疏水相互作用以及在酰胺和羟基间的氢键都有助于面团独特黏弹性的形成。制备面包一定要使用高筋面粉,马铃薯的添加起到了调节面筋含量的作用。新鲜马铃薯泥的添加量不能过高,否则面团的流变学性质、微观结构和力

曲奇饼干: 副物/低筋面粉 1:1-1:10 1%~50%

学性质将会受到不利影响。制备马铃薯蛋糕和饼干，则尽量不要生成面筋。

内蒙古化德县贮期通风库内 马铃薯腐烂的病原鉴定

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2013年10月至2014年4月在内蒙古乌兰察布市化德县对贮期通风库内腐烂的马铃薯进行了取样,以组织分离法对病原菌进行分离、纯化培养,通过形态观察与分子鉴定手段确定了造成化德县贮期马铃薯腐烂的病害主要有以下几种:干腐病(*Fusarium* spp.)、晚疫病(*Phytophthora infestans*)、早疫病(*Alternaria solani*)、环腐病(*Clavibacter michiganense* subsp. *sepedonicus*)、软腐病(*Erwinia* spp.)。其中干腐病为主要病害,轻微发病可造成薯块表皮褐斑,影响经济及种用价值,严重发病造成薯块凹陷腐烂,失去应有价值。经鉴定引起马铃薯干腐病的病原菌有4种,分别是:接骨木镰刀菌(*Fusarium sambucinum*)、燕麦镰刀菌(*F. avenaceum*)、锐顶镰刀菌(*F. acuminatum*)和木贼镰刀菌(*F. equiseti*)。贮藏后期病薯多存在病菌复合侵染现象,如致病疫霉引起的晚疫病及部分茄链格孢引起的早疫病发生的复合侵染,细菌类密执安棒形菌环腐亚种引起的环腐病及胡萝卜欧文氏菌胡萝卜致病亚种引起的软腐病发生的复合侵染等。腐烂薯块由于呼吸增强,温度升高加速了腐烂过程,导致更易被病原菌侵入,因此复合侵染多出现在腐烂较严重的薯块上,并可对薯块造成致命性破坏。复合发病的薯块多失去商用及种用价值,且病残体极易成为来年贮期病害的初侵染源。

内蒙古马铃薯产业的特点、问题及对策

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马铃薯是保障中国粮食安全的重要作物之一,是脱贫增收的重要产业。内蒙

